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A Transdiagnostic Approach to Impulsivity in Adolescence: Integrating Urgency and Cognitive Control from UPPS-P & Barratt Psychometric Models

Esteve Montasell Jordana

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Doctorate in Clinical and Health Psychology

Departament de Psicologia Clínica i de la Salut



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Supervised by

Dr. Joan Deus Yela

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Doctorate in Clinical and Health Psychology

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That, in their capacity as supervisors, they have overseen the present doctoral thesis entitled **"A Transdiagnostic Approach to Impulsivity in Adolescence: Integrating Urgency and Cognitive Control from UPPS-P & Barratt Psychometric Models"**, carried out and submitted by **Esteve Montasell Jordana**, within the Doctoral Programme in Clinical and Health Psychology at the Faculty of Psychology of the **Universitat Autònoma de Barcelona** (**UAB**). Furthermore, they hereby state and certify that this thesis meets all the necessary academic and scientific requirements to be defended in order to obtain the degree of ***doctor (international mention)***.

Signed,

Dr. Joan Deus Yela **Dr. Laura Blanco-Hinojo**

Universitat Autònoma de Barcelona

Bellaterra, a 30 de maig de 2026

Festina Lente

Octavi August

More errors arise from inhibited indecision than from impulsive behavior.

Morris L. Ernst

Patient perseverance in well doing is infinitely harder than a sudden and impulsive self-sacrifice.

Horace Mann

Todos vosotros que amáis el trabajo salvaje y lo rápido, nuevo, extraño; os soportáis mal a vosotros mismos, vuestra diligencia es huida y voluntad de olvidarse a sí mismo. Si creyeseis más en la vida, os lanzaríais menos al instante. ¡Pero no tenéis en vosotros bastante contenido para la espera, y ni siquiera para la pereza!

Asi hablo Zaratrustra, *F. Nietzsche*

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Aquest treball sorgeix de la necessitat d' haver vist i visitant persones, que sense entendre res molts cops venien amb informes, etiquetes i més informes on sortia la paraula "impulsiu o impulsiva" amb un consegüent diagnòstic i una intervenció o decisió clínica darrere. Aquest treball sorgeix d'això, d'aquesta necessitat d'obligar-nos com a clínics a fer les coses millor del que les fem i passar per la recerca curosa a explicar més històries diàries encara que només sigui per un senyal abraçant altres disciplines i volent saber d'altres vies de coneixement. Revisar-se i acceptar la responsabilitat de treballar des de la inèrcia i saber que t'equivoques i després, proposar alguna cosa diferent des de la humilitat. Espero que això pugui aportar a altres a fer el mateix.

«Algunes persones miren el món i diuen: Per què? Altres miren el món i diuen: Per què no?»

George Bernard Shaw

One light, one mind, flashing in the dark
Blinded by the silence of a thousand broken hearts
"For crying out loud" she screamed unto me
A free for all, f^{cxx} 'em all, you are at your own sight!

27-06-2005 - 01-10-2025 Badalona

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List of abbreviations

ADHD Attention Deficit Hyperactivity Disorder
ARS - Acquiescent Response Style
ASD Autism Spectrum Disorder
AN Anorexia Nervosa
APA American Psychiatric Association
BART Ballon Analogue Risk Task
BPD Borderline Personality Disorder
BIS Barratt Impulsivity Scale
BN Bulimia Nervosa
CFA Confirmatory Factor Analysis
CPT Continuous Performance Test
CFI Comparative Fit Index
CI Confidence Interval
dlPFC Dorsolateral Prefrontal Cortex
DSM Diagnostic and Statistical Manual of Mental disorders
ED Eating Disorder
EFs Executive Function
EFA Exploratory Factor Analysis
ERS Extreme Response Style
ESEM Exploratory Structural Equation Modelling
FASD -Fetal Alcohol Spectrum Disorder
NNSI Non-Suicidal Self-Injury
OCD Obsessive-Compulsive Disorder
OFC Orbital frontal Cortex
PCF Prefrontal Cortex
PTSD Post Traumatic Stress Disorder
RMSEA Root Mean Square Error of Approximation
SDR Socially Desirable Responding
SEM Structural Equation Modeling
SRMR Standardized Root Mean Square Residual
SUD Substance Use Disorder
TCI-R Temperament and Character Inventory Revised
TLI Tucker Lewis Index
TPQ Tridimensional Personality Questionnaire
UPPS-P (Negative) Urgency, (lack of) Premeditation, (lack of) Perseverance, and Sensation Seeking (UPPS) Impulsive Behavior Scale – Positive Urgency
VmPCF Ventromedial Prefrontal Cortex

General

Preface

A central argument of this work is the necessity for a translational perspective between clinical practitioners and researchers. Traditional metaphors, which depict clinicians as "*trench workers*" and researchers as distant officers, are overly reductionist and risk obscuring the role of applied research in doctoral investigations. Instead, this thesis proposes an alternative metaphor: the doctoral research process resembles work in a *mine*. Just as miners and engineers collaboratively explore subterranean spaces, psychologists and researchers must employ diverse tools, whether intensive assessments, experimental tasks, or psychometric instruments to uncover valuable insights about human behavior. The findings extracted in these "galleries" are then refined and further developed, providing both practical benefits for clinical practice and theoretical contributions for academic research. This perspective underscores that both clinical and academic work are interdependent. Practitioners benefit from innovations and refined methodologies developed through research, while researchers gain insight and direction from clinical observations and applied challenges. By framing doctoral work as a cooperative and exploratory endeavor, this thesis advocates for a balanced integration of theory, method, and practice in Clinical Psychology, reflecting a translational perspective in which scientific inquiry and clinical application mutually refine one another. Without this reciprocal exchange, academic psychology risks losing both practical relevance and societal impact in an increasingly applied and outcome-oriented context. This thesis is only the first step.

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ABSTRACT

Introduction: Impulsivity is a multidimensional construct with central relevance for adolescent development and psychopathology, yet its assessment remains heterogeneous and fragmented across theoretical traditions. Limited integration exists between personality-based models, such as the UPPS-P framework, and neurocognitive approaches derived from the Barratt model. This doctoral thesis aimed to evaluate the psychometric adequacy and practical utility of the main self-report measures of impulsivity in Spanish adolescents, focusing on structural validity, convergent validity, and normative interpretation. It also sought to clarify the conceptual complementarity between these models for developmentally appropriate assessment.

Method: Three empirical studies were conducted in Spanish adolescents aged 11–19 years. Study 1 examined the UPPS-P in a community sample (N = 9,024), using CFA and ESEM, reliability (ω), measurement invariance across age and sex, convergent validity with the BIS-11-A, and normative data. Study 2 evaluated the S-UPPS-P in a combined community and clinical sample (N = 8,944), applying CFA/ESEM, reliability, measurement invariance, convergent validity with the BIS-11-A, and normative interpretation. Study 3 assessed the BIS-15-A in a community sample (N = 8,520), using CFA and EFA, reliability, and convergent validity with the UPPS-P framework, but without invariance testing. Advanced psychometric techniques were applied across studies.

Results: The UPPS-P demonstrated a robust five-factor structure with superior fit under ESEM, strong reliability, and full measurement invariance across demographic groups. The S-UPPS-P preserved the multidimensional structure with adequate psychometric performance and full invariance, supporting its use in both community and clinical settings. The BIS-15-A did not replicate its original 3-factor model; instead, a 2-factor solution (executive control and motor action) showed improved fit but weaker structural robustness. Convergent validity indicated consistent associations between UPPS-based measures and Barratt scales, particularly for urgency and control-related dimensions, with weaker overlap for sensation seeking. Normative data enhanced interpretability, and no substantial demographic or clinical differences were observed.

Conclusions: Findings support a multidimensional model of impulsivity. UPPS-based instruments showed stronger structural validity and measurement invariance, whereas the BIS-15-A captured complementary executive control processes. These models reflect distinct but related levels of analysis, integrating personality traits and cognitive regulation. Impulsivity is best understood as emerging from the interaction between dispositional and executive systems, supporting multimethod and theoretically grounded assessment frameworks.

Resumen

Introducción: La impulsividad es un constructo multidimensional de relevancia central en el desarrollo adolescente y la psicopatología, pero su evaluación sigue fragmentada entre modelos de personalidad y enfoques neuropsicológicos. Existe una integración limitada entre el modelo UPPS-P y el modelo de Barratt. Esta tesis doctoral tuvo como objetivo evaluar la adecuación psicométrica y utilidad clínica de los principales instrumentos de autoinforme de impulsividad en adolescentes españoles, con énfasis en la validez estructural, convergente y la interpretación normativa, así como en la complementariedad de ambos enfoques.

Método: Se realizaron tres estudios en adolescentes de 11–19 años. El Estudio 1 examinó el UPPS-P en muestra comunitaria (N = 9,024) mediante CFA/ESEM, fiabilidad (ω), invarianza por edad y sexo, validez convergente con el BIS-11-A y datos normativos. El Estudio 2 evaluó el S-UPPS-P en muestra comunitaria y clínica (N = 8,944) mediante CFA/ESEM, fiabilidad, invarianza, validez convergente con el BIS-11-A y normas. El Estudio 3 analizó el BIS-15-A en muestra comunitaria (N = 8,520) mediante CFA/EFA, fiabilidad y validez convergente con el UPPS-P, sin análisis de invarianza.

Resultados: El UPPS-P mostró una estructura de cinco factores robusta, mejor ajustada con ESEM, alta fiabilidad y plena invarianza. El S-UPPS-P preservó la estructura multidimensional con adecuadas propiedades psicométricas y plena invarianza en contextos comunitarios y clínicos. El BIS-15-A no replicó su modelo original de tres factores, emergiendo una solución de dos factores (control ejecutivo y acción motora) con mejor ajuste, pero menor estabilidad estructural. La validez convergente mostró relaciones consistentes entre modelos, especialmente en urgencia y control, con menor solapamiento en búsqueda de sensaciones. No se observaron diferencias relevantes entre grupos.

Conclusiones: Los resultados apoyan un modelo multidimensional de la impulsividad. Los instrumentos UPPS-P muestran mayor validez estructural e invariancia, mientras que el BIS-15-A refleja procesos ejecutivos complementarios. Ambos modelos representan niveles de análisis distintos pero relacionados, integrando rasgos de personalidad y control cognitivo. La impulsividad se entiende mejor como resultado de la interacción entre sistemas disposicionales y ejecutivos.

Resum

Introducció: La impulsivitat és un constructe multidimensional amb una rellevància central en el desenvolupament adolescent i la psicopatologia, però la seva avaluació continua fragmentada entre models de personalitat i enfocaments neuropsicològics. Existeix una integració limitada entre el model UPPS-P i el model de Barratt. Aquesta tesi doctoral va tenir com a objectiu avaluar l'adequació psicomètrica i la utilitat clínica dels principals instruments d'autoinforme d'impulsivitat en adolescents espanyols, amb èmfasi en la validesa estructural, convergent i la interpretació normativa, així com en la complementarietat d'ambdós enfocaments.

Mètode: Es van dur a terme tres estudis en adolescents de 11–19 anys. L'Estudi 1 va analitzar l'UPPS-P en mostra comunitària (N = 9,024) mitjançant CFA/ESEM, fiabilitat (ω), invariància per edat i sexe, validesa convergent amb el BIS-11-A i dades normatives. L'Estudi 2 va avaluar el S-UPPS-P en mostra comunitària i clínica (N = 8,944) mitjançant CFA/ESEM, fiabilitat, invariància, validesa convergent amb el BIS-11-A i normes. L'Estudi 3 va analitzar el BIS-15-A en mostra comunitària (N = 8,520) mitjançant CFA/EFA, fiabilitat i validesa convergent amb l'UPPS-P, sense anàlisi d'invariància.

Resultats: L'UPPS-P va mostrar una estructura de cinc factors robusta, amb millor ajust mitjançant ESEM, alta fiabilitat i plena invariància. L'S-UPPS-P va preservar l'estructura multidimensional amb bones propietats psicomètriques i invariància completa en contextos comunitaris i clínics. El BIS-15-A no va replicar el model original de tres factors, emergint una solució de dos factors (control executiu i acció motora) amb millor ajust però menor estabilitat. La validesa convergent va mostrar associacions consistents entre models, especialment en urgència i control, amb menor solapament en cerca de sensacions. No es van observar diferències rellevants entre grups.

Conclusions: Els resultats donen suport a un model multidimensional de la impulsivitat. Els instruments basats en l'UPPS-P mostren més validesa estructural i invariància, mentre que el BIS-15-A reflecteix processos executius complementaris. Ambdós models representen nivells d'anàlisi diferents però relacionats, integrant trets de personalitat i control cognitiu. La impulsivitat s'entén millor com el resultat de la interacció entre sistemes disposicionals i executius.

INTRODUCTION

Impulsivity: A Complex, Multilevel Construct

In arguments, it steps forward before reflection can clear its throat. It mistakes *urgency* for clarity and *speed* for certainty. And yet, it feels so convincingly like instinct, like courage, like truth unfiltered. In psychological research, this same phenomenon is conceptualized as impulsivity, broadly understood as a multidimensional construct involving deficits in inhibitory control, decision-making, and emotional regulation. From this perspective, what appears in everyday life as spontaneous conviction or rapid response can be interpreted as the behavioral expression of underlying variability in cognitive and affective control processes

From a dimensional perspective, impulsivity can be conceptualized as a continuum ranging from adaptive to maladaptive functioning. At one end, impulsive responses may serve an adaptive function, facilitating rapid reactions to potential threats and enabling the activation of defensive or preventive mechanisms. At the other end of the spectrum, however, excessive or poorly regulated impulsivity may become maladaptive, contributing to dysfunctional behavior within increasingly complex environmental and interpersonal contexts. Thus, impulsive behavior is not exclusive to the psychopathological sphere (Arce & Santisteban, 2006). In fact, impulses are linked to will, they give us vitality and keep us away from apathy and boredom. Impulsivity can promote creativity. However, the constant promotion of the search for novelty (in a society that feeds on systematic, tireless and perpetually insufficient consumption), coupled with a certain intolerance of frustration or subsequent cognitive rigidity, can lead us to dysfunctional impulsive behaviors; with an unreflective way of functioning (automated and fed back by increasingly simple and undemanding cognitive routines) that avoids at all costs negative urgency (avoidance of facing unpleasant situations) and self-stimulates positive and pleasurable urgency (Han, 2017). This dual nature highlights the need to differentiate functional impulsivity from its dysfunctional expressions in complex real-world contexts.

Within this framework, attentional control emerges as a key mechanism underlying the regulation of impulsive behavior. In this context, the ability to be attentive attempts to cope with automaticity. Thus, attention and impulsivity have historically represented extremes of the behavioral control. In psychopathology, we find behaviors classified as "impulsive" in a wide range of diagnoses of mental disorders, including addictions (in their wide range), personality disorders, psychosis, obesity, suicidal behaviors, autism spectrum, attention deficit and/or hyperactivity disorder (ADHD), or post-traumatic stress disorder (PTSD), to name a few.

In the broadest sense, impulsivity refers to a lack of behavioral inhibition, which can result in unplanned, premature, and frequently risky actions (de Wit, 2009). Impulsivity is typically defined as a lack of control or disinhibition in both cognitive processes and actions,

manifested by a tendency to act prematurely and without foresight. This can manifest in various contexts, including engaging in risky behaviors such as reckless driving, risky sexual encounters, or substance abuse, as well as exhibiting a preference for novelty and a limited capacity for reflection. It is important to note, however, that impulsivity does not always result in negative outcomes. In certain situations, quick decision-making can be advantageous, particularly when time is limited (Dickman, 1990). The diversity in the expression of impulsivity presents a significant challenge for accurately describing and analyzing the phenomenon as it evolves throughout an individual's life. A precise and operational definition of the term "impulsivity" varies greatly depending on the different sources and studies reviewed: impulsivity is neither a single nor a simple construct (Sharma et al., 2014), encompassing several dimensions in a multifaceted and heterogeneous phenomenon (Dalley & Robbins, 2017). This definition emphasizes the core role of impaired inhibitory control and reduced foresight in impulsive behavior.

Impulsivity has a long tradition in psychology as isolated behaviors and personality traits; as a symptom within diagnostic categories, and specifically in neuropsychology as a behavior resulting from various altered cognitive processes (Rochat et al., 2018). With this variety; we can try to frame impulsivity using dimensional or categorical approaches. Dimensional approaches (as a trait, present to a greater or lesser extent along a continuum); categorical approaches (as specific concrete behaviors, present or absent, and represented in the classificatory criteria of mental disorders), and finally we can consider it as a trait (characterological) or state (symptomatic). This can be summarized as three functions (Joyner et al., 2021):

- As an isolated symptom, serving as a diagnostic criterion for various mental disorders, such as trichotillomania or pathological gambling, where specific impulsive behaviors play a key role in defining these conditions.
- Impulsivity can define specific clinical disorders, such as in intermittent explosive disorder, where impulsive aggressive acts are central to the clinical presentation as a distinct nosological entity.
- As a dimension or personality trait, ranging from the *normally* adaptive to the pathological, a trait that is stable over time and appears in different life circumstances (as in borderline personality disorder [BPD]).

The overall goal of the research in the field of impulsivity is to refine it into a more conceptually precise construct. The goal is to understand impulsivity as a phenomenon that exists either as a *state* or as a *trait* across different nosological entities, while also subdividing it into distinct dimensions based on findings from neuropsychology and neuroscience studies. Achieving this requires a more precise and selective measurement approach that integrates neuroscientific findings and recognizes the phenomenological context in which impulsive behavior occurs. Over time, various schools of thought in psychology have attempted to identify and explain impulsivity from their respective historical and theoretical perspectives, reflecting the complexity of this phenomenon (Cloninger 1994; Freud, 1915;

Kelly, 1991; Kraepelin, 1927; Wampold & Imel, 2015). Taken together, these perspectives converge on the notion that impulsivity reflects a heterogeneous construct involving premature action, reduced planning, and context-insensitive behavior.

This introduction aims to provide an overview of the neurobiological and contextual bases of adolescence, impulsivity, and the historical and conceptual evolution of the latter. Additionally, it seeks to contextualize the psychometric properties of two widely used instruments (UPPS-P and BIS) as examined in the empirical studies that composes this doctoral thesis, conducted in a large representative community sample of Spanish adolescents. Furthermore, the present work highlights the relevance of incorporating neuropsychological assessment (Rochat et al., 2018) to characterize profiles of impulsivity-related impairment across psychopathological domains during adolescence. Accordingly, the present work aims to refine its conceptualization and measurement through an integrative neuropsychological, neurobiological and psychometric approach.

Confusion and poor specificity: The jingle jangle fallacy

In the complex landscape of personality and psychopathology research, impulsivity exemplifies the persistent jingle-jangle fallacy that has plagued the field for decades. The *jingle* fallacy refers to the assumption that two different constructs are the same because they have the same label. The *jangle* fallacy refers to the assumption that two identical constructs are different because they have different labels (Block, 1995). This issue is particularly critical in the study of impulsivity, where overlapping definitions have led to inconsistent operationalizations across clinical and research settings.

This persistent fallacy has sustained longstanding conceptual ambiguity and terminological inconsistency in the study of impulsivity. Researchers continue to debate whether impulsivity constitutes a coherent psychological trait. Notably, Strickland and Johnson (2021) provided theoretical, empirical, and sociocultural evidence that the concept of "impulsivity" fails the basic requirements of a valid psychological construct, as did other authors (Enticott & Ogloff, 2006; Sharma et al., 2014; Zavlis & Fried, 2024). This lack of conceptual clarity limits both the comparability of findings across studies and the development of precise assessment and intervention strategies.

This debate underscores the persistent confusion and poor specificity surrounding impulsivity. Accordingly, the present review draws on major theoretical traditions including personality and temperament models, but also neurobiological and behavioral perspectives- to illustrate the progression from early unidimensional views to contemporary multidimensional frameworks. Within this context, the present thesis aims to address this conceptual fragmentation by integrating psychometric and neuropsychological approaches to impulsivity in adolescence.

History and background of Impulsivity

History isn't something you look back at and say it was inevitable, it happens because people make decisions that are sometimes very impulsive and of the moment, but those moments are cumulative realities.

Marsha P. Johnson (1945 – 1992)

Impulsivity has been conceptualized in multiple ways throughout the history of psychiatry and psychology. In early psychiatry, Kraepelin (1927) described "*impulse insanity*" as a disorder characterized by the emergence of pathological tendencies and uncontrolled impulses. In psychology, J.P. and Ruth Guilford (1939) introduced the *Rhathymia factor*, defined as "freedom from care or concern; a lack of serious thinking and an impulsiveness," highlighting its relevance as a core personality trait.

Over the years, impulsivity in the context of psychopathology has been defined in three overlapping ways (Arce & Santisteban, 2006; Bakhshani, 2014):

- *Acting quickly without thinking or making a conscious judgment*.
- *Acting without sufficient thought.*
- *A tendency to act with less consideration than others with similar levels of knowledge and skill*.

Additional influential definitions have emphasized slightly different but convergent elements:

- Potenza & de Wit (2010): *a predisposition toward rapid, unplanned reactions to internal or external stimuli, with diminished regard for the negative consequences to oneself or others.*
- Evenden (1999): *a wide range of actions that are poorly conceived, prematurely expressed, excessively risky or inappropriate, often leading to undesirable outcomes*.
- Nigg et al. (2005): *a rash response in situations where a more considered response would be appropriate*.
- Moeller et al. (2001): *rapid, unplanned action without regard for the consequences of the action.*

These definitions converge on several key features: premature or ill-prepared responses, lack of planning, potential for negative consequences, and contextually inappropriate behavior. In sum, they it suggests that impulsivity can be approached as a multidimensional construct, far from what the common use of a single word might suggest (Dalley et al., 2011; Nigg,

2017). **Table 1** attempts to synthesize the chronology of the theories and models developed for impulsivity.

Several theoretical models further refined these ideas. Buss & Plomin (1975) described impulsivity as rapid responses across diverse contexts, including behavioral delay, evaluation of alternatives and consequences, persistence despite distractions, and novelty seeking. Eysenck proposed a factor-analytic model of personality, conceptualizing impulsivity initially as a combination of habits; non-planning, liveliness, narrow impulsivity, and risk-taking and later reorganized, it into venturesomeness and pure impulsiveness (Eysenck & Eysenck, 1977; Eysenck et al., 1985). Dickman (1990) distinguished between functional and dysfunctional impulsivity. Functional impulsivity reflects efficient, audacious, and rapid risk-taking with good attentional and sequential processing. Dysfunctional impulsivity involves chaotic, poorly planned behavior, excessive sensitivity to interference, and inadequate attention, which itself contributes to impulsive behavior (Bari & Robbins, 2013; Caswell et al., 2013; Leshem & Yefet, 2019).

Other researchers emphasized biological and temperament-based aspects of impulsivity. Cloninger (1994), through the Tridimensional Personality Questionnaire (TPQ) and Temperament and Character Inventory Revised (TCI-R), highlighted novelty seeking as a key component of impulsivity. Novel stimuli serve as powerful behavioral activators, and reinforcers play an important role in driving exploration and goal-directed activity.

Taken together, this historical trajectory reflects a shift from unitary, inhibition-focused models toward multidimensional frameworks integrating affective, cognitive, and behavioral processes. Early frameworks emphasized inhibitory deficits and motor disinhibition, while contemporary approaches recognize the heterogeneity of impulsive traits and their distinct developmental and clinical correlates.

However, despite their contributions, these models share a common limitation: the tendency to conceptualize impulsivity as a relatively homogeneous construct, overlooking its multidimensional and context-dependent nature. These limitations paved the way for more integrative and multidimensional frameworks, aiming to disentangle the affective, cognitive, and behavioral components of impulsivity.

In summary, the conceptualization of impulsivity has evolved from early unitary models to multidimensional frameworks integrating affective, cognitive, and behavioral components. Classical approaches (Kraepelin, Guilford, Eysenck) emphasized inhibitory deficits and personality traits, whereas later models (Dickman, Cloninger) highlighted heterogeneity and the role of biological and temperamental factors. This diversity supports the use of complementary tools: the UPPS-P captures personality-based facets such as Urgency, Lack of Premeditation, Lack of Perseverance, and Sensation Seeking, while the Barratt Impulsiveness Scale focuses on cognitive control, attention, and motor impulsivity. Together, these instruments provide an integrative framework linking historical theory with contemporary assessment, enabling a nuanced characterization of impulsivity across development and

clinical contexts. This dual-framework rationale will be detailed further in the Introduction section.

In line with this evolution, the present thesis adopts a multidimensional and transdiagnostic perspective, integrating personality-based and neurocognitive approaches to better characterize impulsivity in adolescence.

Model	Conceptual contribution	Dimensions / Subscales related to Impulsivity
Zuckerman Sensation-Seeking Scale (Zuckerman, et al., 1964)	Introduces sensation seeking as a biological trait, distinguishing impulsive disinhibition from non-impulsive thrill seeking.	Disinhibition Experience Seeking
I-7 Impulsiveness Questionnaire (Impulsivity Subscale) (Eysenck, 1993)	Differentiates impulsivity into disinhibition linked to psychoticism and risk-taking associated with extraversion. (Eysenck & Eysenck, 1985).	Impulsiveness Venturesomeness
Emotionality, Activity, Sociability and Impulsivity Inventory (Buss and Plomin, 1975)	Conceptualizes impulsivity as a multidimensional trait involving behavioral delay, decision-making, persistence, and novelty seeking.	Inhibitory control Decision time Lack of persistence Boredom/sensation seeking
NEO Personality Inventory (NEO PI-R) (Costa and McCrae, 1985)	Frames impulsivity as a personality trait distributed across neuroticism, extraversion, and conscientiousness within a lexical trait model.	Impulsiveness Score (Neuroticism Scale) Self-Discipline Score (Conscientiousness Scale)
Sensitivity to Punishment and Sensitivity to Reward Questionnaire (SPSRQ; Torrubia, et al. 2001)	Theory of Reward Sensitivity (Gray's behavioral approach) (Gray, 1987). Conceptualizes impulsivity as sensitivity to reward, grounded in neurobiological approach–avoidance motivational systems.	Sensitivity to Punishment scale Sensitivity to Reward scale
Dickman Impulsiveness Inventory [DII] (Dickman, 1990)	Distinguishes between functional impulsivity (adaptive, goal-oriented speed) and dysfunctional impulsivity (maladaptive, error-prone responding).	Dysfunctional impulsivity Functional impulsivity
Tridimensional Personality Questionnaire [TPQ] (Cloninger, 1994)	Conceptualizes impulsivity as a biologically driven, automatic response to novel stimuli within temperament dimensions.	Novelty seeking
BIS-11 (Patton et al. 1995)	Conceptualizes impulsivity as a multifaceted construct comprising attentional, motor, and non-planning components of behavior	Motor Cognitive Non-planning
UPPS-P (Lynam et al., 2006)	Conceptualizes impulsivity as a multidimensional impulsivity trait.	Urgency Negative Urgency Positive Lack of Premeditation

		Lack of Perseverance Sensation Seeking
Multidimensional Personality Questionnaire (MPQ) (Tellegen and Waller, 2008)	Conceptualizes impulsivity as low behavioral control within a 3-factor model of emotionality and constraint.	Control Scale

Table 1. Chronology of the theories and models developed for impulsivity. Adapted from Evenden (1999).

Executive Functions and Impulsivity

Contemporary research increasingly conceptualizes impulsivity not only as a personality trait but also as a manifestation of deficits in executive functions (EFs). Executive functions are high-level cognitive abilities that support planning, organization, and the successful execution of goal-directed, future-oriented actions. These multifaceted skills span multiple cognitive domains and influence behavior and social functioning across contexts (Lezak, 2012).

Across different executive function models, impulsivity is commonly conceptualized as emerging from deficits in core executive processes (Sambol et al., 2023). Within Diamond's (2013) framework (**Figure 1**), impulsivity is viewed as a behavioral manifestation of reduced inhibitory control, encompassing response inhibition and interference control, which represent central mechanisms underlying self-regulation.

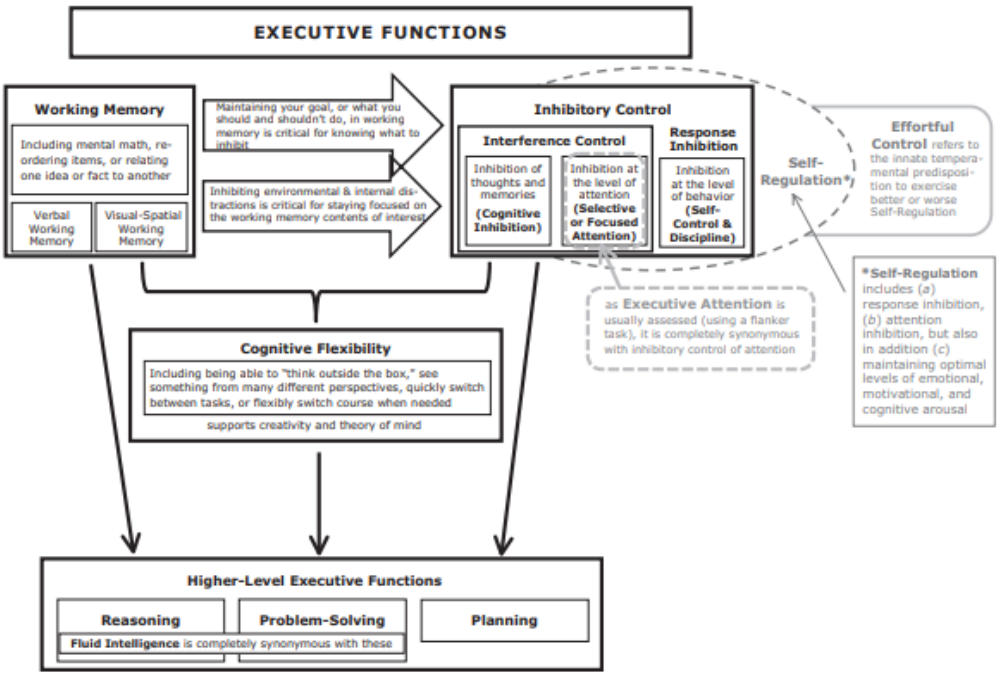


Figure 1. Diamond's Executive Model (2013)

Nigg (2017) extends this perspective, proposing that impulsivity overlaps with but is distinct from disinhibition and risk-taking, highlighting that impulsivity cannot be fully explained by inhibitory control alone. This distinction emphasizes the complexity of impulsivity, which involves interactions between affective, cognitive, and behavioral processes (**Figure 2**).

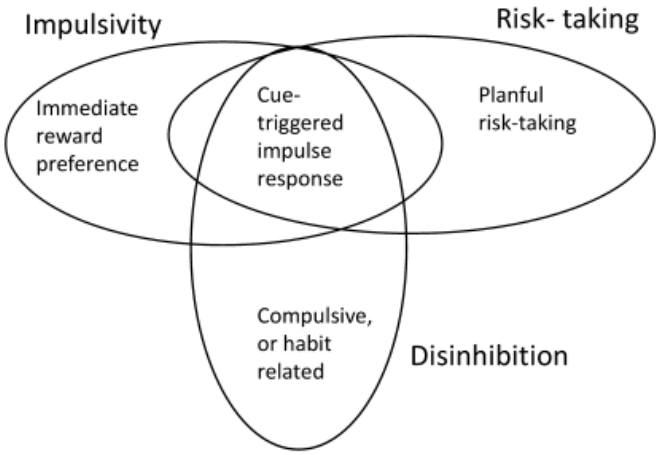


Figure 2. Impulsivity, disinhibition, and risk-taking (**Nigg, 2017**). Some behaviors involve inhibition as well as impulsivity, but other impulsive behaviors include processes beyond response disinhibition, and some disinhibitory problems are not impulsive (e.g. ruminative obsession). Risk-taking can be impulsive, or not. Reproduced from Nigg (2017).

Another influential framework is Miyake et al., (2000), whose model of executive functions identifies inhibition as a core component, while also recognizing interactions with other executive processes, such as working memory updating and task-set shifting. From this perspective, facets of impulsivity such as acting without forethought or difficulty suppressing prepotent responses can be seen as arising from specific executive deficits while also being influenced by broader cognitive control networks.

A neuropsychological perspective reinforces the multifactorial nature of impulsivity. Poor performance in inhibitory or executive tasks can result from diverse factors, including underlying psychiatric symptoms, attentional limitations, or developmental immaturities (Keefe, 1995; Reynolds & Horton, 2008). This approach underscores the importance of considering multiple mechanisms (cognitive, affective, and behavioral) when evaluating impulsivity in adolescents and young adults (Rochat et al., 2018).

Taken together, the executive function models described above converge on the view that impulsivity is a multifactorial construct, emerging from interactions between inhibitory control, working memory, executive attention, and affective regulation that modulate higher-order executive functions as planification or problem solving. This conceptualization supports the need for multifaceted assessment strategies that capture both trait-level dispositions and cognitive-executive processes. In line with this rationale, the current work focuses on self-report measures (e.g., UPPS-P, which indexes affective and personality-based tendencies) and laboratory-based behavioral tasks (e.g., Stroop, CPT), which together provide complementary insights into the cognitive and affective components of impulsivity. From this perspective, UPPS-P dimensions such as Urgency may reflect failures in the interaction between executive control and emotional regulation systems.

By integrating these methods, it is possible to obtain a nuanced understanding of impulsivity in adolescence, while still respecting the multifactorial nature of the construct.

These processes are particularly relevant during adolescence, a developmental period characterized by ongoing maturation of executive control systems and heightened emotional reactivity. This integrative framework supports the need for multidimensional assessment strategies combining psychometric and neuropsychological measures to better characterize impulsivity in developmental and clinical contexts (Rochat et al., 2018).

Barratt Model

One of the most cited authors in impulsivity literature is Ernest S. Barratt. Over the years, he formulated a theory of impulsivity that integrates cognitive, behavioral, environmental and biological factors into a general systems model. He studied impulsivity as a construct for over 40 years, using questionnaires as well as behavioral and electrophysiological measures. The development of the BIS Impulsivity Scale stemmed from Barratt's view that impulsivity was not a unidimensional construct. In fact, he saw impulsivity as a multidimensional construct with three subdivisions, as measured by the Barratt Impulsivity Scale (BIS). Since 1959, Barratt and colleagues made several modifications to the BIS in a sustained attempt to improve its validity and clarify the construct of impulsivity. The BIS scale has undergone a series of item analyses to enhance its orthogonality to anxiety, eliminating Sensation Seeking and social items to create a purer measure of impulsivity. Over time, the scale has undergone several revisions, ranging from a 2-factor model (Barratt, 1987) to a 6 first-order factor structure (primary facets) that load onto three second-order factors (Patton et al., 1995), resulting in heterogeneous psychometric properties that complicate the replication of the original model (Stanford et al., 2009; Vasconcelos et al., 2013). Moreover, Lange et al. (2017) reported positive associations between motor impulsiveness and extraversion, as well as between attentional impulsiveness and neuroticism from the Big Five Personality model (Costa & McCrae, 1985). Despite its widespread use, the Barratt model has been criticized for its inconsistent factorial structure and limited specificity in capturing distinct dimensions of impulsivity.

The factor structure of impulsivity consists of six dimensions distributed in three factors:

- Motor Impulsivity
    - *Motor* Impulsivity or tendency to act according to the emotional State
    - *Perseverance* or consistent lifestyle, subject to habits.
- Attentional Impulsivity
    - *Cognitive instability* or sensitivity to interference and distractibility
    - *Attention* or ability to maintain concentration.
- Non Planning Impulsivity

- *Self-control* or ability to foresee the consequences of behavior
- *Cognitive Complexity* or ability to enjoy complex tasks.

Barrat & colleagues (2001), within a broader bio-psycho-social model, defined impulsivity as a phenomenon that should include three phenomena, in order to contextualize it with various cognitive and social characteristics (Bakhshani, 2014).

- A decreased sensitivity to the negative consequences of actions or behaviors.
- A quick and immediate reaction to unwanted stimuli, before full elaboration of the information, and with a tendency to act with less foresight than most individuals of the same ability and knowledge.
- A lack of disregard for the long-term consequences of actions.

At that point, Barratt proposed what he called a *clinical* definition of impulsivity: "a predisposition toward rapid, unplanned reactions to internal or external stimuli without regard to the negative consequences of these reactions to the impulsive individual or to others" (Moeller et al., 2001). However, its capacity to distinguish between affective and cognitive components of impulsivity remains limited, which has motivated the development of more multidimensional approaches. The current version of the BIS (BIS-11) (Patton et al., 1995) has become one of the most widely used measures of impulsivity. The BIS-11 is a 30-item questionnaire with three subscales, Non-planning, Attentional and Motor impulsivity. Over time, shorter versions of the BIS have emerged, such as Spinella's (2007) 15-item version or Steinberg et al.'s (2013) 8-item version.

For the assessment of internal consistency, most studies relied on Cronbach's alpha coefficients. Across the reviewed literature, alpha values for the BIS scales were generally within the acceptable range, indicating moderate to adequate internal consistency. **Table 2** summarize the internal consistency estimates reported in the reviewed BIS studies.

These dimensions are typically grouped into three higher-order factors: attentional, motor, and non-planning impulsivity. From a neuropsychological perspective, these dimensions have been primarily associated with deficits in executive control, particularly in inhibitory processes and attentional regulation.

BIS 2n order original version	Attentional Impulsivity	Non Planning Impulsivity	Motor Impulsivity	Total
Soodsawang et al. (2019)	NP	NP	NP	.83
Ellouze et al., (2013)	.66	.61	.72	.78
Wan et al. (2016)	.67 - .85 (Cognitive Impulsivity)	.85-.87	.80-.86	.67-.79
von Diemen et al. (2007)	NP	NP	NP	.71
Hindu Singh et al., (2008)	NP	NP	NP	NP
Willhelm et al. (2020) 12 items	.55	.52	.69	0.75
Regan et al., (2019)	.72	.68	.52	.79
Reise et al., (2013) 28 items	.70	.67	.60	NP
Hartmann et al., (2011)	.74 (General Impulsivity)	.72	.30	.74
Li & Chen, (2007)	NP	NP	NP	.83
Khemiri et al., 2021)	.60	.50	.70	.78
Someya et al., 2001)	.60	.65	.64	.79
Janavičiūtė, & Šinkariova, (2020)	.74	.58	.59	.80
Malloy-Diniz, et al., (2015)	.65	.59	.59	NP
Juneja et al., (2019)	.72	.78	.78	NP
Weinstein et al., (2015)	.44-.45	.51-.65	.67-.71	.79 - .82

BIS 30 items version	General Impulsivity	Non Planning Impulsivity	Total
Yao et al. (2007)	NP	NP	.80
Fossati et al. (2002)	NP	NP	.78
Martínez-Loredo et al. (2015)	.91	.85	.87
Malloy-Diniz, et al., (2015)	.78 (Inhibition control)	.61	NP

BIS Brief Version	Poor self-regulation	Impulsive behavior	Total
Benk et al. (2022)	.67	.73	.70 - .78
Mathias et al. (2018)	NP	NP	NP
Morean et al., (2014)	.75	.72	NP
Kata & Polezak, (2021)	.70	.73	.69
Charles et al. (2021)	.80	.70	NP

BIS Haden & Shiva (2008) Version	Non Planning Impulsivity	Motor Impulsivity	Total
Juneja et al., (2019)	.85	.85	.89
Tsatali et al., (2021) (25 items)	.84	.85	.87

BIS Version 28 items from (Reise et al., 2013)	cognitive impulsivity	behavioral impulsivity	Total
Lindstrøm et al., (2016)	NP	NP	.60
Juneja et al., (2019)	.84	.82	NP

BIS 21 items Version	Cognitive Impulsivity	Behavioral Impulsivity	Impatience -restlessness	Total
Kapitány-Fövény et al., (2020)	.84	.77	.81	NP

BIS 15 item Version	Motor Impulsivity	Non Planning Impulsivity	Attentional Impulsivity	Total
Juneja et al., (2019)	.85	.85	.89	NP
Spinella .79-.81	NP	NP	NP	.79-.81
Bhat et al., (2018)	NP	NP	NP	.79
Meule et al., (2011)	.72	.82	.68	NP
Orozco-Cabal et al. (2010)	NP	NP	NP	0.79

BIS Versions	Perseverance (Per)	Motor (M)	Attention (Aten)	Cognitive instability (Cog Ins)	Self-control (Self Con)	Cognitive complexity (Cog Com)	Total
Pechorro et al. (2015)	.53	.84	.80	.62	.80	.67	NP
Pechorro et al. (2017)	.38	.84	.78	.41	.76	.62	.84
Yao et al. (2007)	*NP*	NP	NP	NP	NP	NP	.80
Patton et al., 1995	NP	NP	NP	NP	NP	.79-.83 total	NP
Fossati et al. (2002)	NP	NP	NP	NP	NP	NP	NP
Juneja et al., (2019)	.38	.81	.73	.44	.83	.48	NP
Reise et al., (2013)	.32	.61	.65	.54	.4	.65	NP
Malloy-Diniz, et al., (2015)	.14	.65	.56	0.51	.62	.28	NP

Table 2 Internal consistency estimates across BIS studies. In bold studies with adolescents' samples. All studies reported Alpha Cronbach's index. NP; Not Reported.

In the adolescent population, Fossati et al. (2002) developed the BIS-11-A to replicate the original adult model in adolescents. However, its structure has remained inconsistent over the years (Reise, 2013; Wan et al., 2016). Some studies have replicated the 3-factor structure for the adolescent BIS-11-A (Hartmann et al., 2011; von Diemen et al., 2007), while others have identified a simpler 2-factor structure. This simpler model includes a general impulsivity factor that combines attention, cognitive, and motor items, along with a Non-planning impulsivity factor (Martínez-Loredo et al., 2015; Yao et al., 2007). Supplementary material from study three summarizes Barratt versions and factor solutions in adolescents.

In the transdiagnostic approach, the Barrat Impulsiveness scale (BIS-11) has also proved its worth. Recently, Crisp & Grant, (2024) as identified impulsivity as a transdiagnostic factor across several disorders, including binge eating disorder, bulimia nervosa, borderline personality disorder, addictive disorder (substance use or compulsive buying) and mood disorder (panic disorder and/or agoraphobia. Over the decades, this model has contributed substantially to research advances and to the identification of clinically useful features for assessment and treatment across different diagnosis and pathologies (see **Table 3**).

Diagnosis	Studies including Barratt Scale versions
Obsessive Compulsive Disorder (OCD) & Autism (ASD)	Frydman et al., 2020; Li & Chen, 2007; Sohn et al., 2014; Namlı et al., 2023.
Bipolar Disorder I	Kahn et al., 2019; Nandagopal et al., 2011.
Attention Deficit Hyperactivity Disorder (ADHD)	Figueiredo et al., 2021; Khemiri et al., 2021; Brager-Larsen et al., 2023; Speranza et al., 2011.
Borderline personality Disorder	Brager-Larsen et al., 2023; Speranza et al., 2011
Depressive Disorders and self-harm	Müller et al., 2016; Ram et al., 2019; Costa et al., 2021; Cassels et al., 2022; Huang et al., 2017; Liu et al. 2022; Ran et al. 2022; Regan et al., 2019.
Eating Disorders	Ballarotto et al., 2017; Bizzi et al., 2023; Filippone et al., 2022; Meule & Platte, 2016; Norton et al., 2024; Veit et al., 2021.
Obesity	Fields et al., 2013; Meule, 2013; Kulendran et al., 2016.
Trauma - PTSD	Mahoney et al., 2024; Meyers et al., 2019; Li et al., 2023.
Social Anxiety	Orsolini et al., 2022; Peterka-Bonetta et al., 2019.
Pornography	Antons et al., 2019.
Antisocial Personality disorder	Pechorro et al., 2015; Plessen et al., 2023; Turri et al., 2023.
Cognitive function	Bari & Robbins, 2013; Freis et al., 2022; Panwar et al., 2014; Patzelt et el., 2019; Uncapher et al., 2016; Withney et al., 2004; Yu et al., 2020.

Table 3. Barratt Impulsiveness Scale and Associated Psychopathological Construct.

Overall, the Barratt model represents a foundational framework for understanding impulsivity, particularly in relation to cognitive control and behavioral regulation. Its contribution has been instrumental in advancing the assessment of impulsivity across a wide range of clinical and non-clinical populations. However, despite its extensive use, the model shows important limitations, particularly in its reduced capacity to differentiate between affective, cognitive, and behavioral components of impulsive functioning. In this sense, its

relative lack of specificity has contributed to ongoing conceptual ambiguity in the field. These limitations highlight the need for more integrative approaches that capture the multidimensional and transdiagnostic nature of impulsivity, incorporating both emotional and executive processes. In contrast to the Barratt model, which emphasizes cognitive and behavioral aspects of impulsivity, the UPPS-P framework incorporates affect-driven dimensions such as urgency, providing a more differentiated conceptualization.

Finally, **Table 4** summarizes the main neuroanatomical correlates of the BIS, including both the total score and its individual facets. These associations provide a neurobiological framework that supports the interpretation and contextualization of the findings discussed later in this thesis.

Barrat facets	Neuroanatomical region
Total score	• Frontoparietal network function (Kubera et al., 2018). • Left middle frontal gyrus, orbitalfrontal cortex, left superior frontal gyrus (Matsuo et al., 2009; Schilling et al., 2012), left pars opercularis (Lim et al., 2021), ventral striatum and nucleus accumbens (Herbort et al., 2016), right inferior parietal, postcentral, and supramarginal (Besteher et al., 2019), left postcentral gyrus, cingulate gyrus, precentral gyrus, pars opercularis of the inferior frontal gyrus, right middle temporal gyrus, superior parietal gyrus, pericalcarine gyrus, and lateral occipital gyrus (Hirjak et al., 2017).
Attentional Impulsiveness	• Frontoparietal network function (Kubera et al., 2018). • Right inferior and superior parietal and supramarginal gyrus (Besteher et al., 2019), bilateral middle frontal gyrus, left superior frontal gyrus, bilateral superior temporal gyrus, left transverse occipital cortex (Lee et al., 2011; Schilling et al., 2012), left pars opercularis (Lim et al., 2021), left postcentral gyrus, cingulate gyrus, precentral gyrus, pars opercularis of the inferior frontal gyrus, right middle temporal gyrus, superior parietal gyrus, pericalcarine gyrus, and lateral occipital gyrus (Hirjak et al., 2017), right primary motor cortex, primary sensory cortex and the premotor cortex (Panwar et al., 2014).
Motor Impulsiveness	• Frontoparietal network function and Striatal and midcingulate network (Kubera et al., 2018). • Left middle frontal gyrus, right orbitalfrontal cortex, left superior frontal gyrus, right precentral cortex, left Inferior parietal cortex (Matsuo et al., 2009; Schilling et al., 2012), left superior temporal, lingual and supramarginal gyrus (Hirjak et al., 2017, Lee et al., 2011), right cerebellum (Hirjak et al., 2017), left pars opercularis (Lim et al., 2021), right supplementary motor area and paracentral lobule (Ai et al., 2019), left inferior frontal gyrus, insula, dorsolateral prefrontal cortex, Broca's area, putamen and the premotor cortex (Panwar et al., 2014).
Non-Planning Impulsiveness	• Frontoparietal network function (Kubera et al., 2018) • Left middle frontal gyrus, right orbital frontal cortex, right Inferior temporal cortex (Lee et al., 2011; Matsuo et al., 2009; Schilling et al., 2012), pars opercularis of the right inferior frontal gyrus and the left middle temporal, precentral and superior parietal gyrus (Hirjak et al., 2017), posterior cingulate cortex, primary visual cortex and extrastriate cortex (Panwar et al., 2014).

Table 4. Neuroanatomical correlates of the Barrat impulsiveness scale (BIS).

UPPS-P - Impulsive Behavior Scale –

The UPPS-P model of impulsivity (Urgency, Premeditation, Perseverance, Sensation Seeking, and Positive Urgency; Whiteside & Lynam, 2001; Whiteside et al., 2005) was an attempt to unify different etiological "pathways" of impulsivity based on the Five Factor Model (Costa & McCrae, 1985). The impulsivity facets identified by this model are associated with different personality domains: Conscientiousness (deliberation and persistence), Extraversion (sensation seeking) and Neuroticism (urgency). It was obtained from a factor analysis of 20 scales (9 of which were self-report scales), with 4 factors collected in 40 items, and later including Positive Urgency, resulting UPPS-P Impulsive Behavior Scale, in 5 factors and 59 items, which has been validated in the majority languages (Um et al., 2018). Within the context of this thesis, the UPPS-P framework is particularly relevant because it provides a multidimensional account of impulsivity that integrates personality, affective reactivity, and self-regulatory processes.

The UPPS-P model highlights the importance of distinguishing between emotional (*hot*) and non-emotional (*cold*) facets in all behavioral and executive varieties. Sensation Seeking and Urgency are strongly associated with emotional factors. Urgency depends on inadequate emotional appraisal before making decisions and Sensation Seeking is linked to anticipation of reward and lack of foresight about the risks involved. In contrast, Lack of Premeditation and Perseverance are less dependent on emotions (Berg et al., 2015). This distinction is especially relevant in adolescence, where ongoing maturation of executive control systems coexists with heightened affective and reward sensitivity.

Although a child version emerged (Zapolski et al., 2011) and it was adapted in Spanish (Caneto et al., 2020) and subsequently used in the child and pre-adolescent population; there is no consensus on using that version or the original adult version in adolescents. For the most part, the adult version has been used without difficulty throughout the adolescent period, as the content of the items is more appropriate than the items in the child model (Littlefield et al., 2016; Herdoiza & Choliz, 2019). Even so, the child version has demonstrated its value in discriminating internalizing and externalizing facets in preadolescents (Marmorstein, 2013). This issue is particularly relevant for the present thesis, given the need to ensure developmental appropriateness when assessing impulsivity in adolescent populations.

Studies support that the psychometric properties of the UPPS-P scores are reliable in terms of construct validity. High scores on the UPPS correlate with a wide range of behavioral manifestations of impulsivity and with different facets of psychopathology (Fisher et al., 2024). We will now briefly describe each subscale: Lack of Perseverance, Lack of Premeditation, Sensation Seeking, and Negative and Positive Urgency. These dimensions should not be understood as isolated traits, but as partially overlapping pathways through which impulsive behavior may emerge across different emotional, cognitive, and motivational contexts.

Lack of Perseverance

This factor focuses on the inability to stay focused on a task that may be long, difficult or boring. High levels of lack of perseverance may suggest a difficulty in working under conditions that require resistance to distractors or in managing time under pressure. This dimension is not well represented in other measures of impulsivity (same situation as urgency). This factor is positively associated with sensitivity to punishment and people with this sensitivity show a tendency to avoid unwanted stimuli. From a neuropsychological perspective, this facet may be closely linked to sustained attention, resistance to interference, and goal-directed persistence.

Lack of Premeditation

This factor measures the difficulty in projecting the consequences of a behavior before engaging in it. The definition has been used to conceptualize problematic impulse control, and is related to *choice impulsivity* (Bari & Robbins, 2013). Furthermore, it is similar to the non-planning dimension included in Barratt's model (Whiteside & Lynam, 2003). Its conceptual overlap with choice impulsivity also makes it particularly relevant for bridging personality-based models and neurocognitive approaches to impulsive decision-making (Nigg, 2017, p. 38).

Sensation Seeking

This impulsive facet incorporates two aspects. On the one hand, the tendency to enjoy exciting activities, and the discovery of trying new novel experiences that may or may not be risky or dangerous (Harden & Tucker-drob, 2011). It is located in different personality models (e.g., the *novelty seeking* variable from the Cloninger-Temperament and Character model). Sensation seeking shows a correlation with *reward sensitivity* where both dimensions are related to approach behavior associated with the prospect of reward or novel stimuli. Importantly, Sensation Seeking should not be considered inherently maladaptive, as it may also reflect normative exploratory tendencies, particularly during adolescence.

Negative and Positive Urgency

Negative Urgency determines the association between affect and impulsivity, and this dimension is used to describe the difficulty in coping with urges to act in response to negative emotions. In other words, it refers to the tendency to engage in impulsive behaviors when experiencing negative affect despite potential negative or harmful long-term consequences. High levels of urgency are associated with difficulties in resisting cravings or temptations (Hershberger et al., 2017). Negative Urgency can be influenced by the depletion of cognitive resources (Maranges et al., 2017), which occurs when strong negative emotions tax an individual's cognitive capacity. Under these conditions, even individuals with effective problem-solving skills may struggle to make adaptive decisions or respond efficiently to challenging situations, leading to a decline in performance over time. For this reason, Urgency has been increasingly conceptualized as one of the most clinically informative facets

of impulsivity, particularly in relation to maladaptive coping and emotion-driven dysregulation.

Finally, the fifth factor, Positive Urgency, was added to the model with a paper by Cyders et al. (2007), defined as a tendency to rash actions in response to positive moods (e.g. euphoric moments). The literature faces another challenge in clearly distinguishing the outcomes of Positive and Negative Urgency as a single coherent construct. Billieux et al. (2021) debated whether separating these two facets is clinically useful; conceptually, however, they may still be considered components of the same overarching construct. In line with this perspective, subsequent research has proposed integrative approaches to study Urgency, aiming to address its transdiagnostic features and to unify findings across different theoretical models (Fisher et al., 2024; Hook et al., 2021; Mestre-Bach, 2019; Sonmez et al., 2024; see also Türkmen et al., 2023, for a distinct conceptualization of urgency traits). Taken together, both forms of Urgency may reflect a shared vulnerability to emotion-based rash action, differing mainly in affective valence rather than in underlying self-regulatory dysfunction.

Overall, the UPPS-P framework represents one of the most conceptually differentiated and clinically useful models of impulsivity currently available. By distinguishing between affective, cognitive, and motivational pathways, it provides a more precise understanding of the heterogeneity underlying impulsive behavior. This multidimensional perspective is particularly relevant in adolescence, a developmental stage characterized by the interaction between emotional reactivity, reward sensitivity, and still-maturing executive control systems. In this sense, the UPPS-P model offers a particularly valuable framework for the present thesis, both for its psychometric utility and for its capacity to support a transdiagnostic and developmentally informed conceptualization of impulsivity.

Psychometric properties: Long and short versions

During the development of the UPPS-P scales, debate arose regarding the creation of abbreviated versions to reduce respondent burden. A key issue in the validation and practical use of the UPPS-P concerns the balance between psychometric robustness and assessment efficiency. The original full version comprises 59 items, whereas the short form contains 20 items (Billieux et al., 2012; Cyders et al., 2014). The short versions have been widely adopted due to logistical advantages, reducing administration time from approximately 15 to 5 minutes, and because studies show substantial concordance with the full scale in terms of factorial structure and inter-scale correlations (Lozano et al., 2018). Although the short form yields scores that are highly correlated with the full UPPS-P, the original version provides greater measurement precision. This means the long version can capture subtle differences between individuals, detect smaller effect sizes, and reduce the standard error of measurement, even if the overall patterns of scores are similar. Rasch analyses support adequate model–data fit for both versions, with the long form offering superior internal consistency, while the short form demonstrates efficiency and practicality (Lozano et al., 2018; Claréus et al., 2017). In adolescent populations, the 5-factor structure of the full UPPS-

P had not been fully replicated until recently. Bussio et al. (2023) provided empirical confirmation of the complete model in a Chilean adolescent sample, supporting the applicability of the long version in developmental research. This distinction is particularly relevant for the present thesis, as the choice between long and short versions involves a trade-off between psychometric precision and feasibility in adolescent assessment contexts.

Regarding factor-analytic techniques, Exploratory Factor Analysis (EFA) is often considered a flexible approach because it places minimal constraints on the pattern of relations between observed variables and latent factors (Fabrigar et al., 1999; Van Prooijen & Van der Kloot, 2001). However, EFA has important limitations: it does not allow for the testing of specific hypotheses, nor does it provide strong criteria for evaluating model acceptability, except when maximum likelihood estimation is used. When there is sufficient theoretical and empirical justification for specifying a particular model, and when the goal is to formally test that model, Confirmatory Factor Analysis (CFA) is the preferred method. Although CFA requires a more detailed a priori specification of the hypothesized structure, it offers more rigorous evaluation based on goodness-of-fit indices and statistical testing. In the context of UPPS-P validation, this distinction is especially important because the instrument is grounded in a theoretically specified multidimensional structure rather than in purely exploratory item clustering. For these reasons, major validation studies of the UPPS-P in adolescents have relied on CFA to determine the best-fitting psychometric model. Two structures have been most consistently supported across international research: (1) the original 5-factor model and (2) a 3-factor hierarchical model comprising a higher-order Urgency factor (combining positive and negative urgency), a Conscientiousness deficit factor (encompassing Lack of Premeditation and Lack of Perseverance), and Sensation Seeking (Fournier et al., 2025). **Tables 5 and 6** provide a summary of the factor-analytic techniques employed across the reviewed studies. Importantly, these alternative structures do not necessarily reflect contradictory findings, but rather different ways of organizing partially overlapping dimensions of impulsivity across developmental and cultural contexts.

For the analysis of internal consistency, most authors relied on Cronbach's alpha. Across studies, alpha coefficients for the UPPS-P scales were generally comparable and acceptable. In the adolescent adaptation by Bussio et al. (2023), the Lack of Perseverance scale demonstrated moderate internal consistency. In contrast, within the short version of the scale, both the Lack of Perseverance and Negative Urgency subscales consistently show lower reliability estimates in adolescent samples (Donati et al., 2021; Eray et al., 2023), as well as in adults. **Tables 7 and 8** summarize the internal consistency and construct validity findings for the UPPS-P and S-UPPS-P across reviewed studies. These findings suggest that reliability should be interpreted at the subscale level rather than assumed uniformly across the instrument, particularly when working with abbreviated versions or developmental samples. Taken together, these findings support the psychometric usefulness of both the UPPS-P and S-UPPS-P, while also underscoring the importance of considering developmental stage, subscale reliability, and assessment purpose when selecting the most appropriate version.

Long Versions	Sample size *N*	Extraction and rotation technique	Number of factors	Construct Validity
Original (Whiteside & Lynam, 2001)	**122**	PCA (principal components analysis) and EFA (exploratory factor analysis) using varimax rotation	4	The Personality Assessment Inventory (PAI), The South Oaks Gambling Screen (SOGS), Alcohol Use Disorders Identification Test (AUDIT)
(Cyders, 2013)	1372	CFA (Confirmatory factor analysis) and ESEM. Weighted least squares mean- and variance-adjusted estimation (WLSMV).	5	The Drinking Styles Questionnaire, The Mood-Based Questionnaire, The Risky Behavior Questionnaire.
Brazilian Norms (Pinto et al., 2021)	718	CFA and WLSMV	**5**	-
Brazilian (Sediyama et al., 2017)	384	CFA and EFA with WLSMV and Geomin oblique rotation	4	Mini International Neuropsychiatric Interview (MINI Plus v.5)
Dutch (Bousardt, 2017)	301	CFA and ESEM	5	The Checklist Aggressive Behavior
German (Wüllhorst et al., 2024)	399	CFA with diagonally weighted least squares estimation (DWLS)	5	Barratt Impulsiveness Scale (BIS-15), Depression-Anxiety-Stress-Scales (DASS-21) Alcohol Use Disorder Identification Test (AUDIT), Drug Use Disorder Identification Test (DUDIT)
French (Van Der Linden et al., 2006)	234	EFA and CFA	4	-
German (Kampfe, 2009)	214	CFA	4	NEO-PI-R facets, Positive and Negative Affect Schedule (PANAS), The Mehrfach-Wort-wahltest (MWT-A), 21 item Beck- Depression Inventory, State-Trait Anxiety Inventory, Leistungsprüfsystem (LPS)
Italian (Fossati et al., 2016)	268	CFA and ESEM with WLSMV	5	The Barratt Impulsiveness Scale-11 (BIS-11), The Structured Clinical Interview for DSM-IV Axis II Personality Disorders (SCID-II), The Personality

				Inventory for DSM-5
Italian Norms (Gialdi et al., 2021)	797	CFA with WLSMV	5	
Korean version (Kim & Lee, 2014)	625	CFA	5	Barrat BIS-11, Sensation Seeking Scale (SSS), Eysenck inventory scale (EIS) Sensitivity to punishment and sensitivity to reward questionnaire (SPSRQ)
Chilean adolescents (Bussio et al., 2023)	838	CFA with WLSMV	5	Barratt Impulsiveness Scale (BIS-11A), Sensitivity to punishment and sensitivity to reward questionnaire (SPSRQ), substance use items, taken from the Chilean national studies on substance use
Spanish (Verdejo-Garcia et al., 2010)	150	PCA using varimax rotation	5	Sensitivity to punishment and sensitivity to reward questionnaire (SPSRQ), The Plutchik Impulsivity Scale, Delay-Discounting Test
Spanish adolescents (Montasell-Jordana, et al., 2025)	9024	CFA and ESEM, with WLSMV	5	Barrat BIS-11
China (Zhang, et al., 2020)	127	CFA with maximum likelihood estimation (MLE)	5	Beck Depression Inventory II (BDI-II), State-Trait Anxiety Inventory (STAI) Delay Discounting Task (DDT), Balloon Analogue Risk Task (BART), Beads Task

Table 5. Factor-analytic techniques employed across UPPS-P validation studies. PCA: Principal Component Analysis; CFA: Confirmatory Factor Analysis; EFA: Exploratory Factor Analysis; SCA: ML: Maximum Likelihood; DWLS: diagonally weighted least squares; WLSMV: Weighted least squares mean- and variance-adjusted.

Short Versions	Sample size *N*	Extraction and rotation technique	Number of Factors	Convergent and Construct Validity
English (Cyders et al., 2014)	251	CFA with WLSMV	5	Alcohol Use Disorder Identification Test, National Survey on Drug Use and Health Instrument-Modified, The Eating Disorder Diagnostic Scale, The South Oaks Gambling Screen, The Sexual Behavior Scale, The Self-Harm Inventory
Arabic (Bteich et al., 2017)	743	CFA	5	Compulsive Internet Use Scale [CIUS])
Brazilian (Pompeia et al., 2018)	510	CFA	5	-
Farsi (Shokri & Sanaeeour, 2016)	201	Classical Test Theory (CTT).	5	Problematic and Risky Internet Use Screening Scale
French (Billieux et al., 2012)	650	CFA with maximum likelihood estimation (MLE) with robust standard errors and a mean-adjusted $\chi 2$ statistic test	5	Audit, BDI-2, Spielberg trait anxiety inventory
German (Wüllhorst et al., 2024)	399	CFA with DWLS.	5	Barratt Impulsiveness Scale (BIS-15), Depression-Anxiety-Stress-Scales (DASS-21) Alcohol Use Disorder Identification Test (AUDIT), Drug Use Disorder Identification Test (DUDIT)
Italian (D'Orta et al. 2015)	188	CFA	5	The Fagerström Test for Nicotine Dependence, CIUS, BDI-2
Italian Adolescent (Donati et al., 2021)	647	CFA with MLE	5	The Gambling Behavior Scale for Adolescents (GBS-A), Generalized Problematic Internet Use Scale 2 (GPIUS2)
Korean Short (Lim & Kim, 2018)	724	CFA	5	BDI-2, State trait anxiety inventory, eating disorder inventory – II, AUDIT, Canadian Problem Gambling index

Korean children (Lee et al., 2024)	330	CFA	5	CBCL 6–18, BIS-11
Polish (Poprawa, 2019)	522	CFA with generalised least squares (GLS)	5	Eysenck & Eysenck IVE Impulsiveness Questionnaire, Difficulties in Emotion Regulation Scale, (DERS), Neuroticism Scale (N) from the NEO-PI-R, The Self-control Scale (SCS), Poprawa's Risk Behaviours and States Scale
Swedish (Daukantaitė, 2017)	343	CFA with MLE	5	Depression anxiety scale + questions
Spanish (Candido 2012)	189	CFAs with MLE	5	Emotional regulation questionnaire
Spanish adolescent (Montasell-Jordana, et al., 2025)	8944	CFA with WLSMV and exploratory structural equation modeling (ESEM)	5	Barrat Impulsiveness Scale (BIS-11)
Portugal (Pechorro et al., 2021)	470	CFA with MLE	5	Youth Psychopathic Traits Inventory Triarchic—Short (YPI-Tri-S) Dirty Dozen (DD), Peer Conflict Scale-20 (PCS-20), Adolescent Health Self-Report Delinquency (AHSRD), Conduct Disorder Screener (CDS), Brief Self-Control Scale (BSCS), self-report version of the General Delinquency Seriousness Classification (GDSC)
Hungarian (Zsila et al., 2020)	15.703	CFA with MLE	5	Hypersexual behavior consequences scale
Iran (Behrouzian et al., 2022)	254	ESEM with MLE	5	Short-form self-compassion scale, McLean Screening Instrument for Borderline Personality Disorder (MSI-BPD), Cognitive Flexibility Inventory (CFI), Perth Alexithymia Questionnaire (PAQ), Deliberate Self-harm Inventory (DSHI)

China (Wang et al., 2020)	2551	CFA with Satorra-Bentler's Maximum Likelihood Mean Adjusted estimator.	5	Smartphone Addiction scale, Proneness Scale (C-SAPS), Dangerous Use (DU) Subscale of the PMPUQ-SV, Depression Anxiety Stress Scales-21
Greece (Tsolakis et al., 2021)	167	PCA with Varimax rotation	3	Barrat BIS-11
Japan (Hasegawa, et al., 2020)	632	EFA and CFA with oblique solution promax rotation	5	Motor Impulsiveness Scale (BIS-11), Short form of the Japanese Big-Five Scale, Short Grit Scale (Grit-S), Brief Self-Control Scale
Turkish adults (Huseynbalayeva et al., 2025)	304	EFA and CFA	4	BIS Barratt Scale 11, Brief Sensation Seeking Scale
Turkish version (Eray et al., 2023)	384	CFA with WLSMV	5	Barratt Impulsivity (BIS-11), Conners-wells adolescent self-report scale-short (CASS-S), Strengths and Difficulties Questionnaire (SDQ)

Table 6. Factor-analytic techniques employed across S-UPPS-P studies. PCA: Principal Component Analysis; CFA: Confirmatory Factor Analysis; EFA: Exploratory Factor Analysis; MLE: Maximum Likelihood; DWLS: diagonally weighted least squares; WLSMV: Weighted least squares mean- and variance-adjusted.

UPPS-P Versions	Negative Urgency	Positive urgency	Lack of premeditation	Lack of perseverance	Sensation Seeking
Original (Whiteside, 2005) 45 items	.89 Negative urgency		.87	.83	.85
Cyders, (2013)	.89	.94	.83	.82	.85
Brazilian Norms (Pinto et al., 2021)	.92	.97	.92	.90	.91
Brazilian (Sediyama et al., 2017)	.85	.85	.87	.75	.84
Dutch (Bousardt, 2017)	.86	.93	.90	.84	.85
German (Wüllhorst et al., 2024)	.86	.90	.91	.82	.90
French (Van Der Linden et al., 2006) 45 items	.83 Negative Urgency		.83	.81	.77
German (Kampfe, 2009)	.82	.82	.80	.85	.83
Italian (Fossati et al., 2016)	.86	.92	.84	.86	.86
Italian Norms (Gialdi et al., 2021)	.92	.97	.91	.90	.91
Korean version (Lim, & Young-ho, 2016)	.86	.92	.82	.82	.86
Polish version (Poprawa, 2016)	.87	.87	.85	.73	.84
Chilean adolescents (Bussio et al., 2023)	.81	.88	.78	.66	.78
Spanish (Verdejo-Garcia et al., 2010)	.87	.93	.87	.79	.89
Montasell-Jordana, et al., (2025)	.88	.94	.86	.83	.87
China (Zhang, et al., 2020)	.83	.84	.70	.69	.81

Table 7. Internal consistency estimates across UPPS-P studies. Includes Cronbach's alphas or Omegas coefficients for the UPPS-P subscales.

S-UPPS-P Versions	Negative Urgency	Positive urgency	Lack of premeditation	Lack of perseverance	Sensation Seeking
English (Cyders et al., 2014)	.78	.85	.85	.79	.74
Arabic (Bteich et al., 2017)	.63	.63	.58	.72	.70
Brazilian (Pompeia et al., 2018)	.82	.86	.82	.79	.82
Farsi (Shokri & Sanaeeour, 2016)	.80	.74	.67	.73	.76
French (Billieux et al., 2012)	.78	.70	.79	.84	.83
German (Wüllhorst et al., 2024)	.88	.85	.83	.89	.78
Italian (D'Orta et al. 2015)	.78	.78	.73	.84	.82
Italian Adolescent (Donati et al., 2021)	.68	.72	.73	.81	.74
Korean Short (Lim & Kim, 2018)	.70	.76	.65	.71	.70
Polish (Poprawa, 2019)	.82	.86	.84	.85	.82
Swedish (Daukantaitė, 2017)	.65	.78	.78	.60	.69
Spanish (Candido 2012)	.68	.61	.78	.79	.81
Montasell-Jordana, et al., (2025)	.74	.82	.75	.67	.73
Portugal (Pechorro et al., 2021)	.81	.87	.86	.77	.86
Hungarian (Zsila et al., 2020)	.82	.73	.83	.83	.77
Iran (Behrouzian et al., 2022)	.78	.68	.66	.71	.65
Greece (Tsolakis et al., 2021)	.79 Emotion rash-action		.91 Deficits in conscientiousness		.73
China (Wang et al., 2020)	.73	.70	.74	.77	.74
Japan (Hasegawa, et al., 2020)	.75	.69	.74	.79	.65
Turkish adults (Huseynbalayeva et al., 2022)	.78	.72	.84	.85	.74
Turkish adolescents (Eray et al., 2023)	.63	.69	.74	.40	.53

Table 8. Internal consistency estimates across S-UPPS-P studies. Includes Cronbach's alphas or Omega's coefficients for the UPPS-P subscales.

Across studies, internal consistency was generally acceptable for both versions of the scale, although reliability tended to be lower for Lack of Perseverance and, in some cases, Negative Urgency, particularly in abbreviated formats and younger samples.

Globally, the UPPS-P has proven its value and has become popular and useful in several areas of psychopathology and for assessing multidimensional impulsive personality traits. Furthermore, it has shown its usefulness as:

- An addiction profile model (Albein-Urios et al., 2014).
- Research into social apathy (Petitet et al., 2021).
- A predictor of dropout from psychological treatment (Arntz et al., 2023; Barreno et al., 2019; Basting et al., 2024).
- An indicator of treatment outcome (Peckham et al., 2019).
- Outcome of emotional regulation strategies (Anestis et al., 2007; d'Acremont & Van der Linden, 2007).
- A predictor of suicide risk (Lynam et al., 2011; Ortin-Peralta et al., 2024).

Table 9 summarizes the main clinical and behavioral domains in which each UPPS-P facet has been studied. This overview highlights the differential relevance of the UPPS-P dimensions across a wide range of psychopathological and maladaptive behavioral outcomes, further supporting the multidimensional and transdiagnostic utility of the model. As shown in **Table 8**, each UPPS-P facet appears to be associated with partially distinct clinical and behavioral domains, supporting the view that impulsivity is best understood as a heterogeneous and multidimensional construct rather than as a unitary disposition.

Areas of study for each facet of the UPPS-P	Main Clinical and Behavioral Domains Associated with Each UPPS-P Facet
Negative Urgency Tendency to engage in impulsive behaviors under conditions of negative affect such as stress, frustration or anger. A compelling need to avoid an undesirable stimulus (negative emotions or physical sensations).	• ADHD - Inattention (Gomez et al., 2022; Gomez & Watson, 2023; Halvorson et al., 2021; Haas et al., 2017; Roberts et al., 2014). • Alcoholism, drinking problems and alcohol dependance (Coskunpinar et al., 2013; Dir et al., 2013; Fischer et al., 2012; Stautz & Cooper, 2013). • Antisocial features (Hahn et al., 2016). Aggressivity (Gomez et al., 2022; McNicoll et al., 2023). Intermittent Explosive disorder (Um et al., 2018). • BPD (Fossati et al., 2014; Hahn et al., 2016; Lynam et al., 2011). • Compulsive shopping (Claes & Muller, 2017). • Eating Disorders (Anorexia Restrictive and Purgative) (Mallorquí-Bagué et al., 2020). Bulimia Nervosa (Fischer et al., 2003, 2008). Concern for Dieting (Mobbs et al., 2008). Obesity (Coumans et al., 2018; Delgado-Rico et al., 2012; VanderBroek-Stice et al., 2017). • Gambling disorder (Devos et al., 2020; Mallorquí-Bagué et al., 2018; Mestre-Bach et al., 2020; Savvidou et al., 2017). • Mobile phone dependence (Billieux et al., 2007). • Non-suicidal self-injury [NNSI] (Claes & Muehlenkamp, 2013; Claes et al., 2015; Dir et al. 2013; Lynam et al., 2011, 2015; Riley et al., 2015). • OCD (Prochazkova et al., 2018; Zermatten & Van der Linden, 2008). Rumination and procrastination (Rebetez et al., 2018). Indecisiveness (Barkley-Levenson & Fox, 2016). • Perfectionism (Christian et al., 2021). • Pornography use (Bőthe et al., 2019; Wéry et al., 2018). • PTSD (Hyatt et al., 2024; Kim & Choi, 2020; Mirhashem et al., 2017; Morris et al., 2020; Weiss et al., 2017). • Substance abuse (Hershberger et al., 2017; Leung et al., 2017; Smith & Cyders, 2016; Vanderveen et al., 2016; Vassileva et al., 2019). Smoking anxiety (Billieux et al al., 2007; Bos et al., 2019; Doran et al., 2009). • Suicidal ideation (Beach et al., 2022; Hamza et al., 2015; Lockwood et al., 2020; Ortin-Peralta et al., 2024; Scheve et al., 2024).

Positive Urgency Reinforcement of emotions that may become pleasurable. Tendency to perform impulsive behaviors in conditions of positive affect (e.g. euphoria).	• ADHD – Inattention and Hyperactivity/impulsivity (Gomez et al., 2022; Gomez & Watson, 2023). • Alcoholism, drinking problems and alcohol dependance (Coskunpinar et al., 2013; Fischer et al., 2012; Stautz & Cooper, 2013). • Antisocial features (Hahn et al., 2016; Maneiro et al., 2017) • Bipolar Disorder I/II (Carroll et al., 2022; Teh et al., 2024; Um & Cyders, 2019). • BPD (Fossati et al., 2014; Hahn et al., 2016). • Defiance and Vindictiveness (Gomez et al., 2022). • Eating Disorders (ED) (Mallorquí-Bagué et al., 2020). • Gambling disorder (Devos et al., 2020; Mallorquí-Bagué et al., 2018; Mestre-Bach et al., 2020). • Obesity (Delgado-Rico et al., 2012; VanderBroek-Stice et al., 2017). • Perfectionism (Christian et al., 2021). • PTSD (Mirhashem et al., 2017). • Risky sexual behavior (Zapolski et al., 2009). • Substance abuse (Hershberger et al., 2017; Leung et al., 2017; Smith &Cyders, 2016; Vanderveen et al., 2016; Vassileva et al., 2019).

Lack of Premeditation Higher tolerance to punishment. Reduced decision making without evaluating past and future. Poor executive control. Low self-control.	• ADHD - Inattention (Gomez et al., 2022; Gomez & Watson, 2023; Halvorson et al., 2021; Miller et al., 2010). • Alcoholism (Fischer et al., 2012; Stautz & Cooper, 2013) • Antisocial features (Hahn et al., 2016; Um et al., 2018); Intermittent Explosive Disorder (Um et al.,2018); Defiance (Gomez et al., 2022). Aggressive behaviors (Maneiro et al., 2017). • BPD (Hahn et al., 2016; Lynam et al., 2011). • Bulimia (Fisher et al., 2003,2008; Mallorquí-Bagué et al., 2020). • NNSI (Claes & Muehlenkamp, 2013; Claes et al., 2015; Lynam et al., 2011, 2015). • Obesity (Delgado-Rico et al., 2012). • OCD (Prochazkova et al., 2018; Zermatten & Van der Linden, 2008). • Perfectionistic' indecisiveness (Barkley-Levenson & Fox, 2016). • Substance use and Abuse disorder (Hershberger et al., 2017; Leung et al., 2017; Vanderveen et al., 2016; Vassileva et al., 2019; Um et al., 2018). • Suicidal ideation (Beach et al., 2022; Hamza et al., 2015; Lockwood et al., 2020).
Lack of Perseverance Lack of sufficient strength of reinforcers. Resistance to proactive interference (impaired ability to inhibit irrelevant thoughts or memories).	• ADHD - Inattention (Gomez et al., 2022; Halvorson et al., 2021; Haas et al., 2017; Miller et al., 2010). • Alcoholism (Coskunpinar et al., 2013; Fischer et al., 2012; Stautz & Cooper, 2013). • BPD (Hahn et al., 2016; Lynam, 2011). • Daydreaming and procrastination (Rebetez et al., 2018). Mental Effort Avoidance (Patzelt et al., 2019). • Dieting and Weight fluctuation (Mobbs et al., 2008). • Gambling disorder (Devos et al., 2020; Mallorquí-Bagué et al., 2018; Mestre-Bach et al., 2020). • Indecisiveness (Barkley-Levenson & Fox, 2016). • Kleptomania (Um et al., 2018). • NNSI (Claes & Muehlenkamp, 2013; Claes et al., 2015; Lynam et al., 2015; Riley et al., 2015). • No violent behaviors (Maneiro et al., 2017). • OCD (Prochazkova et al., 2018; Zermatten & Van der Linden, 2008). • Psychopathy (Gray et al., 2019). Defiance (Gomez et al., 2022). • Substance abuse (Hershberger et al., 2017; Leung et al., 2017; Vanderveen et al., 2016; Vassileva et al., 2019). • Suicidal ideation (Scheve et al., 2024)

Sensation Seeking Tendency towards exploratory activity in response to novel stimuli and active avoidance of monotony leading to impulsive decision making and engagement in novel and exciting behaviors.	• ADHD (Gomez et al., 2022). • Alcoholism (Fischer et al., 2012; Stautz & Cooper, 2013). • Antisocial features (Hahn et al., 2016; Maneiro et al., 2017). • Bulimia (Fisher et al., 2003, 2008; Cyders, 2008; Mallorquí-Bagué et al., 2020). • Gambling disorder (Devos et al., 2020; Mallorquí-Bagué et al., 2018; Mestre-Bach et al., 2020; Savvidou et al., 2017). • NNSI (Claes et al., 2015; Lynam et al., 2015). • Obesity (Delgado-Rico et al., 2012). • Paraphilic disorders (Um et al., 2018). • Psychopathy (Gray et al., 2019; Poythress and Hall, 2011). • Pyromania (Um et al., 2018). • Substance abuse (Hershberger et al., 2017; Leung et al., 2017; Vanderveen et al., 2016; Vassileva et al., 2019). • Weight fluctuation (Mobbs et al., 2008).

Table 9. Main Clinical and Behavioral Domains Associated with Each UPPS-P Facet.

It should be noted that both autism spectrum disorder and obsessive-compulsive disorder have not been studied using the UPPS-P because of limited research. This could be due to the fact that the explanatory model in these disorders would be dominated by a cross-cutting axis between compulsivity and impulsivity (Berlin & Hollander, 2014; Hollander et al., 2016; Hook et al., 2021; Namlı et al., 2023), as well as specific neuroanatomical changes (Boedhoe et al., 2020) that are investigated by behavioral inhibition (Hlavatá et al., 2018; Penadés et al., 2007; van Velzen et al., 2014) and cognitive flexibility tasks (Uddin, 2021). **Figure 3** exemplifies the differences for both dimensions.

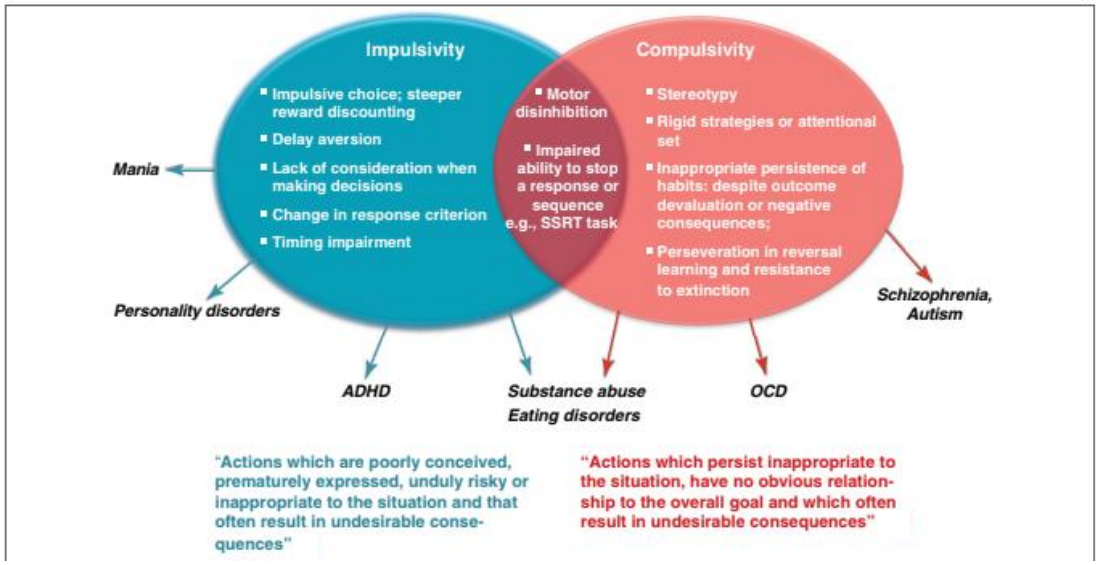


Figure 3. The impulsivity and compulsivity constructs. The diagram describes possible psychological mechanisms underlying the two constructs. From Robbins et al., (2012).

Table 10 summarizes the main neuroanatomical correlates associated with the UPPS-P dimensions, including both the global construct and its individual facets. This overview provides a neurobiological framework for understanding the partially distinct mechanisms underlying each impulsivity dimension, particularly in relation to affective reactivity, reward processing, and executive control. In this way, the table helps contextualize the multidimensional nature of impulsivity and supports the interpretation of the findings discussed later in this thesis.

UPPS-P facet	Neuroanatomical regions
Negative Urgency	• Amygdala, insula (Stewart et al., 2023), anterior cingulate cortex (Zhao et al., 2017), anterior striatum, inferior frontal gyrus, orbitofrontal cortex (Zhao et al., 2017), right inferior frontal gyrus (Albein-Urios, 2012), ventromedial prefrontal cortex (Zhao et al., 2017), dorsomedial prefrontal cortex and right temporal pole (Johnson et al., 2020; Muhlert & Lawrence, 2015; Wang et al., 2017) and precuneus (Zhao et al., 2017).
Positive Urgency	• Anterior cingulate cortex, orbitofrontal cortex, anterior striatum, right inferior frontal gyrus (Albein-Urios, 2012), insula anterior, amygdala, ventromedial prefrontal cortex, second somatosensory cortex (Johnson et al., 2020; Moreno-López et al., 2012).
Lack of Premeditation	• Orbitofrontal cortex, insula, posterior striatum, ventromedial prefrontal cortex, amygdala, dorsolateral prefrontal cortex, ventral striatum, supplementary motor area and median orbitofrontal cortex (Albein-Urios, 2012; Golchert et al., 2017), precuneus, posterior cingulate cortex, basal ganglia, thalamus and cerebellum (Abdallah et al., 2020), bilateral occipital cortex (Golchert et al., 2017).
Lack of Perseverance	• Left lateral prefrontal cortex and left anterior prefrontal cortex (Albein-Urios, 2012), bilateral dorsolateral prefrontal cortex and right inferior frontal gyrus (Golchert et al., 2017).
Sensation Seeking	• Left posterior cingulate cortex, right superior and middle frontal circumvolution, left dorsolateral prefrontal cortex and striatum (Albein-Urios, 2012), pericalcarine cortex and frontostriatal regions (Burnette et al., 2019; Miglin et al., 2019).

Table 10. UPPS-P and neuroanatomical correlates. Updated from Celma & Abella, (2015)

Adolescence as a Developmental Window of Vulnerability

Adolescence is a transitional developmental period between childhood and adulthood, marked by profound physical, cognitive, emotional, and social changes (Lozano-Vicente, 2014). From a physiological perspective, it begins with the onset of puberty and extends until adulthood, while the World Health Organization (2017) defines it as the period between ages 10 and 19. Beyond chronological definitions, adolescence is increasingly understood as a neurodevelopmentally sensitive stage characterized by substantial biological, psychological, and social reorganization (Konrad et al., 2013; Steinberg, 2008, 2010; Steinberg et al., 2008). This combination of ongoing brain maturation, hormonal changes, heightened emotional reactivity, and increasing social demands makes adolescence a particularly relevant period for the emergence and expression of impulsive and dysregulated behaviors. For descriptive and developmental purposes, adolescence is commonly divided into three broad stages (see **Figure 4 and Table 11**):

- Early adolescence is marked by the onset of puberty, with rapid physical growth, hormonal changes, and sexual maturation. These biological transitions often coincide with heightened emotional intensity and sensitivity, as well as emerging autonomy, which can contribute to increased conflict with parents and peers.
- Middle adolescence is characterized by continued physical development alongside the search for identity and independence. Adolescents often experience shifts in family dynamics, including conflicts and role renegotiation, as they assert their growing social and personal autonomy. Peer relationships and social comparison become increasingly salient during this stage.
- Late adolescence represents the transition toward adult roles, with physiological maturation largely complete. Psychosocially, individuals renegotiate relationships with parents, increasingly assume responsibility for decision-making, and prepare for independent life, education, or employment. This stage emphasizes identity consolidation, long-term goal setting, and emotional regulation in more complex social contexts.

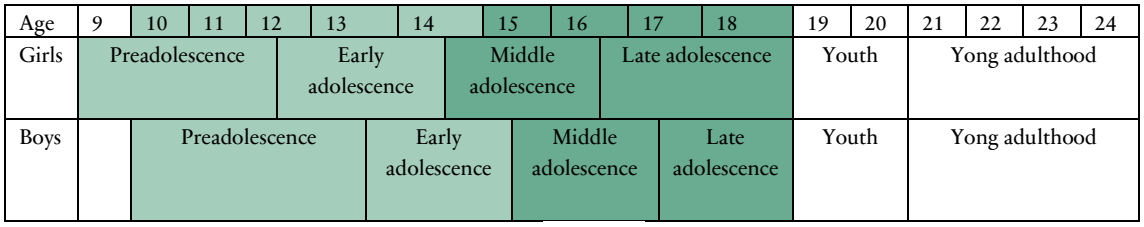


Figure 4. The stages of Adolescence. Adapted from McCarthy et al., (2016) & World health Organization [WHO], (2017).

From a neurodevelopmental perspective, adolescence is considered a period of heightened vulnerability because the maturation of brain systems involved in reward processing, emotional reactivity, and executive control does not occur synchronously. Subcortical and

limbic regions associated with affective salience and reward sensitivity tend to mature earlier, whereas prefrontal regions responsible for planning, inhibitory control, and self-regulation develop more gradually and continue maturing into early adulthood (Casey, 2015; Steinberg, 2010). This developmental imbalance may contribute to increased sensation seeking, emotional impulsivity, and context-dependent difficulties in decision-making, particularly under conditions of stress, social pressure, or heightened emotional arousal.

These changes include biological transitions, such as changes in body size and the onset of menstruation, as well as social transitions, including increased personal autonomy, intense peer group bonding growing distance from traditional authority figures, and emergence of first romantic relationships. Additionally, adolescence is characterized by important psychological changes, a greater tendency to question authority and increased introspection.

During adolescence, hormonal fluctuations and changing social environments may facilitate adaptation to new developmental roles, although this support is not always sufficient or consistent (Backes & Bonnie, 2019; Ruttle et al., 2024; UNICEF Office of Research, 2017). As a result, adolescents are often perceived as rebellious, inattentive, or audacious, without sufficient consideration of the developmental processes underlying these behaviors or their potential long-term implications. When environmental support and regulatory scaffolding are insufficient, the normative development of self-regulation may be compromised, increasing the likelihood of exploratory or risky behaviors such as substance use, early sexual activity, or rule-breaking behaviors (Carvalho et al., 2023; Romer, 2010). These developmental changes create a context in which impulsivity-related behaviors are more likely to emerge, particularly while executive and emotional regulatory capacities are still maturing.

Developmental domains	Preadolescence (ages 9-12 ages in girls; 10-13 in boys)	Early adolescence (ages 12-14 in girls, 13-15 in boys)
Body	• Growth spurt starts: • Body gradually acquires secondary sex characteristics. • Increase in body fat and weight.	• Girls' onset of menstruation (mean age= 12.4 years) • Boys' ejaculation (mean age= 13.4 years). • Significant growth spurt and a marked increase in sensation-seeking, particularly among boys (under discussion by gender theory: Buser et al., 2020; Frick, 2021)
Brain	• A gradual shift occurs from ego-centric to socio-centric thought. • More concrete logical thinking. • Increased craving for new information but language is still concrete. • Little development of prefrontal lobe and executive functions	• More abstract thinking. • There is still development of prefrontal lobe and executive function (e.g., decision making, judgment, problem-solving), particularly among boys. • Deepening of moral thinking
Sexual	• Boys and girls explore more differentiated masculine and feminine roles. • For girl's androgyny is a viable alternative to exclusive femininity, while for boys' exclusive masculinity is socially expected but new worlds perspective has raised a wide masculinity (Amin et al., 2018; Bacete, 2017; Exner-Cortens et al., 2021; Shawcroft et al., 2024)	• Sexual arousal increases, as does need for masturbation. • Other autoerotic behaviors, such as sexual fantasies and wet dreams occur. • Gender identity is developed in the first years of life, but becomes increasingly challenged; development of sexual orientation
Emotional	• A gradual increase in self-consciousness with fluctuations in self-image and feelings of embarrassment. • Emerging need for greater privacy, individuation, and more emotional autonomy from parents. • Growing capacity to differentiate shades and gradations among feelings • A gradual increase in sensation-seeking.	• High level of self-consciousness and fluctuations in self-image. • Level of stress increases, particularly among girls. • Need for more emotional autonomy from parents; de-idealization of one's parents, defining adolescent's own opinions. • Increase in emotional dependency on one's friends. • Intimacy, loyalty, and shared values and attitudes assume a greater weight in friendship

Social	• The need emerges for a same-sex "best friend". • Time is still spent with parents, and parental supervision is still present, but these start to decrease, accompanied by a gradual. increase in conflicts between the preadolescent and parents. • Susceptibility to peer pressure increases.	• More time spent with social subgroups (buddies) and/or alone. • Emerging interest in sex and/or "different" friends. • Less time spent with parents, parental supervision decreases, and conflicts about independence increase. • New social privileges are expected. • Susceptibility to peer pressure reaches its peak.

Table 11. Developmental stages of adolescence by age and gender across domains. Adapted from Mc Carthy et al., (2016). Extracted from World Health Organization [WHO], (2017).

Emotional Changes in Adolescence

Adolescence is characterized by substantial changes in emotional experience and regulation, with important implications for impulsivity. Compared to adults, adolescents experience a higher frequency and intensity of both positive and negative emotions, as well as greater emotional instability, particularly during early adolescence (ages 10–14) (Bailen et al., 2019). This instability gradually declines through mid- to late adolescence (ages 13–18), suggesting a progressive maturation of affective regulation. Gender differences also emerge in these patterns: girls generally exhibit greater emotional intensity and instability, along with less clarity in understanding their emotions, compared to boys. These differences may reflect both biological factors and socialization processes, as girls are often encouraged to engage with emotions more fully, while boys are often socialized to suppress or regulate their emotional expression (Amin et al., 2018).

Heightened emotional intensity and instability can amplify impulsive tendencies, particularly in situations requiring inhibitory control or delayed decision-making. Adolescents with greater emotional reactivity are more prone to rash responses, especially when facing environmental stressors such as social challenges or novel situations, thereby increasing vulnerability to risk-taking and mental health difficulties (Salk et al., 2016). Consistent with these findings, sensation seeking increase during early- to mid-adolescence, peaks around age 16, and then gradually declines in the mid-twenties (Harden & Tucker-Drob, 2011). Neurobiological evidence aligns with this trajectory, showing heightened responsiveness of subcortical regions involved in reward processing, novelty detection, and emotional salience during mid-adolescence (Del Piero et al., 2016; Silverman et al., 2015). The convergence of emotional volatility, reward sensitivity, and still-maturing regulatory systems creates a developmental context in which impulsive behaviors are more likely to emerge.

Psychopathological and Behavioral Risks in Adolescence

Adolescence represents a peak period for the onset of psychopathological disorders, several of which are characterized by heightened impulsivity as a transdiagnostic vulnerability factor (Hershberger et al., 2017; Harden & Tucker-Drob, 2011). Achenbach (1966, 2016) proposed a model distinguishing between two broad categories of disorders: internalizing and externalizing. These categories not only serve as indicators of clinical concern in the general population but have also been applied to classify students within educational settings, helping to identify those who may benefit from targeted interventions.

Internalizing disorders refer to behavioral problems that are internally focused and "overcontrolled," with symptoms related to social isolation, withdrawal, anxiety, and depression (Fan et al., 2023). Internalizing profiles are associated with less positive adjustment

in adulthood (Agnafors et al., 2023; Jamnik & DiLalla, 2019), including suicidal ideation in adolescence (Piqueras et al., 2019; Uno et al., 2024) being a victim of bullying (Kelly et al., 2015) and suicide attempts or completed suicide in adulthood (Bakken et al., 2024), which can be linked to impulsive actions. Studies on developmental trajectories of internalizing and externalizing symptoms in youth reported externalizing problems predicted future internalizing problems, but internalizing problems also significantly predicted future externalizing problems in adulthood (Liu et al., 2023).

In contrast, externalizing disorders refer to behavior problems that are evident in children's outward behavior, such as rule-breaking, aggression, and delinquency (Liu, 2004). The term conduct disorder is commonly used as a synonym for these types of disorder. This term refers to a group of behavioral and emotional problems and is part of the antisocial spectrum (Beauchaine et al., 2017). These behaviors include: aggression toward people and animals (e.g., bullying, threatening, or intimidating); destruction of property (e.g., intentionally destroying other people's property); deceitfulness, lying, or stealing (e.g., breaking into someone else's building, house, or car); and serious rule-breaking (e.g., often staying out at night despite parental objections). Antisocial behavior in adolescence is predictive of later antisocial behavior and negative outcomes in adulthood (Moffitt, 2018). Comorbidity with other disorders such as mood disorders, anxiety, PTSD, substance abuse, neurodevelopmental disorders such as ADHD, ASD, learning disabilities (Norozpour et al., 2023) and language disorders (Helland et al., 2014; Snow & Powell, 2012) is common. Impulsivity has long been considered a critical core of these disorders and is correlated with aggression and violent behavior (Beauchaine et al., 2017). Given this coherent spectrum of externalizing disorders, it is likely that these disorders are related as a continuum, with impulsivity serving as a common underlying mechanism.

Neuroanatomy: Impulsivity and Adolescence

Adolescence is characterized by ongoing maturation of cognitive control and inhibitory processes, which are essential for adaptive decision-making and the suppression of impulsive behaviors (Bailen et al., 2019; Spear, 2013). While basic inhibitory control develops early, its refinement continues throughout adolescence as neural circuits supporting executive function mature and stabilize. The still-developing and context-sensitive of these systems may contribute to variability in response inhibition and increased impulsivity during this developmental period. The contribution of prefrontal systems to inhibitory control is therefore central to understanding the neurodevelopmental basis of impulsivity. Key regions involved in these processes include the ventromedial prefrontal (vmPFC), orbitofrontal cortex (OFC), and dorsolateral prefrontal cortex (dlPFC) (**Figure 5**).

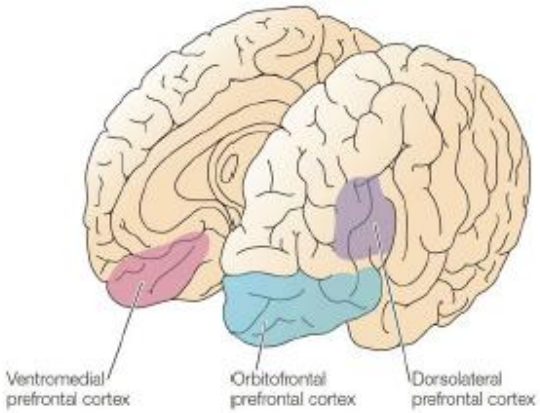


Figure 5. Prefrontal cortex areas. Reproduced from: Celma & Abella (2015).

The vmPFC is involved in decision-making, conflict monitoring, error detection, and the evaluation of risk and reward (Bechara & Damasio, 2005; Euston et al., 2012). The OFC contributes to reward valuation, reversal learning, prediction error signaling, emotional state representation, emotional reevaluation, and social cognition (Fettes et al., 2017). The dlPFC supports domain-general executive functions, including task switching, task-set reconfiguration, interference control, planning, working memory, and inhibitory control (Hart et al., 2013). Human neuroimaging studies using fMRI and MEG reveal that these prefrontal regions, along with the anterior cingulate cortex (ACC), show continued structural and functional development through adolescence, thereby influencing the maturation of self-control, executive functioning, and impulse regulation (Constantinidis & Luna, 2019). **Figure 6** illustrates the principal areas undergoing development and their interaction.

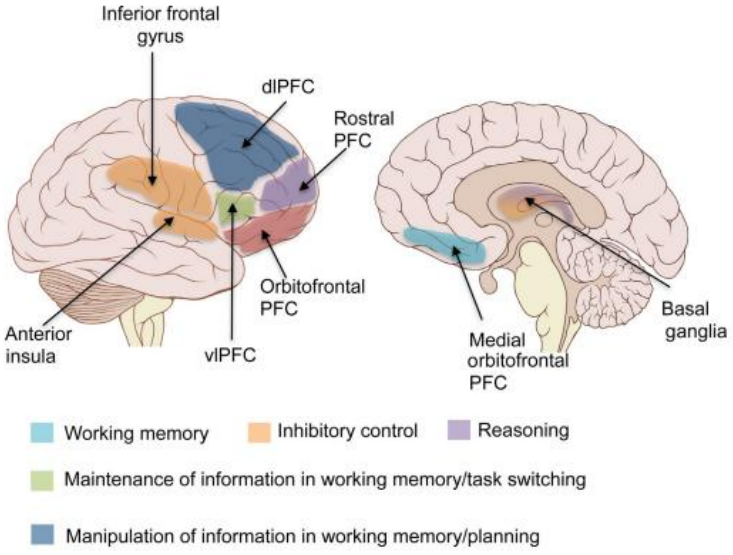


Figure 6. Main brain regions involved in adolescent. From Cristofori et al., (2019).

Several neurobiological models have been proposed to explain the characteristic behavioral profile of adolescent. The dual-system model distinguishes between a "cold" cognitive-control network, involving prefrontal and parietal regions and the ACC, with a "hot" affective-motivational network, including the amygdala, ventral striatum, OFC, medial PFC, and superior temporal sulcus (Steinberg, 2008; Dalley et al., 2011). Empirical evidence indicates that the affective-motivational network is relativaly more influential during adolescence, resulting in heightened reward sensitivity and risk-taking, whereas the cognitive-control network matures more gradually (Ahmed et al., 2015; Bailen et al., 2019). This framework also aligns with motivational models such as the Behavioral Inhibition System (BIS) and Behavioral Activation System (BAS), according to which delayed maturation of inhibitory mechanisms and early predominance of approach-related drives may contribute to impulsive behaviors (Carver & White, 1994; Steinberg et al., 2008).

Complementing the dual-system perspective, Casey (2015) emphasize a developmental mismatch between early-maturing subcortical limbic regions (e.g., nucleus accumbens, amygdala) and later-maturing prefrontal regions. This developmental lag in prefrontal-limbic connectivity may limit "top-down" control over "bottom-up" emotional and reward-driven responses, contributing to characteristic adolescent behaviors. Structural neuroimaging studies further support this developmental trajectory, showing that gray matter density peaks first in sensorimotor areas and later in prefrontal regions, reflecting prolonged prefrontal maturation (Porter et al., 2015). Increasing prefrontal connectivity with other cortical and subcortical regions is associated with improvements in sustained inhibitory control and planning across adolescence (Cristofori et al., 2019; Konrad et al., 2013). Rather than focusing solely on the relative strength of two systems, this model emphasizes that the connectivity between these regions is still developing during adolescence, thereby limiting the efficient regulation of emotional and reward-driven reactivity (**Figure 7**).

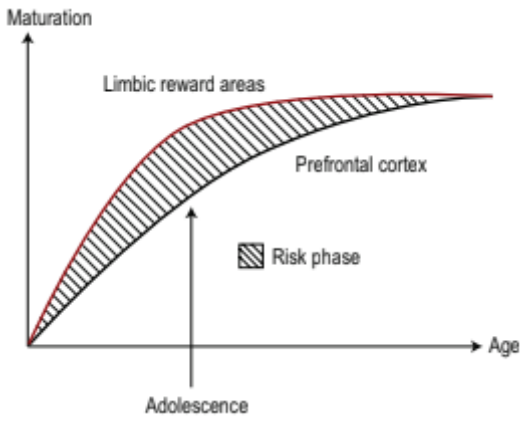


Figure 7. Casey proposal for Adolescence prefrontal evolution. Extracted from Casey (2015).

Neuroimaging studies of impulsivity further highlight distinct neural circuits underlying different forms of behavioral regulation and loss of control. "Stopping impulsivity," the capacity to suppress prepotent motor responses, relies on cortical motor areas, including primary motor cortex, supplementary motor area (SMA/pre-SMA), dorsal premotor cortex, and associated subcortical structures. In contrast, "waiting impulsivity," which refers to difficulties in withholding responses over time and is closely linked to top-down prefrontal control, primarily depends on prefrontal cortical networks interacting with subcortical regions (Dalley & Robbins, 2017; Dalley et al., 2011) (**Figures 8 and 9**). These dissociable circuits illustrate how the maturation of specific neural pathways contributes to the nuanced profile of adolescent impulsivity, encompassing both motor-driven and executive-control-related components.

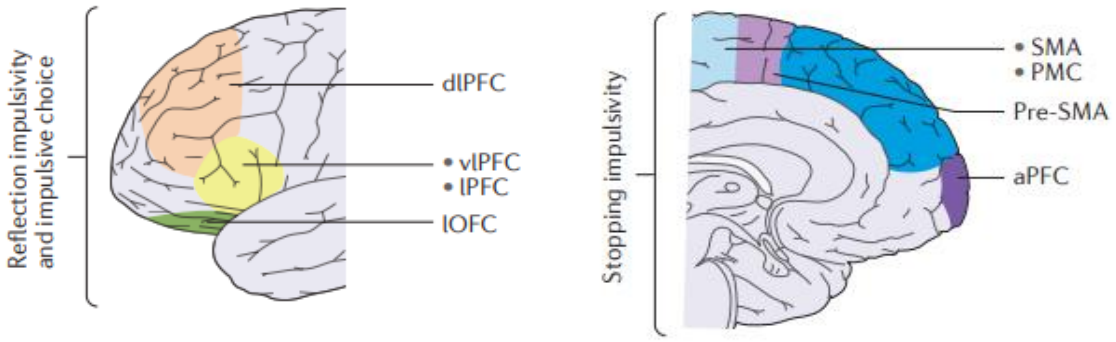


Figure 8. Impulsive choice (waiting impulsivity) and stopping impulsivity. The neural substrates of reflection impulsivity may involve the dorsolateral prefrontal cortex (dlPFC) and inferior parietal cortex. aPFC, anterior PFC; lOFC, lateral orbitofrontal cortex; lPFC, lateral PFC; mOFC, medial OFC; PMC, premotor cortex; pre-SMA, pre-supplementary motor area; vlPFC, ventrolateral PFC; vmPFC, ventromedial PFC. Reproduced from Dalley & Robbins, (2017).

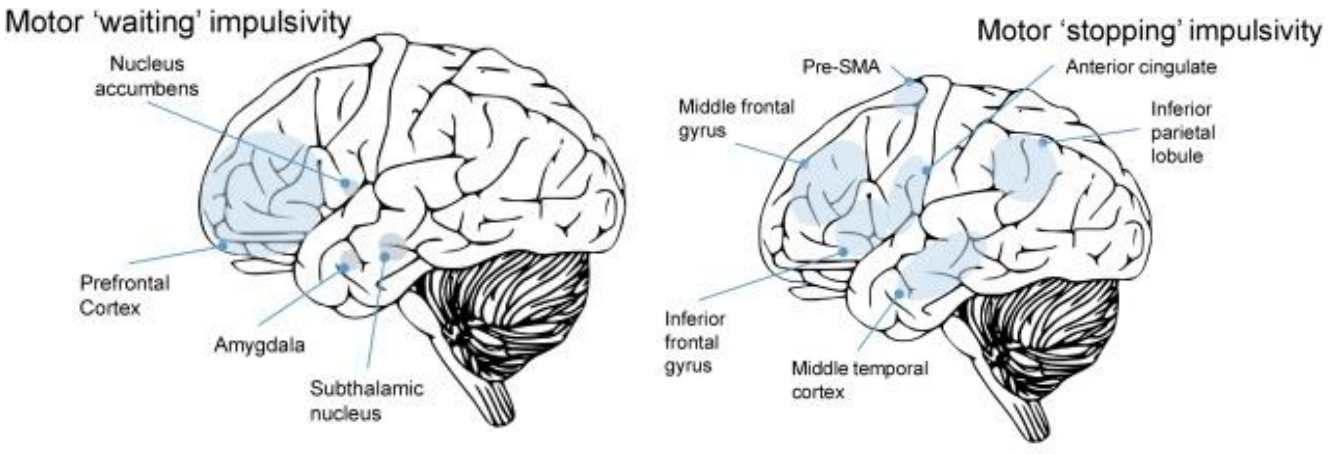


Figure 9. Waiting impulsivity and stopping impulsivity. Reproduced from Herman & Duka, (2019).

As a summary of these neural and behavioral implications, Celma and Abella (2015) categorized different forms of impulsivity according to prefrontal alterations and associated neuropsychological deficits. This framework highlights how specific prefrontal regions contribute to distinct impulsive behaviors and help establishing a structured link between neural maturation, cognitive control, and behavioral outcomes in adolescence (**Table 12**).

Type of Impulsivity (Diamond, 2013; Sharma et al., 2014)	Prefrontal syndrome	Underlying neuropsychological alterations
Inhibition problems	Medial	• Inhibition of predominant responses • Inhibition of previous responses (perseverations) • Inhibition of distractors
Inattention	Dorsolateral	• Maintenance of attention in activity • Maintenance and manipulation of information in working memory
Cognitive flexibility	Dorsolateral	Generation of response alternatives • Formulation of objectives • Development of action plans • Retrieval of relevant episodic memories (e.g., prospective memory) • Anticipation of behavior. Abstract reasoning

Table 12. Types of Impulsivities. Prefrontal alterations and possible underlying neuropsychological alterations

Age differences

Steinberg's foundational work on impulsivity and sensation seeking (Steinberg et al., 2007, 2008; Steinberg, 2008) consistently demonstrates developmentally graded differences in these traits. Across both self-report and performance-based tasks, impulsivity shows a linear decline from late childhood through adulthood (ages 10–30), a pattern replicated in prior studies using the Eysenck and Barratt scales (Galván et al., 2007; Leshem & Glicksohn, 2007; Patton et al., 1995). Additional evidence, such as lower impulsivity scores among college students compared with high-school students (Stanford et al., 1996), further supports this developmental decrease, although some findings may partially reflect selection effects. Despite these convergent results, Steinberg emphasizes the importance of normative data spanning broad developmental age ranges.

Neuropsychological measures provide convergent evidence for these developmental trajectories. For example, age-related improvements in impulse control have been observed on tasks such as the Tower of London, indicating that inhibitory control and planning capacities to mature steadily across adolescence (Albert & Steinberg, 2011; Kavanaugh et al., 2024; Steinberg et al., 2008). Notably, pubertal status appears to be associated with sensation

seeking, but not with impulsivity, suggesting distinct developmental pathways for these constructs. These behavioral findings align with neurobiological evidence showing continued maturation of fronto-cortical systems supporting self-regulation throughout adolescence and into the twenties (Casey, 2015; Paus, 2005).

Taken together, questionnaire, behavioral, and neurobiological evidence converge to indicate that impulse control improves steadily from childhood to adulthood, whereas sensation seeking follows a distinct trajectory. Steinberg (2008) proposes an inverted U-shape developmental trajectory for adolescent risk-taking: between ages 10 and 15, rising sensation seeking combines with still-immature impulse control, heightening vulnerability to risky behavior. After mid-adolescence, both sensation seeking and impulsivity decline, thereby reducing vulnerability to risk-taking behavior.

Longitudinal data further support these patterns. Harden and Tucker-Drob (2011), using a large and socioeconomically diverse sample of over 7,000 adolescents assessed up to five times across 12 years, report that impulsivity declines and stabilizes by the mid-20s, whereas sensation seeking peaks around age 16 before gradually decreasing. These results are consistent with the differential maturation of cortical (self-regulatory) and subcortical (reward-responsive) systems, and highlight significant individual differences in developmental trajectories. While the study was limited by brief measures of impulsivity and sensation seeking, its developmental patterns strongly replicate those identified by Steinberg et al. (2008), underscoring their robustness.

Recent work using the UPPS-P model also indicates age-related reductions in impulsive personality traits, particularly in urgency-related facets and sensation seeking (Littlefield et al., 2016), further reinforcing the general developmental trend toward reduced impulsivity with age.

Sex differences

Although the literature generally supports measurement invariance across sex (Argyriou et al., 2020; Cyders, 2013), evidence for meaningful sex differences in impulsivity remains limited, inconsistent, and highly context-dependent. Males are often overrepresented in socially problematic behaviors such as aggression and criminal activity, which have long been associated with impulsivity. However, sex differences measured through self-report or behavioral tasks are highly task- and construct-dependent, and findings are influenced by sample characteristics and cultural context (Cross et al., 2011; Weafer & de Wit, 2014).

Men are generally more likely than women to engage in novel or stimulating behaviors, a tendency that varies across developmental stages and social contexts and time and is influenced by both cultural and biological factors (Amin et al., 2018; Mmari et al., 2017; Romer et al., 2010; Van der Graaff et al., 2018). Differences in sensation seeking may reflect

interactions between genetic predispositions and socially transmitted information (Cross et al., 2013; Romer et al., 2010).

Specifically, research using the UPPS-P model provides a nuanced perspective on sex differences in impulsivity. Cyders (2013) examined a sample of 1,372 undergraduates and found clear evidence of measurement invariance, supporting psychometrically valid comparisons across sexes. Males reported slightly higher levels of Sensation Seeking and Positive Urgency, and possibly lower Perseverance, but the predictive relations between UPPS-P traits and risk outcomes were largely equivalent for men and women. Similarly, studies using the BIS-11 and other instruments have generally failed to identify robust sex differences (Cross et al., 2011; Patton et al., 1995).

A meta-analysis synthesizing 277 studies (Cross et al., 2011) found that men tend to show higher sensation seeking and behavioral risk-taking, whereas women tend to exhibit greater punishment sensitivity. However, effect sizes were highly heterogeneous across studies, reflecting persistent conceptual ambiguity surrounding impulsivity, which encompasses multiple partially overlapping psychological processes and diverse measurement approaches. This heterogeneity underscores the need for caution when interpreting sex-related differences in impulsivity and highlights the importance of integrating construct-specific measures and task-appropriate assessments.

Assessment of Impulsivity

Although impulsivity has been extensively examined across psychology and neuroscience, there is no single universally accepted assessment method, largely due to its multidimensional and context-dependent nature. Two primary approaches are commonly employed apart from clinical interviews. Self-report questionnaires capture individuals' subjective perceptions of traits such as poor planning, emotional dysregulation, or acting without forethought. Behavioral tasks provide objective performance-based indices of processes including response inhibition, delay discounting, and risk-taking under controlled conditions. Although multimethod assessment may enhance ecological validity and provide a more comprehensive characterization of impulsivity, practical constraints such as time demands, financial cost, and participant burden often limit its feasibility in large-scale research.

Self-report measures such as the UPPS-P and Barratt Impulsiveness Scale offer the advantage of capturing trait-level impulsivity directly from the individual, providing insight into relatively stable patterns of behavior and emotion-driven tendencies that may not be fully observable in laboratory tasks. They are also efficient and easy to administer, allowing researchers to collect data from large samples with minimal time and resources. However, self-reports are limited by subjective bias, as participants may underreport socially undesirable behaviors or lack accurate self-insight (Carvalho et al., 2023). Additionally, they may have reduced sensitivity to moment-to-moment fluctuations in impulsivity, limiting their ability to detect situational or context-dependent impulsive behaviors. **Table 13** summarizes the main self-report instruments used in the assessment of impulsivity.

Instruments	№ items	Dimensions / Subscales related to Impulsivity
Dickman Impulsiveness Inventory (DII) (Dickman, 1990)	23 items	Dysfunctional impulsivity Functional impulsivity
Eysenck's Impulsivity Inventory - IVE Questionnaire. (Eysenck, 1978)	63 items	Impulsiveness Venturesomeness Empathy
BIS/BAS Scales Behavioral inhibition, behavioral activation (Carver & White ,1994)	20 items	Behavioral Inhibition System (BIS) Behavioral Action System (BAS). Includes 3 sub-scales: Reward Responsiveness, Drive, and Fun Seeking.
BIS-11 (Patton et al. 1995)	8- to 30-items version	Motor Attentional Non-planning
UPPS-P (Lynam et al., 2006)	20 or 59 items	Negative Urgency Positive Urgency Lack of Premeditation Lack of Perseverance Sensation Seeking

Table 13. Main Self-report instruments used in the assessment of impulsivity. Although some broader personality scales include subscales related to impulse control, only the most widely used and cited self-report instruments are included here.

Behavioral measures for approaching impulsivity

To complement self-report measures and address their limitations, the literature has increasingly incorporated neuropsychological assessments targeting behavioral facets of impulsivity (Cyders & Coskunpinar, 2011, 2012; Nguyen et al., 2018). In adolescents, both self-report and behavioral approaches remain relatively understudied, and existing research is highly heterogeneous (Willhelm et al., 2016).

Behavioral impulsivity can be conceptualized along at least two components: impulsive choice and impulsive action (Weafer et al., 2013). Impulsive choice reflects a preference for immediate or risky rewards over larger, delayed, or more certain outcomes, indicative of difficulties in evaluating future consequences, and is commonly assessed using tasks such as the Balloon Analogue Risk Task (BART; Lejuez et al., 2002). Impulsive action refers to deficits in behavioral inhibition, the ability to suppress prepotent responses, and is typically measured using tasks such as the Stroop Color-Word Test and the Continuous Performance Task (CPT). The Stroop captures interference control and cognitive flexibility, particularly under conditions requiring inhibition of automatic reading or switching between rules, whereas the CPT indexes sustained attention and response inhibition over time. A third dimension, inattention, reflects increased distractibility and difficulty maintaining focus, which is often inferred from reaction-time measures, omission errors, or variability in responses (de Wit, 2009; Conners, 2014). Stroop and CPT performance together provide complementary behavioral indices of cognitive control and inhibitory regulation, core processes underlying impulsive behavior. Interference and switching difficulties on the Stroop, as well as lapses or commission errors on the CPT, reflect deficits in attentional and motor control consistent with the Barratt Impulsiveness Scale (Patton et al., 1995). Emotion-driven tendencies captured by the UPPS-P model (Whiteside & Lynam, 2001), particularly Negative and Positive Urgency, may exacerbate interference effects on Stroop trials and lapses in CPT performance. Correlations between self-report and behavioral measures are typically modest, reflecting differences in the constructs assessed (Cyders & Coskunpinar, 2011,2012; Willhelm et al., 2016).

Self-reports measures capture “typical performance,” reflecting stable tendencies across everyday contexts, whereas behavioral tasks assess “maximum performance,” reflecting capacity under constrained experimental conditions. By integrating Stroop and CPT performance with multidimensional impulsivity measures, it becomes possible to differentiate impulsivity arising from executive control deficits (attentional and motor impulsivity) versus emotion-driven urgency, thereby providing a mechanistic bridge between laboratory tasks and trait-level constructs.

AIMS AND HYPOTHESES

Background

It is estimated that approximately 50% of mental disorders begin during adolescence (Patalay & Gage, 2019; UNICEF, 2020). During this developmental period, youth and impulsivity often coexist in complex ways: at times, they appear harmonious, while at other times, they contribute to conflict and maladaptive behavior. Adolescence is associated with heightened susceptibility to problem behaviors, which are frequently linked to elevated impulsivity (Berg et al., 2015; Dir et al., 2014; Nigg, 2017; Romer, 2010).

However, despite the relevance of impulsivity during adolescence, there remains a lack of robust psychometric evidence for the main self-report measures used to assess this construct in Spanish adolescents, particularly regarding their factorial validity, measurement invariance, convergent validity, and normative distribution. This limitation is especially relevant in adolescence, where assessment often depends on instruments originally developed for adults and where the availability of age-appropriate normative data remains relatively scarce (Kulendran et al., 2016).

More specifically, the present thesis addresses impulsivity through two complementary assessment traditions. On the one hand, the UPPS-P framework captures impulsive personality pathways, particularly urgency-related, among other trait-based dimensions. On the other hand, the Barratt framework emphasizes cognitive, attentional, and motor components of impulsivity. Examining both models within adolescence may help clarify whether they converge on a shared transdiagnostic construct or instead reflect partially distinct underlying mechanisms.

In this context, examining both the full UPPS-P and its short version is not redundant. The full version provides greater psychometric refinement and is better suited for comprehensive trait-level assessment, whereas the abbreviated version is particularly relevant for applied clinical and educational settings in which brevity, feasibility, and reduced respondent burden are essential (Diersch & Walther, 2016; Fortgang & Cannon, 2022). Establishing whether both versions retain adequate psychometric performance in adolescence is therefore of both clinical and methodological relevance.

In daily clinical practice, professionals often encounter difficulties when trying to move beyond superficial symptom descriptions and toward a more precise understanding of the mechanisms underlying adolescents' behavior. This challenge is particularly relevant in person-centered and recovery-oriented models of care, which emphasize not only symptom reduction but also the individual's functioning, context, capacities, and developmental trajectory (Ragins & Sunkel, 2023; Stylianidis et al., 2016). For example, recovery-oriented approaches emphasize that mental health recovery involves more than symptom reduction;

it includes recognizing an individual's abilities, interests, hopes, and aspirations, as well as restoring meaningful social roles and relationships (Ragins & Sunkel, 2023). Within this framework, improving the psychometric and interpretative foundations of impulsivity assessment may contribute to more meaningful and clinically useful formulations. Given the transdiagnostic relevance of impulsivity and the continued lack of consensus regarding its optimal assessment, future research should aim to develop a more integrative framework for conceptualizing impulsive personality (Um et al., 2018).

Importantly, the Barratt model is not included solely as a convergent criterion. Given its historical and clinical relevance, as well as the persistent debate surrounding its latent structure in adolescence, it is also treated as a central object of study in its own right. This approach allows the thesis not only to compare different measures of impulsivity, but also to examine whether alternative factorial structures may provide a better representation of impulsivity in adolescence. This dual role also facilitates a systematic examination of overlap and divergence across impulsivity frameworks, particularly during adolescence, a developmental period in which executive control systems are still maturing (Casey, 2015; Steinberg, 2010). Ultimately, this strategy contributes to a more integrative understanding of impulsivity by clarifying how different conceptualizations capture overlapping yet non-identical aspects of the construct across developmental stages (Berg et al., 2015; Crisp & Grant, 2024; Hook et al., 2021; Schaub et al., 2023).

Although impulsivity can also be approached through behavioral and neuropsychological tasks, the present thesis focuses primarily on strengthening the psychometric and interpretative foundations of self-report measures in adolescence. Establishing this groundwork may also facilitate future integration with neuropsychological and behavioral approaches to impulsivity assessment (Rochat et al., 2018).

Methodologically, this study focuses on three main contributions. First, we examine the internal structure of impulsivity questionnaires using confirmatory approaches within a structural equation modeling framework, testing measurement invariance across relevant groups. Second, we assess validity in relation to demographic variables (age and sex) and the presence of self- or clinician-reported diagnoses, analyzing both main and interactive effects. Finally, we derive normative scales from the data to facilitate clinical and educational application, supporting evidence-based assessment and intervention in adolescence.

Accordingly, the present doctoral thesis is structured around three complementary empirical studies aimed at clarifying the psychometric validity, practical relevance, and conceptual overlap of the main self-report models of impulsivity in adolescence.

General objectives

The present doctoral thesis aims to examine the psychometric properties and practical utility of the main self-report measures of impulsivity in adolescence, with particular emphasis on their factorial structure, patterns of association across instruments, and normative data in Spanish samples. This objective is addressed through the study of two complementary assessment traditions, namely the UPPS-P framework and the Barratt model, in order to clarify their respective contributions to the measurement and conceptualization of impulsivity during adolescence. More specifically, the general objectives of this thesis are:

- To examine the psychometric properties of the main self-report measures of impulsivity in Spanish adolescents, including their internal structure, reliability, and, where applicable, measurement invariance across relevant demographic and sample subgroups.
- To evaluate the patterns of association and conceptual complementarity between the UPPS-P framework and the Barratt model in the assessment of adolescent impulsivity.
- To provide normative data for the self-report impulsivity measures examined in this thesis, with the aim of improving their interpretability and applicability in adolescent samples.
- To contribute to a more developmentally informed and clinically relevant assessment of impulsivity in adolescence by comparing complementary questionnaire-based models and examining the adequacy of their factorial structures and score interpretations for this developmental stage.

Specific Objectives and Hypotheses

Study 1. Psychometric Properties and Normative Data of the Spanish UPPS-P Impulsive Behavior Scale in Adolescents.

Objectives

- To examine the psychometric properties of the Spanish UPPS-P in a large adolescent sample, including its factorial structure, reliability, and score distribution.
- To assess the convergent validity of the UPPS-P dimensions through their associations with the Barratt Impulsiveness Scale.
- To analyze the relationships between UPPS-P dimensions and relevant demographic variables, particularly age and sex.
- To provide normative data to support the interpretation of UPPS-P scores in Spanish adolescent samples.

Hypotheses

- The 5-factor structure of the UPPS-P is expected to provide an adequate representation of impulsivity facets in adolescence, although some dimensions may show stronger intercorrelations, particularly between the Urgency facets and between Lack of Premeditation and Lack of Perseverance (Berg et al., 2015; Bussio et al., 2023).
- UPPS-P dimensions are expected to show meaningful convergent associations with the Barratt total score, particularly Urgency, Lack of Premeditation, and Lack of Perseverance (Lynam et al., 2026; Patzelt et al., 2019), whereas Sensation Seeking is expected to show weaker associations (Smith et al., 2007).
- The UPPS-P is expected to show very good to excellent internal consistency across its dimensions (Sonmez et al., 2024)
- No substantial age-related differences are expected across impulsivity facets, consistent with previous evidence suggesting relative stability of self-reported impulsivity during adolescence (Cyders, 2013; Littlefield et al., 2016).
- No consistent sex differences are expected across UPPS-P dimensions, given the heterogeneity of findings in both adolescent and adult samples (Argyriou et al., 2020; d'Acremont & Van der Linden, 2005; Bussio et al., 2023; Cross et al., 2011; Gialdi et al., 2021; Pinto et al., 2021; Sonmez et al., 2024).
- Full measurement invariance across sex and age groups is expected, in line with findings reported in adult samples (Argyriou et al., 2020; Cyders, 2013)

Study 2. Spanish Adolescent S-UPPS-P: Psychometric Properties and Normative Data.

Objectives

- To examine the psychometric properties of the Spanish adolescent short version of the UPPS-P (S-UPPS-P), including its factorial structure, reliability, and practical utility for adolescent assessment.
- To assess the convergent validity of the S-UPPS-P dimensions through their associations with the Barratt Impulsiveness Scale.
- To analyze whether S-UPPS-P scores vary as a function of relevant demographic variables and sample characteristics.
- To provide normative data to support the clinical and research interpretation of S-UPPS-P scores in adolescence.

Hypotheses

- The 5-factor structure of the S-UPPS-P is expected to provide an adequate and parsimonious representation of impulsivity facets in adolescents (Donati et al., 2021; Pechorro et al., 2021; Pompeia et al., 2018; Wang et al., 2020).
- The S-UPPS-P is expected to show convergent validity patterns comparable to those observed for the full UPPS-P (Eray et al., 2023), with weaker associations for Sensation Seeking than for the remaining impulsivity dimensions (Smith et al., 2007).

- No substantial differences are expected across age or sex, consistent with previous findings in adolescent and adult samples (Donati et al., 2021; Fournier et al., 2025).
- Internal consistency is expected to be acceptable, albeit lower than that observed for the full UPPS-P due to the reduced number of items (Claréus et al., 2017; Fournier et al., 2025).
- Full measurement invariance is expected across sex and age, as reported for the full UPPS-P in previous studies (Fournier et al., 2025), but not necessarily across sample types (Fossati et al., 2016).
- Given its brevity, the S-UPPS-P is expected to retain acceptable psychometric performance and clinical interpretability in adolescent populations (Fournier et al., 2025; Sönmez et al., 2024; Um et al., 2018).

Study 3. Psychometric Properties and Normative Data for the Spanish 15-item Barratt Impulsiveness Scale in Adolescents (BIS-15-A).

Objectives

- To examine the factorial structure and psychometric properties of the BIS-15-A in a Spanish adolescent sample.
- To identify the factorial solution that best represents BIS-15-A data in adolescence and to evaluate its interpretability from both developmental and clinical perspectives.
- To assess the convergent validity of the BIS-15-A with the UPPS-P Impulsivity Scale.
- To provide normative data to support the interpretation and practical use of the BIS-15-A in adolescent assessment.

Hypotheses

- The original 3-factor structure of the BIS may not show optimal fit in adolescents (Benk-Durmuş et al., 2022; Fossati et al., 2002; Kata & Poleszak, 2021), consistent with previous psychometric findings in Spanish samples (Martínez-Loredo et al., 2015) that question its stability across developmental stages and populations (e.g., Charles et al., 2021).
- Factorial analyses are expected to indicate item redundancy (Reise et al., 2013), suggesting that a shortened version may yield a more parsimonious factorial structure (Charles et al., 2021; Lindstrøm et al., 2016; Spinella, 2007), although item content and relevance may differ in adolescents compared to adults (Fossati et al., 2002; Martínez-Loredo et al., 2015; Yao et al., 2007).
- Internal consistency is expected to be similar to that reported for the original 3-factor structure (Vasconcelos et al., 2012).
- Alternative factorial solutions are expected to better represent BIS-15-A data in adolescence, as the original structure may conflate higher-order planning processes with more basic attentional and motor components operating at different levels of analysis (Diamond, 2013). In particular, a more parsimonious 2-factor structure is

hypothesized, distinguishing a Cognitive Control factor (encompassing attentional and executive processes) and a Motor factor reflecting action-oriented behaviors.

- BIS-15-A scores are expected to show meaningful convergent associations with UPPS-P dimensions, particularly Urgency, Lack of Premeditation, and Lack of Perseverance.

Future Research Considerations

Additional studies currently under review or in preparation may further explore longitudinal developmental patterns, the relationship between self-report and neuropsychological measures of impulsivity, and the transdiagnostic clinical applicability of impulsivity profiles in adolescence. These lines of work will be discussed in the **Future Research** section rather than treated as core hypotheses of the present thesis.

METHOD

Study Design and Sampling Framework

The present study employed a cross-sectional, multi-site design including both community and clinical adolescent samples. This approach was intended to ensure variability in sociodemographic characteristics, developmental stages, and psychopathological profiles, thereby enhancing the generalizability of the findings. For the community sample, an initial stratified epidemiological sampling strategy was implemented to ensure representation across different educational centers and geographical areas. However, final recruitment followed a pragmatic consecutive approach within participating schools. For the main clinical sample and the extended sample, participants were recruited using a consecutive sampling strategy based on accessibility within collaborating clinical services. All three studies were descriptive and stratified studies with sequential and convenience inclusion during January 2021 to December 2022 for the clinical sample and the academic course (September 2021- June 2022) for the community sample. The initial pooled sample was composed of 9.929 participants.

Participants and procedure

The data samples included in this research were derived from two different independent samples: a large community sample and an independent clinical sample. Detailed descriptions of each sample, including sociodemographic characteristics and inclusion/exclusion criteria, are provided in **Tables 14** and **15**. **Figure 12** shows the geographical distribution of the samples.

After application of the corresponding eligibility criteria and data quality screening procedures, the final pooled sample included a total of 8,944 adolescents from the community sample and 801 adolescents from the main clinical sample. The flow of admitted participants is presented in **Figure 10**.

The thesis draws on two primary samples. The first consists of a large community sample of approximately 9,000 adolescents recruited from 66 high schools. This sample was used in Studies 1 and 2. The second comprises a clinical sample of 905 patients recruited from a mental health service, of whom 789 met the inclusion criteria and were included in Study 3. Study 3 integrates both community and clinical data to examine group differences and psychometric properties across populations.

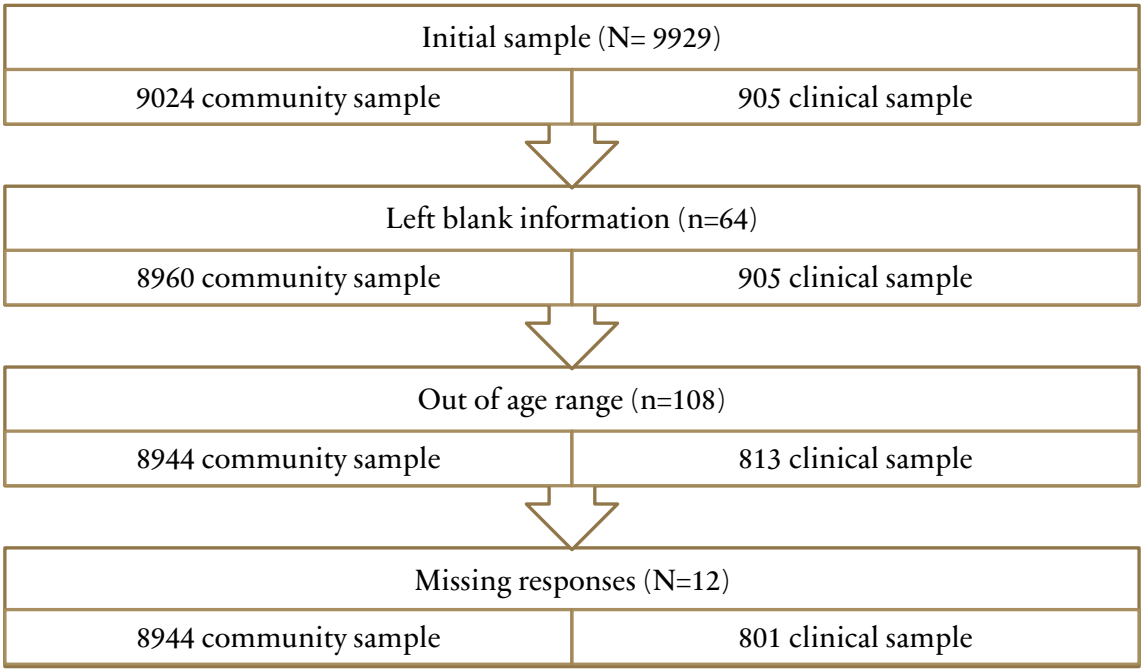


Figure 10. Flux diagram for the final sample.

The thesis comprises several articles employing different instruments, leading to variation in sample sizes and sample composition; the inclusion and exclusion criteria, together with the specific samples used in each study, are summarized in **Table 14**. Clinical and community samples

Study	Initial sample size	Sample Type	Inclusion Criteria	Exclusion Criteria	Final sample size
1	9024	Community	Enrolled in school	Intellectual disability Insufficient reading comprehension	8944
2	8600	Community	Enrolled in school	Intellectual disability Insufficient reading comprehension	8520
3	9024	Community	Enrolled academically	Intellectual disability Insufficient reading comprehension	8944
	905	Clinical sample	Receiving Hospitalization inpatient / day hospital treatment	IQ < 80[†] Insufficient reading comprehension	789
-*	905	Clinical sample	Receiving Hospitalization inpatient/day hospital treatment	Intellectual disability (IQ < 80) Insufficient reading comprehension	789

-*	1310	Extended Clinical sample	Receiving Under treatment of Hospitalization or Day Hospital	Receiving treatment; completed neuropsychological assessment (WISC-V or WAIS-IV and/or CPT-III and/or Stroop).	1270

Table 14. Sample composition and eligibility criteria across studies. *Unsubmitted manuscripts. † Only for the clinical sample

To complement the future research agenda, **Table 16** summarizes the characteristics of an extended clinical sample included within the broader research framework. This dataset comprises a final 1,270 cases recruited between 2016 and 2025 from the same mental health service (neuropsychology unit) and includes a wider range of assessment instruments. Although not included in the present analyses due to the scope of the thesis, this dataset is intended for future research. For this extended clinical sample (unsubmitted data), inclusion additionally required completion of at least one neuropsychological assessment (e.g., WISC–V or WAIS–IV and Continuous Performance Test, and/or Stroop task).

Community Sample

The community sample was recruited from 66 high schools across Catalonia (Spain) using a stratified sampling framework designed to approximate the representativeness of the adolescent population. Schools were selected based on key sociodemographic indicators, including population density, school type (public, publicly subsidized or private), and area-level family income, using publicly available administrative databases from the Government of Catalonia (2022a, 2022b). The stratification process aimed to ensure adequate representation of both urban and rural settings as well as socioeconomic diverse environments.

Eligible participants were adolescents aged between 11 and 19 years enrolled in compulsory or post-compulsory secondary education during the study period. Exclusion criteria included intellectual disability and insufficient reading comprehension to complete the assessment protocol under standardized conditions. Because participation depended on institutional agreement, the final community sample was derived from the pool of eligible educational centers that agreed to participate following the recruitment process.

Data collection followed the same core sociodemographic questionnaire and self-report measures under supervised administration conditions. All participants were characterized according to age and sex. Additional stratification variables for the school type included family income level, school type, and population density of the school catchment area. Additional descriptive variables collected for epidemiological characterization included grade repetition, family structure, country of birth, number of siblings, and preferred leisure activities. These variables were collected to support epidemiological characterization of the sample and to facilitate subgroup and sensitivity analyses. **Table 15** present the detailed

characteristics of the community sample, including the final composition of participating schools and the number of students recruited from each high school.

Variable	Category	Nº Students
Age Mean (SD): 14.25 (1.56)	11-13 years	3075 (34.4%)
	14-16 years	5084 (56.8%)
	17-19 years	785 (8.8%)
Family income level for counties and municipalities with more than 10,000 inhabitants (IDESCAT, 2022a, 2022b).	Low	1021 (11.5%)
	Medium-low	3392 (37.9%)
	Medium	1808 (20.2%)
	Medium-high	1471 (16.4%)
	High	1252 (14.0%)
Density of population Population density of people between 11 and 20 years old in Catalonia (IDESCAT, 2022a, 2022b).	Low	2892 (32.3%)
	Middle	2394 (26.7%)
	High	3658 (40.9%)
Type of schools (public, subsidized and private schools).	Public	3857 (43.1%)
	Subsidized	5004 (55.9%)
	Private	83 (0.9%)
Academic course	1rst ESO	1613 (18%)
	2n ESO	1835 (20.5%)
	3rd ESO	2255 (25.2%)
	4rth ESO	1826 (20.4%)
	1rst Batxillerat	641 (7.2%)
	2n Batxillerat	425 (4.8%)
	1rst Formació Grau Mig	156 (1.7%)
	2n Formació Grau Mig	168 (1.9%)
	Programes de Formació i Inserció (PFI)	25 (0.3%)
Students with repeated course	Yes	717 (8%)
	No	8227 (92%)
Place of Birth	Spain	8274 (92.5%)
	Europe	163 (1.8%)
	Africa	112 (1.3%)
	America	269 (3%)
	Asia	125 (1.4%)
	Oceania	1 (<0.1 %)
Siblings	Yes	7520 (84.1%)
	No	1424 (15.9%)
Sex	Male	4376 (48.9%)
	Female	4417 (49.48%)
	Non-Binary	151 (1.7%)
Type of Family	Cohabiting/married parents	6364 (71.2%)
	Separated/divorced parents	2159 (24.1%)
	Widowed parent	167 (1.9%)
	Single-parent family	215 (2.4%)
	Children under guardianship	18 (0.2%)

Type of Hobby	Sports	3970 (44.4%)
	Dance- sing- act	712 (8%)
	Write-Read-Paint-Draw	804 (9%)
	Practice Arts	38 (0.4%)
	Social Activities	391 (4.4%)
	Music	679 (7.6%)
	Videogames-Mobile-IT	888 (9.9%)
	Cook	80 (0.9%)
	Shopping	24 (0.3%)
	Velocity- Drive	72 (0.8%)
	Puzzles, scale models, board games	100 (1.1%)
	Travel	43 (0.5%)
	Activity with pets or animals	139 (1.6%)
	Fashion	14 (0.2%)
	Yoga meditation, relax or sleep	112 (1.3%)
	Series or TV	128 (1.4%)
	Volunteering and care for others	4 (<0.1%)
	Languages	19 (0.2%)
	Theatre or Cinema	66 (0.7%)
	Make-up or aesthetics	15 (0.2%)
	Photography, design or tattoos	29 (0.3%)
	Anime	73 (0.8%)
	Betting	8 (0.1%)
	Social network	27 (0.3%)
	Group activities (popular culture)	18 (0.2%)
	Nature	52 (0.6%)
	Science or robotics	41(0.5%)
	Learn	39 (0.4%)
	Moto bike skate scooter parkour	135 (1.5%)
	Food	20 (0.2%)
	No favorite hobby	204 (2.3%)
Self-report Diagnostics of the Community sample If they had knowledge of any diagnosis of Mental health problem by any mental health professional (self-reported)	Without disorder	7033 (78.6%)
	Attention deficit hyperactivity disorder	491 (5.5%)
	Language/learning impairment	468 (5.2%)
	Anxiety	406 (4.6%)
	Eating disorders	189 (2.1%)
	Autism spectrum disorders	157 (1.8%)
	Depression/mood disorders	151 (1.7%)
	Borderline personality disorder	3 (0.03%)
	Posttraumatic stress disorder	2 (0.02%)
	Fetal alcohol spectrum disorder	1 (0.01%)
	Other	43 (0.5%)

Table 15. Sociodemographic and sample diagnostics description characteristics of the community sample variables. Note. Educational stages are reported using the official Catalan school System terminology: ESO, compulsory secondary education; Batxillerat, upper secondary education. Grau Mig, Vocational Education and Training (VET), Programes de Formació i Inserció (PFI), School-to-Work Transition Program.

The final sample was derived from the pool of secondary schools and educational centers that agreed to participate following the recruitment and stratification procedures. The resulting sample reflects the distribution of participating institutions across the predefined sociodemographic strata. The final participating centers were as follows:

- Carmelites (Tarragona) 115 (1.3%)
- Cor de Maria (Valls) 194 (2.2%)
- Dominiques (BCN) 128 (1.4%)
- Educem (Granollers) 17 (0.2%)
- Escola Claret (Sabadell) 95 (1.1%)
- Escola Gimbernat (Sant Cugat) 39 (0.4%)
- Escola Guixot (Sabadell) 111 (1.2%)
- Escola Hosteleria Gastronomia (BCN) 8 (0.1%)
- Escola Joan XXIII (Tarragona) 213 (2.4%)
- Escola L'esperança (BCN) 90 (1%)
- Escola La Vall (Bellaterra) 71 (0.8%)
- Escola Mar Mediterrània (Mataró) 88 (1%)
- Escola Minguella (Badalona) 207 (2.3%)
- Escola PIA (Calella) 158 (1.8%)
- Escola PIA Santa Anna (Mataró) 423 (4.7%)
- Escola Regina Carmeli (Rubí) 113 (1.3%)
- Escola Sagrada Família (Viladecans) 188 (2.1%)
- Escola Sant Gregori (BCN) 129 (1.4%)
- Escola Virolai (BCN) 140 (1.6%)
- Fedac (Lleida) 67 (0.7%)
- Fedac (Salt) 89 (1%)
- INS 4 Cantons - Poblenou (BCN) 248 (2.8%)
- INS 9 (Santa Coloma Gramanet) 187 (2.0 %)
- INS Angel Tobies (El Vendrell) 89 (1%)
- INS Argentona 9 (0.1%)
- INS Arraona (Sabadell) 86 (1%)
- INS Badia del Vallès 31 (0.3%)
- INS Blancafort (La Garriga) 190 (2.1%)
- INS Candelera (Ametlla de Mar) 109 (1.2%)
- INS de Turó d'en Baldiri (Teià) 105 (1.2%)
- INS Egara (Terrassa) 204 (2.3%)
- INS els Gorgs (Cerdanyola del Vallès) 122 (1.4%)
- INS Els Roures (Dosrius) 28 (0.3%)
- INS Europa (Hospitalet) 50 (0.6%)
- INS Front Marítim (BCN) 15 (0.2%)
- INS Gabriela Mistral (Sant Vicenç Horts) 54 (0.6%)
- INS Jaume Almera (Vilassar de Dalt) 76 (0.8%)
- INS Josep Mestres i Busquets (Viladecans) 102 (1.1%)
- INS Júlia Minguell (Badalona) 32 (0.4%)
- INS La salle comtal (BCN) 402 (4.5%)
- INS Manolo Hugué (Caldes Montbui) 246 (2.8%)
- INS Manyanet les corts (BCN) 216 (2.4%)
- INS Marià Bell-Lloc (Bigues i Riells del Fai) 255 (2.9%)
- INS Maristes Anna Ravell (BCN) 133 (1.5%)
- INS Marta Estrada (Granollers) 57 (0.6%)
- INS Matadepera 259 (2.9%)
- INS Miquel Biada (Mataró) 25 (0.3%)
- INS Montgròs (Sant Pere de Ribes) 61 (0.7%)
- INS Narcís Monturiol (Figueres) 164 (1.8%)
- INS Palau Ausit (Ripollet) 45 (0.5%)
- INS Ramon Turró (Malgrat Mar)110 (1.2%)
- INS Roquetes (Tortosa) 379 (4.2%)
- INS Sant Josep (Sant Boi Llobregat) 241 (2.7%)
- INS Sils 227 (2.7%)
- INS Vall de Llèmena (Girona) 115 (1.3%)
- INS Vázquez Montalban (Sant Adrià B.) 89 (1%)
- Institució Igualada 41 (0.5%)
- La Concepció (Lloret de Mar) 202 (2.3%)
- La presentació (Reus) 222 (2.5%)
- La Salle (Premià de Mar) 402 (4.5%)
- Parc Estudi Granollers 36 (0.4%)
- Salesianes Sarrià (BCN) 209 (2.3%)
- Salesians (Mataró) 229 (2.6%)
- Vedruna (Palamós) 306 (3.4%)
- Vedruna (Puigcerdà) 115 (1.3%)
- Xaloc (Hospitalet Llobregat) 140 (1.6%)
- **INS Damià Campeny (Mataró) 77**[1]

[1] High school that translated and administered the UPPS-P in Catalan as a pilot study (not included in the studies).

Clinical Sample

A clinical subsample was incorporated primarily for Study 2 and as part of the broader research framework of the thesis. This clinical subcohort (N=905) was recruited from inpatient and day hospital units within the ITA Salud Mental network in Catalonia, including ITA Argentona, ITA La Garriga, ITA Sabadell, ITA Avenir, ITA Urgell, and ITA Anglí. Recruitment followed a consecutive sampling strategy throughout the study period and included adolescents receiving treatment, during the study period, for a range of psychiatric conditions, including behavioral disorders, eating disorders, neurodevelopmental conditions, and other mental health conditions treated within these specialized hospital programs.

Participation was voluntary and no financial compensation was provided. All procedures were implemented in accordance with institutional ethical and data protection standards and were overseen by the ITA Ethics Committee. Written informed consent was obtained from all participants and their legal guardians prior to participation, and confidentiality was ensured through anonymized data management procedures. Assessment instruments were administered primarily in group-based formats, although individual or small-group sessions were conducted when clinically indicated or logistically required. For descriptive and analytic purposes, diagnoses categories were grouped into five into broad domains (see **Figure 11**).

Detailed clinical and demographic characteristics of the sample are presented in **Table 16**. In addition, to the samples directly used in the three published studies, the thesis includes an extended clinical sample described to support the future research agenda of the doctoral project. This sample was not part of the core analyses of the three principal articles, but is presented to contextualize subsequent planned work on the relationship between self-reported impulsivity and neuropsychological performance.

Participants in this extended clinical sample were drawn from the same broader clinical context and were included in this cohort if they had completed at least one of the following assessments as part of their clinical evaluation: WISC-V or WAIS-IV, and/or Continuous

Performance Test, and/or Stroop Test. The main characteristics of this sample are summarized separately in **Table 17**.

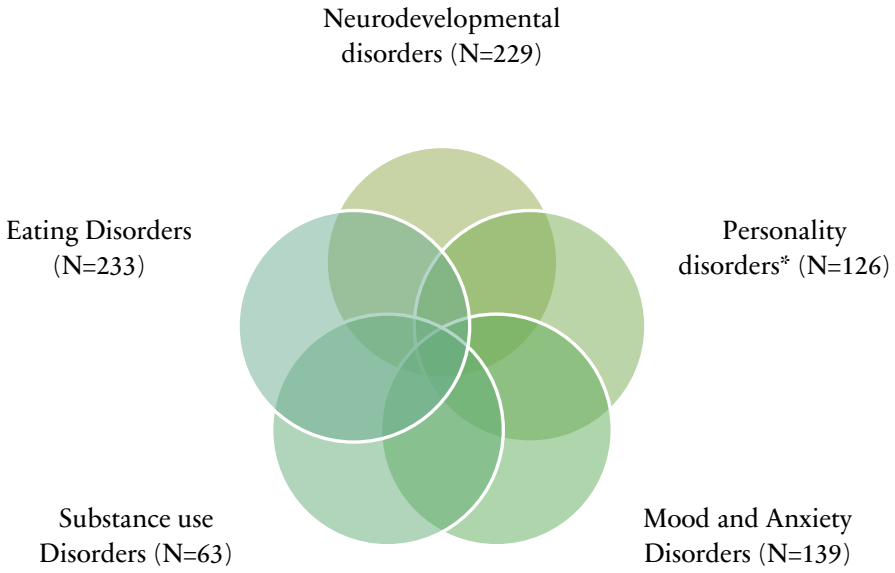


Figure 11. Classification of clinical diagnoses. The main diagnoses were divided into: Neurodevelopmental disorders including attention deficit hyperactivity disorder (ADHD), autism spectrum disorder (ASD) and fetal alcohol spectrum disorder (FASD). Mood and anxiety disorders including Depression (with Self-harm and/or suicidal ideation) post-traumatic stress disorder (PTSD). *Personality disorders (or at least incipient traits) as borderline personality disorder (BDP) and obsessive-compulsive disorder (OCD). Eating Disorders including Anorexia restrictive and purgative (I and II), Binge disorder and Bulimia. Substance abuse disorders (majorly Cannabis).

Variable	Category	Nº Patients
Age Mean 15.8 (SD – 1.66)	11-13 years	61 (7.6%)
	14-16 years	457 (57.1%)
	17-19 years	283 (35.3%)
Place of Birth	Spain	677 (84.5%)
	Europe	61 (7.6%)
	Africa	11 (1.4%)
	America	37 (4.6%)
	Asia	14 (1.7%)
Siblings	Yes	674 (84.1%)
	No	127 (15.9%)
Sex	Male	173 (21.6%)
	Female	616 (76.9%)
	Non-Binary	8 (1%)
Academic Course	1r ESO	17 (2.1%)
	2n ESO	68 (8.5%)
	3r ESO	157 (19.6%)
	4rt ESO	227 (28.3%)
	1rst Batxillerat	97 (12.1%)
	2n Batxillerat	101 (12.6%)
	Formació Grau Mig	71 (8.8%)
	Formació Grau Superior	11 (1.4%)
	University	48 (6%)
	6è Primaria	3 (0.4%)
	USE	1 (0.1%)
Students with repeated course	Yes	181 (22.6%)
	No	620 (77.4%)
Type of Family	Cohabiting/married parents	495 (61.8%)
	Separated/divorced parents	269 (33.6%)
	Widowed parent	18 (2.2%)
	Single-parent family	19 (2.4%)
Type of Hobby	Sports	223 (27.8%)
	Dance- sing- act	95 (11.9%)
	Write-Read-Paint-Draw	139 (17.4%)
	Practice Arts	9 (1.1%)
	Social Activities	63 (7.9%)
	Music	98 (12.2%)
	Videogames-Mobile-IT	22 (2.7%)
	Cook	11 (1.4%)
	Shopping	3 (0.4%)
	Velocity- Drive	2 (0.2%)
	Puzzles, scale models, board games	17 (2.1%)
	Travel	11 (1.4%)
	Activity with pets or animals	20 (2.5%)
	Fashion	6 (0.7%)

	Yoga meditation, relax or sleep	2 (0.2%)
	Series or TV	1 (0.1%)
	Volunteering and care for others	2 (0.2%)
	Languages	14 (1.7%)
	Theatre or Cinema	4 (0.5%)
	Make-up or aesthetics	7 (0.9%)
	Photography, design or tattoos	3 (0.4%)
	Anime	1 (0.1%)
	Betting	2 (0.2%)
	Social network	2 (0.2%)
	Group activities (popular culture)	8 (1%)
	Nature	2 (0.4%)
	Science or robotics	1 (0.1%)
	Learn	6 (0.7%)
	No favorite hobby	18 (2.2%)
Treatment regime	Inpatients	515 (65.3%)
	Day Hospital regime	274 (34.7%)
Admission diagnosis	Eating Disorder	
	Behavior Disorder and/or substance use disorder (SUD)	
	Autism Spectrum Disorder (ASD)	
	Mood Disorder or Depression (with Self-harm and/or suicidal ideation)	
Principal or primary diagnosis	ADHD	89 (11.1%)
	Anorexia Restrictive (I)	117 (14.6%)
	Anorexia Purgative (II)	47 (5.9%)
	ASD	98 (12.2%)
	Border Line Personality Disorder (BDP)	78 (9.7%)
	Binge disorder	33 (4.1%)
	Bulimia	36 (4.5%)
	Depression (with Self-harm and/or NNSI)	78 (9.7%)
	FASD	42 (5.2%)
	OCD	43 (5.4%)
	PTSD	61 (7.6%)
	SUD (Cannabis)	63 (7.9%)
	Others	16 (2.1%)

Table 16. Sociodemographic characteristics, treatment regimen, admission, and primary diagnoses of the clinical sample. Note. Educational stages are reported using the official Catalan school System terminology: ESO, compulsory secondary education; Batxillerat, upper secondary education; Grau Mig, Vocational Education and Training (VET); Programes de Formació i Inserció, School-to-Work Transition Program; Formació Grau Superior, Certificate of Higher Education (HNC); 6e primària 6th course Primary Education; USE, Intensive Support for Inclusive Schooling. ADHD, attention deficit hyperactivity disorder; ASD, autism spectrum disorder; NNSI, Non-suicidal self-injury; FASD, Fetal alcohol spectrum disorder; OCD, Obssesive-Compulsive Disorder; PTSD, Posttraumatic stress disorder.

Extended Clinical sample (N=1270)	Category	Nº Patients
Treatment regime	Inpatients	760 (58.1 %)
	Day Hospital regime	222 (17 %)
	Outpatient	138 (10.5 %)
	Controls (participants: individuals without a current or prior psychiatric or neurological diagnosis)	122 (9.3 %)
Admission diagnosis	Eating Disorder	301 (23 %)
	Behavior Disorder and/or substance use disorder (SUD)	324 (24.8 %)
	Autism Spectrum Disorder (ASD)	158 (12.1%)
	Mood Disorder or Depression (with Self-harm and/or NNSI)	237 (18.1 %)
Principal or primary diagnosis	ADHD	252 (19.3 %)
	Anorexia Restrictive (I)	24 (5.3 %)
	Anorexia Purgative (II)	69 (1.8 %)
	ASD	399 (30.5%)
	Borderline Personality Disorder (BPD)	65 (5 %)
	Bulimia	14 (1.1 %)
	Depression (with Self-harm and/or NNSI)	29 (2.2 %)
	FASD	55 (4.2%)
	OCD	16 (1.2%)
	PTSD	26 (2 %)
	SUD (Cannabis)	46 (3.5%)
	Others	95 (23.9%)

Table 17. Treatment regimen, admission, and primary diagnoses of the extended clinical sample. Note: ADHD, attention deficit hyperactivity disorder; ASD, autism spectrum disorder; NNSI, Non-suicidal self-injury FASD, Fetal alcohol spectrum disorder; OCD, Obsessive-Compulsive Disorder; PTSD, Posttraumatic stress disorder.



Figure 12. Geographic distribution of the participating centers. The study included 66 Secondary Schools (Private, Public, and Subsidized) and 8 mental health clinics (Ita Salud Mental) Across various regions of Catalonia.

Instruments and assessment

Data were collected using a multimethod assessment approach that combined standardized self-report questionnaires and neuropsychological measures with established psychometric properties. Sociodemographic variables and selected clinical information were obtained through a structured sociodemographic survey administered to both the community and clinical samples. This survey included demographic characteristics, as well as relevant educational, family variables, and, when applicable, clinical background variables (**Table 18**).

All instruments included in the thesis were selected on the basis of their relevance to the assessment of impulsivity in adolescence. Prior to data collection, written authorization was obtained from the original authors or publishers when required, and officially adapted versions or authorized assessment materials were used in accordance with copyright and ethical standards. Administration procedures followed standardized guidelines to ensure consistency across assessment contexts. Not all instruments were administered to every sample: for the community sample, resource constraints limited assessments to those collected directly by the researcher, whereas for the clinical samples, some data were obtained with the support of the neuropsychology service, and additional measures from the extended clinical sample were collected as part of routine clinical practice.

Construct	Type	Instruments	Community sample (N=9024)	Clinical sample (N=905)	Extended Clinical Sample (N=1270)
Impulsivity	Self-report	UPPS-P	9024	876	-
		BIS Barratt Scale	8520	441	-
	Neuropsychological	CPT-III	-	219	560
		Stroop Task	-	231	686
Executive function and Attention	Neuropsychological	Cowat	-	-	571
		Animals	-	-	574
		TMT (A and B)	-	-	103
		Tower of London	-	-	480
Speed Processing	Neuropsychological	Symbol Digits Oral Test	-	-	435
Memory	Neuropsychological	TAVECI	-	-	212
		RAVLT	-	-	166
		Rey's figure	-	-	640
Organization and perceptual integration	Neuropsychological	VOT	-	-	72
		JLO	-	-	59
Intelligence		WISC-V	-	-	522
		WAIS-IV	-	-	422

Table 18. Neuropsychological constructs, corresponding assessment instruments, and their use in community, clinical, and extended clinical samples. Note: CPT-III, Continuous Performance Test 3rd edition™; COWAT, El Controlled Oral Word Association Test; TMT, Trail Making Test; TAVECI, Test de Aprendizaje Verbal España-Complutense Infantil; RAVLT, Rey- Auditory Verbal Learning Test; VOT, Hooper Visual Organization Test; JLO, Judgment of Line Orientation; WISC-V, Wechsler Intelligence Scale for Children fifth Edition; WAIS-IV, Wechsler Adult Intelligence Scale Fourth Edition.

Sociodemographic Survey

Sociodemographic and contextual variables were collected with an ad hoc structured survey administered to all participants. This questionnaire included information on age, sex, country of birth, family structure, number of siblings, grade repetition, and school-related contextual variables, such as school type, population density, and area-level socioeconomic indicators in the community sample. Additional questions on self-reported mental health diagnoses were included when relevant, and in some school settings this information was complemented by school psychological services. In the clinical sample, diagnostic information was obtained from clinical records and grouped into broader diagnostic categories for descriptive and analytic purposes.

Self-report Measures of Impulsivity

UPPS-P Impulsive Behavior Scale

Impulsivity traits were assessed using the *UPPS–P Impulsive Behavior Scale* (Lynam et al., 2006). The Spanish version adapted by Verdejo-García et al. (2010) was administered. This self-report instrument comprises 59 items assessing five dimensions of impulsivity: Negative Urgency, Positive Urgency, Lack of Premeditation, Lack of Perseverance, and Sensation Seeking. Items are rated on a 4-point Likert-type scale ranging from 1 (*strongly agree*) to 4 (*strongly disagree*). Subscale scores are computed by summing item responses within each domain, with reverse scoring applied where appropriate. Higher scores indicate greater levels of trait impulsivity across the respective dimensions. The UPPS–P has demonstrated adequate reliability and construct validity in adolescent and adult samples and is widely used within multidimensional models of impulsivity. In the present thesis, the UPPS-P was used primarily in **Study 1** as the main instrument for evaluating the psychometric properties and normative interpretation of impulsivity traits in adolescents, and as a convergent criterion in **Study 3**.

Barratt Impulsiveness Scale: BIS-11-A (Barratt Impulsiveness Scale 11th for Adolescents)

The Barratt Impulsiveness Scale for Adolescents (BIS-11-A) (Fossati et al., 2002; Spanish adaptation by Martínez-Loredo et al., 2015) was used to assess a more global and cognitively oriented model of impulsivity, emphasizing Motor, Attentional, and Non-planning aspects. This version includes developmentally appropriate modifications of selected items from the adult form to ensure relevance for adolescent populations. Each item describes impulsivity-

related cognitions or behaviors across everyday contexts (e.g., attentional control, planning, and behavioral regulation) and is rated on a 4-point Likert-type scale ranging from 1 (*rarely/never*) to 4 (*almost always/always*). Subscale scores are calculated by summing item responses within each dimension, applying reverse scoring when necessary, and a total impulsivity score is derived by summing all items. Higher scores reflect greater levels of impulsivity.

For **Study 3**, the focus shifted to the BIS-15-A, based on the 15-item version proposed by Spinella (2007). In this study, the shortened version was examined as the main psychometric object of interest, with the aim of identifying its most appropriate factorial structure and practical interpretability in Spanish adolescents. This distinction between the BIS-11-A as a convergent criterion and the BIS-15-A as a primary object of validation should be made explicit in the thesis, as it is central to the rationale of the third article.

Neuropsychological Measures

Continuous performance Test (CPT-III)

Sustained attention and response inhibition were assessed, when available, using the Conners Continuous Performance Test, Third Edition (CPT-III™; Conners, 2014). The CPT-III™ is a computerized continuous performance task designed to evaluate attentional functioning and inhibitory control in individuals aged 8 years and older. The administration requires approximately 14 minutes and consists of six blocks subdivided into three sub-blocks of 20 trials each. Stimuli are presented at variable inter-stimulus intervals (1, 2, and 4 seconds), allowing the evaluation of vigilance, sustained attention, and temporal changes in performance, including potential fatigue or vigilance decrement effects.

During the task, participants are instructed to respond by pressing the space bar whenever any letter appears on the screen (target stimulus), except for the letter "X," which serves as a non-target stimulus requiring response inhibition. This go/no-go paradigm provides behavioral indices of attentional control, impulsive responding, and processing speed under continuous performance demands.

The CPT-III™ generates both raw and standardized scores, including indices of omission errors (inattention), commission errors (impulsivity), perseverative responses, hit reaction time (HRT), reaction time variability, detectability, and overall vigilance. Although reaction time measures provide indirect indicators of attentional and inhibitory processes, they may also be influenced by non-cognitive factors such as arousal, fatigue, motivation, or task engagement; therefore, results were interpreted within a broader multimethod assessment framework. Normative scoring procedures adjust for age and sex effects to enhance

interpretability (Conners, 2014; Newcorn et al., 2001; Conners et al., 2003). Despite the lack of correlation (Fields et al., 2009; Vasconcelos et al., 2014), it is important to include assessments that are not based solely on self-report scales, as cognitive tasks allow for evaluation of impulsive functioning through direct and indirect measures, such as neuropsychological tests and performance metrics. Although the CPT-III has not yet been analyzed in the present research, it was included for use in future research to provide a complementary, performance-based measure of attentional control and response inhibition.

Stroop Test

The Stroop Color-Word Interference Test is a widely used measure of cognitive control and selective attention (Stroop, 1935; Golden, 1978, 2020; Delis et al., 2001; Scarpina & Tagini, 2017). The Stroop effect demonstrates the difficulty in naming the ink color of a word when the color and the semantic meaning are incongruent. For instance, identifying the ink color of the word "red" printed in blue ink requires longer response times and greater cognitive effort compared to when the ink color and word meaning are congruent (MacLeod, 1991). This phenomenon reflects the automaticity of reading and the interference that arises when processing conflicting information.

Different versions of the Stroop test measure interference in slightly different ways. The Golden version (Golden, 1978, 2020) assesses performance by the number of correct responses within a fixed time interval, whereas the D-KEFS version (Delis et al., 2001) primarily records the time required to complete a fixed number of items.

In this study, we administered the Golden version (Golden, 2020), comprising three standard conditions, each lasting 45 seconds:

- Condition 1 (C1 – Color Naming): Participants name patches of colors as quickly and accurately as possible.
- Condition 2 (C2 – Word Reading): Participants read aloud the words "red," "blue," and "green" printed in black ink.
- Condition 3 (C3 – Color-Word Inhibition): Participants name the ink color of the words "red," "blue," and "green" when the word meaning is incongruent, requiring inhibition of the automatic reading response.

Additionally, we included a fourth condition (C4) adapted from the Color-Word Interference Test (CWIT) in the D-KEFS (Delis et al., 2001), but using a 45-second administration consistent with the Golden version. In this condition, participants must switch between naming the ink color and reading the word, depending on whether the word appears inside a box. This inhibition/switching task can be more challenging than the classic Stroop interference condition (C3) for some individuals (Lippa & Davis, 2010). While this condition has been rarely applied to adolescents, existing normative data are limited to the original D-KEFS manual (Delis et al., 2001) and adult samples (Espenes et al., 2024; Tsatali et al., 2024).

In this thesis, the Stroop task was selected due to its long history of publication, versatility in administration, and extensive use in studies involving both self-report measures and clinical populations, such as addiction (Albein-Urios et al., 2014; Martínez-Loredo et al., 2018), where impulsivity is a key factor. Its ability to assess inhibitory control and to examine the functioning of different cognitive components through performance-based measures provided an advantage over other instruments, particularly for collecting data from adolescents, where certain facets of the Stroop task, such as inhibition/switching, remain underexplored. Although the results have not yet been analyzed in the present study, the Stroop task was included to be administered in future research as a complementary measure of cognitive inhibition and executive control within adolescent populations and to complement data from CPT-III (Rucklidge, 2006).

STATISTICAL ANALYSIS

Prior to analysis, the data were carefully screened and cleaned: incomplete or unfinished protocols were excluded. Data from the community sample were collected via Google Forms, with all items set as mandatory, thereby preventing missing responses. Only incomplete or unfinished protocols were excluded from the analyses. In the clinical sample, assessments were administered using paper-based protocols, which were subsequently entered manually into the database. Analyses were conducted using the maximum available sample for each variable and study, allowing inclusion of all valid observations while minimizing data loss. The proportion of excluded data was documented, with most exclusions resulting from lack of participant collaboration or incomplete task performance, ensuring that the final dataset included only reliable and interpretable observations for subsequent analyses.

All statistical analyses were conducted using IBM SPSS Statistics (V.27) for Windows and Stata, selected for their complementary strengths in psychometric evaluation, multivariate modeling, and advanced statistical procedures. The analytical strategy was guided by the specific objectives of each study, as well as by the measurement level and distributional properties of the variables under examination. Accordingly, descriptive, inferential, psychometrics and multivariate techniques were applied following established methodological standards in psychological and psychometric research. Given that the thesis comprises multiple empirical studies with partially distinct but related methodological aims, the specific analytical procedures, model specifications, and estimation strategies adopted in each study are described in detail within the corresponding manuscripts presented in the Results section. A comprehensive overview of the statistical procedures employed across studies is provided in **Table 19**, which summarizes the main analytical techniques and their respective purposes within the overall research framework.

Analytical Purpose	Statistical procedure	Primary purpose
Descriptive analyses Sample Description	Descriptive statistics Means, standard deviations, frequencies, and percentages	To characterize the samples and summarize the distribution of sociodemographic, clinical, and questionnaire variables. Used to summarize sociodemographic, clinical, and questionnaire data (e.g., means, standard deviations, frequencies, percentages).
Group comparisons	Independent-samples *t*-test / Analysis of variance (ANOVA)	To compare mean differences across three or more independent groups. Used to compare mean scores across demographic or clinical groups.
Associations between variables	Pearson's correlation coefficients	To estimate the degree of linear association between continuous variables. Used to examine linear associations and convergent validity between impulsivity measures
Psychometric structure: Internal structure	Exploratory Factor Analysis (EFA)	To explore the latent dimensional structure of impulsivity-related measures. Used to explore the latent structure of a measure when model fit was uncertain or alternative structures were considered.
Psychometric structure: Internal structure	Confirmatory Factor Analysis (CFA)	To test the fit of theoretically specified measurement models. Used to test the fit of hypothesized factorial models based on prior theory or previous research.
Psychometric structure: Internal structure	Exploratory Structural Equation Modeling (ESEM)	To evaluate multidimensional structures while allowing for theoretically plausible cross-loadings. Used to estimate more flexible factorial models allowing cross-loadings while preserving a structural equation modeling framework.
Reliability analyses	Internal consistency coefficients. McDonald's ω	To estimate the reliability of questionnaire scores across impulsivity dimensions. Used to estimate the internal consistency of questionnaire scores. McDonald's omega (ω) was used instead of Cronbach's alpha because it provides a more accurate estimate of internal consistency when items have unequal factor loadings or the scale is multidimensional.
Measurement invariance	Multi-group CFA / ESEM	Used to test whether the internal structure of the instruments was comparable across sex, age, or sample groups. Used to ensure that factor structure, loadings, and item intercepts are comparable across samples (e.g., community vs. clinical adolescents) before making group comparisons.
Normative analyses	Percentile-based descriptive analyses. Percentile ranks, T-scores, SEm	To derive reference values and normative information for clinical and research use. Used to generate normative reference values and improve score interpretability in adolescent assessment.

Table 19. Overview of statistical procedures used across studies.

Ethics

All studies were conducted in accordance with the Declaration of Helsinki (World Medical Association, 2013). Ethical approval was granted by the Universitat Autònoma de Barcelona, Comitè d'Ètica i Experimentació Animal i Humana (CEEAH; approval No. 6494). Authorization for recruitment in educational centers was obtained from the Departament d'Educació de la Generalitat de Catalunya (approval No. 9067/490777/2021) and from the administration of each participating secondary school. For the clinical sample, the study was additionally reviewed and approved by the internal Ethics Committee of ITA Salud Mental and authorized by the company's CEO (Mr. Jaume Raventós). Written informed consent was obtained from all participants and their legal guardians prior to data collection. All procedures complied with ethical standards for research involving minors and clinical populations. Data were handled confidentially in accordance with applicable data protection regulations.

RESULTS

Study 1

Psychometric Properties and Normative Data of the Spanish UPPS-P Impulsive Behavior Scale in Adolescents

Study 2

Assessing impulsivity in adolescents: Psychometric properties of the Spanish short S-UPPS-P

Study 3

Psychometric properties and normative data for the Spanish 15-item Barratt Impulsiveness Scale in adolescents (BIS-15-A)

Study 1: Psychometric properties and normative data of the Spanish UPPS-P Impulsive Behavior Scale in adolescents

Montasell-Jordana, E., Penelo, E., Blanco-Hinojo, L., Pujol, J., Billieux, J., & Deus, J. (2025). Psychometric Properties and Normative Data of the Spanish UPPS-P Impulsive Behavior Scale in Adolescents. *Journal of Personality Assessment, 107*(2), 234–243.
https://doi.org/10.1080/00223891.2024.2399184

318 Views. 1 CrossRef citations to date. 1 Altmetric

Journal of Personality Assessment (JPA) is the official journal of *the Society for Personality Assessment*. It publishes research on methods and applications related to the psychological assessment of psychopathology, maladaptive personality traits, and normative personality processes. In particular, manuscripts reporting on the psychometric development of instruments are evaluated with regard to their methodological rigor, as well as the theoretical and empirical contribution of the findings to the broader assessment literature. JPA is a well-established and highly regarded journal within the field of clinical psychological assessment and is widely recognized among specialists in personality and psychometric research.

Journal metrics and indexing (year of publication)

- Journal Impact Factor (JIF): 2.0
- Quartile: Q2 (Q1 according to CiteScore Best Quartile)
- 5-year Impact Factor: **3.2** (**2024**)

Scopus metrics (2024)

- CiteScore: 6.3
- SCImago Journal Rank (SJR): 1.287
- H-index: 122
- CiteScore rank 2024
    - 51/313 **83**th percentil Clinical Psychology
    - 126/580 78th percentil Medicine - Psychiatry and Mental Health

Citations

- Web of Science (WoS): 10.984
- Scopus: 1.775
- Google Scholar: 43

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Psychometric properties and normative data of the Spanish UPPS-P Impulsive Behavior Scale in adolescents

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ABSTRACT

Impulsivity is a multidimensional construct linked to a broad spectrum of psychopathological and neuropsychological disorders. The UPPS-P model has emerged as a valuable tool for assessing impulsivity from a multi-dimensional perspective. Despite its relevance, few studies have examined the psychometric properties of the UPPS-P scale scores in a large, representative sample of adolescents. This study aims to evaluate the psychometric properties of the Spanish UPPS-P in adolescents and to establish normative data for this population in Spain. To this end, 9024 students aged 11-19 from 66 different Spanish high schools were included. The fit for the expected 5-factor model, assessed through confirmatory factor analysis, was inadequate (CFI and TLI ≤ .85, RMSEA = .063), but becomes satisfactory when employing the more flexible ESEM approach (CFI and TLI ≥ .94, RMSEA = .038), which was invariant across gender and age. Internal consistency reliability was satisfactory (ω = .83 to .94). Convergent validity with the Barratt Impulsiveness Scale-11-A total score was good (r = .53 to .60). We provide population norms of the UPPS-P, which may help practitioners to interpret the UPPS-P scores of adolescents from the general population in Spain. Subsequent research should explore implications for both clinical and non-clinical settings.

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Impulsivity, a multi-dimensional personality trait, involves acting on immediate urges rather than thoughtful responses (Nigg et al., 2005; Patton et al., 1995). High impulsivity has been associated with cognitive impairments and various problem behaviors, as well as engaging in risky behaviors that can contribute to the development of mental health problems in adulthood (Bailen, et al., 2019).

Impulsivity is a prominent trait during adolescence, spanning from ages 10 to 19 according to the World Health Organization (WHO, 2021). During this developmental period, heightened emotions and poor inhibitory control make adolescents more prone to impulsive actions and experimentation with potentially risky behaviors, such as drug use, early sexual activity, or delinquent and aggressive behaviors, compared to older individuals (Bailen, et al., 2019).

Assessing impulsivity in adolescents is challenging due to the paucity of psychometric instruments tailored to this age group, with most instruments originally developed for adults (Black et al., 2022; Smith et al., 2009). In addition, the appropriateness of existing measures for assessing impulsivity in adolescents is currently being explored (Joyner et al., 2021). Whiteside and Lynam (2001) introduced a widely accepted impulsivity framework based on the five-factor personality model (Costa & McCrae, 2008) that integrates theoretical perspectives on impulsivity as a stable personality trait normal to pathological, as an isolated symptom defining specific mental disorders, and as a clinical disorder-shaping presentation as observed in intermittent explosive disorder (Joyner et al., 2021).

Whiteside & Lynam (2001) factor analyzed components (items) from various self-report impulsivity measures (e.g., Temperamental Cloninger Inventory [TCI-R]; Cloninger, 1994; Dickman's Functional and Dysfunctional Impulsivity Survey [DII]; Dickman, 1990; and the Barratt Impulsiveness Scale [BIS]; Patton et al., 1995), NEO-PI-R (Costa & McCrae, 2008) facets of Impulsiveness (Negative Urgency), Excitement Seeking (Sensation Seeking), Self-Discipline (Perseverance), and Deliberation (Premeditation), and developed a multi-dimensional measure labelled as UPPS and later labelled as UPPS-P including the Positive Urgency scale (Cyders et al., 2007; Lynam et al.,

2006). Negative Urgency, Lack of Premeditation, Lack of Perseverance, Sensation Seeking, and Positive Urgency represent facets of the impulsive personality in a variety of expressions and constructs associated with many diagnoses and pathologies in adults (Gay et al., 2008; Rochat et al., 2018; Wilbertz et al., 2014) and in youth (see, e.g., Sonmez et al., 2024). Notably, recent discussions by Billieux et al. (2021) have raised questions about whether Negative and Positive Urgency constitute a single coherent construct, underscoring the established central role of Urgency as a transdiagnostic risk factor for a wide range of mental disorders (e.g., Berg et al., 2015; Halcomb et al., 2019; King et al., 2018). Simultaneously, the underlying UPPS-P impulsivity model has been widely discussed from neuropsychological perspectives (Bechara & Van der Linden, 2005; Rochat et al., 2018), offering an integrated framework that considers neurocognitive and affective aspects of impulsivity.

The UPPS-P scale has been adapted to different languages (see, e.g., Um et al., 2018) and validated in adolescents, including a French version of the original UPPS scale (d'Acremont & Van der Linden, 2005), and the Chilean version of the UPPS-P (Bussio et al., 2023), with normative data being available for adults for the Brazilian version (Pinto et al., 2021) and the Italian version (Gialdi et al., 2021).

In adolescents, previous research by Bussio et al. (2023) showed that the 59-item and 5-factor model had poor fit using Confirmatory Factor Analysis (CFA). However, Exploratory Structural Equation Modeling (ESEM) yielded better results for several solutions, ranging from 3- to 5-factor models. In contrast, prior validation studies of the UPPS-P in adults found the expected 5-factor structure (Fossati et al., 2016; Gialdi et al., 2021; Pinto et al., 2021; Verdejo-Garcia et al., 2010; Zhang et al., 2020). Some studies using CFA obtained unsatisfactory results, leading to item exclusion (Zhang et al., 2020), parceling of observed variables (e.g., Pilatti et al., 2015), or reliance on Root Mean Square Error of Approximation (RMSEA) while disregarding alternative model fit indices (Bousardt et al., 2018). Higher correlations were observed between Negative and Positive Urgency, and between Lack of Premeditation and Lack of Perseverance. By contrast, Sensation seeking is recognized as a

distinct dimension of impulsivity, linked to motivational aspects such as novelty seeking, excitement, and arousal. Thus, it operates largely independently of other traits (Romer, 2010; Sperry et al., 2016). Similar factor loadings and factor correlations across gender have been reported in previous research (Whiteside & Lynam, 2001). Additionally, measurement invariance has been found across age and gender in adults (Argyriou et al., 2020; Cyders, 2013; Gialdi et al., 2021; Pinto et al., 2021). In preadolescents, measurement invariance has been established across various demographic characteristics like gender, ethnicity, household income, and parental education (Watts et al., 2020). UPPS-P scores have shown acceptable internal consistency reliability across diverse languages, with coefficients ranging from .69 to .97 (Fossati et al., 2016; Gialdi et al., 2021; Lim & Lee, 2014; Pinto et al., 2021; Verdejo-Garcia et al., 2010). Regarding convergent validity, low to medium but statistically significant correlations have been reported between the BIS and UPPS-P scale scores (Bussio et al., 2023; Fossati et al., 2016; Lim & Lee, 2014). The BIS offers a broader discipline-neutral model synthesized from various disciplines for assessing impulsivity from a behavioral approach rather than as a characteristic of an individual (Whiteside & Lynam, 2003). This instrument has been widely used in psychiatry and psychology for decades and has influenced the conceptualization of impulsivity (Stanford et al., 2009). Regarding differences on scale scores by gender, there has been heterogeneity among the effect sizes found across studies (Cross et al., 2011). In adolescents, research has indicated that Sensation Seeking was higher in boys than in girls with a medium effect size, but girls scored slightly higher compared to boys on Negative Urgency with effect sizes between small and medium (d'Acremont & Van der Linden, 2005; Littlefield et al., 2016). Lastly, previous research providing normative data (Gialdi et al., 2021; Pinto et al., 2021) found no significant differences in age and gender among adults, thus establishing a single norm for adults.

To our knowledge, no study has provided normative data for adolescents, as validation studies have often focused on specific clinical samples in adolescents (Sonmez et al., 2024). This study aimed to fill this gap by pursuing three specific objectives: a) to test the factor structure, measurement invariance across

gender and age, and internal consistency of the UPPS-P scale scores; b) to examine convergent validity with an alternative self-reported measure of impulsivity; and c) to explore the relationship between UPPS-P scores with external measures as gender and age, and, accordingly, to provide normative data for the Spanish adolescent population. As previously mentioned, we hypothesize a low correlation of Sensation Seeking and a medium correlation for the rest of the UPPS-P scales with the total BIS score. We do not expect differences in UPPS-P scale scores regarding age, whereas in terms of gender we avoided formulating specific hypotheses due to the variety of results of the previous validation studies available.

Method

Transparency and Openness

This study's design and its analysis were not preregistered. All data, analysis code, and research materials are available upon request from the first author.

Participants

Participants were recruited for this study using cluster sampling from schools located throughout the territory of Catalonia, Spain. The database of the Department of Education of the Generalitat de Catalunya (Government of Catalonia, 2022a, 2022b) was used to select schools of different types (private, public and subsidized), as well as different academic courses. The databases of the Institut d'Estadística de Catalunya (IDESCAT) were consulted for data clustering on population density and family income level (IDESCAT, 2022a, 2022b). A total of 66 secondary schools were randomly selected and considered for the study during the academic year 2021-2022. The inclusion criteria for participants enrolled in these schools was being aged between 11 and 19. Exclusion criteria comprised: students who were in special education or adapted courses, and individuals with an insufficient level of reading comprehension in Spanish.

The initial sample comprised 9024 participants who agreed to take part in the study. Data of participants who omitted information or left the administration blank during the data collection process (n = 64) and those who fell outside the specified age range (n = 16) were excluded, resulting in a final sample of 8944 participants. The socio-demographic variables were self-

reported by the students in an ad hoc survey, along with a list of mental health disorders. Participants were prompted to specify whether they had received a diagnosis from a mental health professional, with a detailed list of specific disorders provided for reference; an open-ended question was incorporated to capture any additional disorders. In fewer than 10% of schools, psychological disorders were instead identified by the school's psychological services after the survey administration. Sample characteristics are displayed in Table 1.

Instruments

UPPS–P Impulsivity scale (Lynam et al., 2006). We used the Spanish adult version of the UPPS-P adapted by Verdejo-García et al. (2010). This self-report questionnaire consists of 59 items and aims to assess the five distinct personality pathways to impulsive behavior mentioned in the introduction: Negative Urgency (e.g., "When I feel rejected, I will often say things that I later regret"), Lack of Perseverance (e.g., "Once I get going on something I hate to stop"), Lack of Premeditation (e.g., "I like to stop and think things over before I do them"), Sensation Seeking (e.g., "I quite enjoy taking risks"), and Positive Urgency (e.g., "I tend to lose control when I am in a great mood"). Each item is rated on a 4-point Likert scale ranging from 1 (*strongly agree*) to 4 (*strongly disagree*). Subscale scores are calculated by summing the item responses (reversed when necessary). Higher scores indicate higher levels of impulsivity.

BIS-11-A (Barratt Impulsiveness Scale, version 11 for adolescents; Fossati et al., 2002). We used the Spanish version adapted for adolescents by Martínez-Loredo et al. (2015) to evaluate convergent validity, since the BIS-11-A is the most widely used psychometric instrument in the field and has significantly influenced the way impulsivity has been conceptualized in psychology and psychiatry for decades (Stanford et al., 2009). The BIS-11-A consists of 30 items that measure various aspects of impulsivity, including motor, unplanned, and attentional dimensions. Each item in the BIS-11-A presents a statement describing impulsivity-related thoughts or behaviors in different situations. Participants respond to each item using a 4-point Likert scale, ranging from 1 (*rarely/never*) to 4 (*almost always/always*). The total score is obtained by summing the item responses, with items

reversed when necessary, and ranges from 30 to 120, with higher scores indicating higher levels of impulsivity. In our sample, we found good internal consistency reliability for the BIS-11-A total score, with an omega coefficient of .84.

Procedure

The procedure received approval from the ethics committee of (blinded) and also authorization from the Department of Education of the Government of Catalonia (Spain) for recruiting centers. Initial contact with schools was established with the director, providing an overview of the research goals and a request for cooperation. Upon the schools' agreement to participate, each institution's administration reviewed and approved the detailed study protocol. An information sheet was furnished to each participating institution, and a video document explaining the study's characteristics, objectives, and future guidelines was sent to the school administration for parental communication. To inform parents about the study, a two-week notice period was given during which they could opt their minor children out of the research. The self-reported questionnaires and the ad-hoc survey for socio-demographics and mental health problems were administered collectively during a one-hour academic session with the assistance of a teacher, and the main researcher was present at that time. An online platform was utilized for administration to facilitate data collection. All students received an information sheet assuring them that their data would be treated confidentially and only be used at the group level. In four centers, the ad-hoc survey for socio-demographics did not include the mental health section and school services reported the diagnosis of mental disorders directly to the first author (on the basis of their own internal data protection protocols).

Statistical Analysis

Analyses were conducted with SPSS29 and MPlus8.9 programs. Internal structure of UPPS-P items was analyzed with CFA and ESEM (Asparouhov & Muthén, 2009) with target rotation. In both CFA and ESEM, we relied on weighted least squares means and variance adjusted (WLSMV) estimator and theta parameterization (Millsap & Yun-Tein, 2004). ESEM is a more flexible approach than CFA, because ESEM with target rotation estimates the factor loadings of all items on all the factors, 5 in our case, but restricts values on

non-intended factors (nontarget loadings) to be as close as possible to 0, whereas CFA limits each item to load only onto its intended factor and all possible cross-loadings on non-intended factors are restricted to be 0. We tested a 59-item and 5-factor model with correlated factors. Goodness-of-fit was assessed with the common fit indices (Jackson et al., 2009): Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Root Mean Square Error of Approximation (RMSEA). The following thresholds were considered (Brown, 2015): excellent fit for CFI and TLI > .95 and RMSEA < .05 and moderate fit for CFI and TLI > .90 and RMSEA < .08. CFA or ESEM approach was selected based on relevant better fit, to test measurement invariance across gender and age, following the usual sequence (e.g., Vandenberg & Lance, 2000) and steps for categorical indicators (Muthén & Muthén, 1998-2017), in addition to reporting requirements (Putnick & Bornstein, 2016). The factor-variance strategy was used for model identification (for details at each step, see, for example, Ezpeleta & Penelo, 2015). Given that group sizes were unequal (Chen, 2007), the sensitivity of chi-square to sample size and model complexity, both aspects being our case, and that our purpose of measurement invariance testing was to filter out small non-invariance to achieve approximate measurement invariance in our large sample size (Cao & Liang, 2022), the following combined criterion (D'Urso et al., 2022) was adopted as indicative of a meaningful worsening in fit and, thus, of non-invariance when comparing between nested models: both a significant chi-square difference test and at least one between a decrease in CFI > .005 or an increase in RMSEA > .015 (Chen, 2007). Internal consistency reliability of the UPPS-P scale scores was assessed with the omega coefficient (McDonald, 1999). Pearson's correlation coefficients were used to evaluate the convergent validity with BIS-11-A impulsivity total score.

Lastly, differences among gender and age were evaluated with a two-factor mixed analysis of variance (ANOVA), in order to establish normative data groups. To determine relevant differences of these variables on raw scores, three criteria were combined. As the main criterion, η^2 effect-size was used applying Cohen's rules of thumb of 0.01 for small, 0.06 medium and 0.14 for large effect (Cohen, 1988). Additionally, the following information was

also taken into account. Standard error of measurement (*SEm*) was obtained, based on reliability coefficient and standard deviation of raw scores, and then 95% CI or range of true scores was derived around *SEm* values. Lastly, a difference above 5-6 points on raw subscale scores was considered as an indicator of practical importance. Then, normative data for each factor based on each eventual normative reference group were calculated using T-scores and percentile ranks.

Results

Item mean (and standard deviation) values ranged from 1.64 to 3.00 (0.71-1.18). Median (in absolute value) of skewness was 0.34 and kurtosis was 0.78. None of the items showed floor or ceiling effects.

Goodness-of-fit indexes for CFA model were inadequate (CFI = .842, TLI = .836, RMSEA = .063, 90% CI [.063, .064]), but satisfactory for the more flexible ESEM approach (CFI = .950, TLI = .940, RMSEA = .038, 90% CI [.038, .039]), as expected given the far fewer restrictions being imposed compared with the CFA. Next, ESEM model was used as the baseline configural model for the tests of equivalence of factor loadings (weak or metric invariance) plus item thresholds (strong or scalar invariance), and item uniquenesses (strict invariance) across gender and age. Full measurement invariance was attained across all groups of responses (no decrease in CFI [increase: .002-.017] and no increase in RMSEA [decrease: .001-.010]). Table S1 expands details involving results for each step.

Standardized factor loadings and factor correlations in the overall sample are displayed in Table 2. Internal structure was basically as expected, since all the 59 items showed the highest factor loading on their intended factor, specifically 40 items with values above .50, 12 items above .40, 3 items above .35, and 4 items only above .30. Three items showed a second factor loading above .30 on a non-intended factor: 17 and 53 from Negative Urgency, and 47 from Lack of Perseverance. Two more items showed cross-loadings similar to each other (target factor loading .31-.32 and nontarget cross-loading .25-.28): 12 from Negative Urgency and 57 from Positive Urgency. Consistent with prior studies, the greatest factor correlations were between the two Urgency dimensions (.62) and between Lack of

Premeditation and Lack of Perseverance (.54).

Internal consistency reliability was satisfactory for all UPPS-P scale scores, with omega values ranging between .83 and .94 (Table 2, bottom).

Regarding convergent validity with BIS-11-A, the total score correlated highly-moderately with the theoretically most closely related UPPS-P measures: .56 with Negative Urgency, .54 with Positive Urgency, .60 with Lack of Premeditation, and .53 with Lack of Perseverance; the correlation with Sensation Seeking was lower (.19).

Results for the 3 × 9 ANOVA (gender [females, males, and non-binary] × age [from 11 to 19 years old]) for UPPS-P scale scores showed very small or null effects for the two terms and for the interaction ($\eta^2 \leq 0.004$) (Table S2, left). In addition, the 95% CI for range of "true" scores based on *SEm* (Table S2, center) was wider than the range between the highest and the lowest observed group mean (for cells with $n > 30$) (Table S2, right), which in turn did not exceed the threshold of 5-6 points considered as a cut point of practical importance for the scale scores. Taken as a whole, differences among gender and age were considered negligible. Therefore, we calculated norms based exclusively on the total sample for each derived scale score. T-scores and percentile ranks for UPPS-P are provided in Table 3.

Discussion

The aim of the present study was to evaluate the psychometric properties of the UPPS-P scale and to provide the first normative data for the Spanish adolescent population. Overall, our results found the expected internal structure and satisfactory internal consistency reliability and convergent validity with BIS-11-A scores. Furthermore, minimal differences were observed in terms of gender and age, and subsequently the normative data were calculated for the whole sample. Our results showed psychometric properties similar to those found in studies involving college students (Verdejo-Garcia et al., 2010).

The results obtained in the present adolescent sample showed the expected 5-factor structure of the items of the UPPS–P and the relation between the different subscale scores was consistent with the theoretical model underlying the test and previous studies in

adults (Argyriou et al., 2020; Fossati et al., 2016; Pilatti et al., 2015; Verdejo-Garcia et al., 2010; Zhang et al., 2020). As in Bussio et al. (2023), and as expected, ESEM yielded better fit than CFA, since in CFA all possible cross-loading (nontarget loadings) are fixed to be exactly 0, whereas in ESEM this restriction is relaxed since this imposition disappears. All 59 items met the minimum standard, since they all had a salient factor loading above .30 onto its intended factor. Nonetheless, five items showed remarkable cross-loadings: three of Negative Urgency (items 12, 17 and 53), one of Positive Urgency (item 57), and one of Lack of Perseverance (item 47). We decided to allocate them in their original expected factor based both on their highest loading and given their contribution to the internal consistency of their respective scale score according to their content. If we were to adopt a stricter criterion than the minimum of .30 for the interpretation of factor loadings, then the highest loading was .30-.39 for 7 items and .40-.49 for another 12 items. Despite this issue, we consider this allows us to provide normative data consistent with previous research and in particular the Spanish version of the UPPS-P scale (Verdejo-García et al., 2010).

All factor correlations were statistically significant, evidencing related but distinguishable factors, with varying magnitudes among different pairs of factors. Notably, stronger correlations were identified between dimensions more closely linked from a theoretical standpoint. The most elevated correlation emerged between Negative Urgency and Positive Urgency, elucidated by their shared nature as emotion-related impulsivity traits, recognized as transdiagnostic factors in psychopathology. This is also consistent with a recent study having employed item-based network analysis to show that both urgencies actually cohere in a single and coherent construct and should not necessarily be dissociated (Billieux et al., 2021), even if from a clinical perspective a fine-grained assessment of impulsivity (Berg et al., 2015; MacKillop et al., 2016) could benefit from a separated assessment of the two urgency facets (e.g., a patient with mood disorder could typically be characterized by differential scores for these two facets). Negative Urgency is especially significant during adolescence, a period characterized by heightened emotional reactivity and distress due to the intensity of the initial experiential behavioral episodes and

increased susceptibility to psychopathological disorders (Gomez & Watson, 2023; Harden & Tucker-Drob, 2011; Mallorquí-Bagué et al., 2020; Sonmez et al., 2024). Positive Urgency adds unique value in adolescent assessment of the emotion-driven impulsiveness (Do et al., 2022; Duell & Steinberg, 2019; Littlefield et al., 2016). Another notable correlation was observed between Lack of Premeditation and Lack of Perseverance. Both measures can be linked to cognitive top-down processing (tendency to react impulsively arising from difficulties in cognitive processing; e.g., poor selective attention, response selection, and planning in daily tasks) and also related with other psychological variables such as feeling of insecurity, low self-confidence or a proneness towards obsessions (Barkley-Levenson & Fox, 2016; Berg et al., 2015; Fossati et al., 2016; Zermatten & Van der Linden, 2008). However, it is worth noting that the presence of numerous reverse-scored items in both scales may impact their factor structure in factor analysis, potentially contributing to the observed correlation, as highlighted in previous studies (Distefano & Motl, 2006; Spector et al., 1997). Our findings align with prior validation studies in adults reporting similar correlations between Urgency dimensions and between Lack of Premeditation and Lack of Perseverance (Lim & Lee, 2014; Pinto et al., 2021; Verdejo-García et al., 2010; Zhang et al., 2020). Predictably, Sensation Seeking showed low correlations with the other factors, consistent with previous studies (Lynam et al., 2006; Pilatti et al., 2015; Verdejo-García et al., 2010). Sensation Seeking represents a more independent and not necessarily dysfunctional dimension of impulsivity (Sperry et al., 2016). For example, past research showed that Sensation Seeking is related to the frequency of engagement in some potentially risky behaviors, but that the actual negative outcomes resulting from them are better predicted by other impulsivity facets such as Urgency (Smith et al., 2007).

Regarding measurement invariance, strict invariance across gender and age was found, as for gender in other studies in adults (Argyriou et al., 2020; Cyders, 2013; Pinto et al., 2021). Regardless of the use of more conservative (Meade et al., 2008) or more liberal criteria (Rutkowski & Svetina, 2014) than those used based on Chen (2007) in terms of decreasing CFI and increasing RMSEA to establish or not the lack of measurement invariance, we found

an improvement in the fit, given that at each step evaluated we observed an increase of CFI and a decrease of RMSEA. Furthermore, our findings align with previous research in preadolescents using the UPPS-P from Watts et al. (2020), showing measurement invariance across several demographic variables including gender. The UPPS-P appears to function comparably across gender and age during adolescence, and mean differences on scale scores do reflect trait-level differences.

In relation to internal consistency, the subscale scores exhibited high coefficient values, ranging from very good to excellent (ω between .83 Lack of Perseverance and .94 Positive Urgency). Our findings align with those obtained in various adult adaptations from around the world, including the Dutch (Bousardt et al., 2018), Korean (Lim & Lee, 2014), Italian (Fossati et al., 2016; Gialdi et al., 2021), Portuguese (Pinto et al., 2021), Spanish (Verdejo-Garcia et al., 2010) or Chinese (Zhang et al., 2020) versions, and also were slightly higher than those found in adolescents (Bussio et al., 2023).

In assessing convergent validity, Lack of Premeditation showed a moderate-high correlation with the theoretical construct of the Non-Planning facet of the BIS-11-A. Lack of Perseverance scores also exhibited a moderate correlation with the BIS-11-A global score. As expected, Sensation Seeking exhibited a low correlation, considering that the BIS-11-A does not specifically assess Sensation Seeking as one of its facets. In this context, our findings support results of prior studies in adults (Fossati et al., 2016; Lim & Lee, 2014; Verdejo-Garcia et al., 2010) as well as in adolescents (Bussio et al., 2023).

Finally, normative data were calculated on the basis of the total sample for each derived scale score, as differences between gender and age were considered negligible. A single UPPS-P norm in adolescents aligns with previous literature of no gender differences (Cross et al., 2011; Fossati et al., 2016) and, thus, the availability of undifferentiated norms in adults (Gialdi et al., 2021; Pinto et al., 2021).

Several limitations must be acknowledged. We had no opportunity to corroborate the self-reported diagnoses provided by students with

clinically confirmed diagnoses by professionals for the major part of the sample, in order to provide evidence on criterion-related validity. Resource constraints and limited access to comprehensive diagnostic data precluded the acquisition of accurate and validated diagnostic information from all participants through the psychological services of the schools. Similarly, the convergent and discriminant validity of the UPPS-P scores in adolescence should be examined using additional specific instruments assessing impulsivity. Future research could focus on obtaining information that allows the establishment of cut-off points. Investigating potential variations in UPPS-P facet manifestations among psychological disorders characterized by impulsivity could provide valuable insights. Nonetheless, our results are based on a very large and diverse sample obtained through random stratification, representing the adolescent population across family situations, high schools, income levels (Evans et al., 2022), and population densities. Furthermore, our self-reported data sample mirrors the prevalence of disorders observed in adolescent epidemiological studies in Spain (Haro et al., 2006). To our knowledge, our study is the first one to deliberately encompass the entire stage of adolescence, capturing the spectrum from early adolescence to post-mandatory education and coexistence with emerging adults, aligning with the World Health Organization's definition of adolescence (WHO, 2021). These results can be considered applicable to the adolescent population within a school setting.

Despite the aforementioned limitations, our findings suggest that scores for the Spanish version of the UPPS-P have an acceptable validity for the adolescent population. Future research in both clinical and non-clinical samples, school counseling, and the daily clinical practice in Spain may benefit from the normative data we provide. Adolescence is a critical period of life where some impulsivity-related diagnoses may emerge, potentially guiding diagnostic orientations into adulthood with some degree of severity prognosis. Moreover, the availability of normative data from our study opens avenues for future research, enabling the selection of participants with varying levels of impulsivity for more targeted interventions and assessments. We expect that this study will allow future cross-cultural comparisons using the UPPS-P and also

enable exploration of its relationship with clinical and non-clinical outcomes in adolescents.

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Table 1. Sociodemographic characteristics of the final sample (N = 8944)

Measure		
Age; *M* (*SD*)	(years)	14.7 (1.5)
Gender; *n* (%)	Male	4376 (48.9%)
	Female	4417 (49.4%)
	Non-binary	151 (1.7%)
Place of birth; *n* (%)	Spain	8274 (92.5%)
	Other European countries	163 (1.8%)
	Outside Europe	507 (5.7%)
Siblings; *n* (%)	Yes	7520 (84.1%)
Socio-economic status [a]; *n* (%)	Low	1021 (11.5%)
	Medium-low	3392 (37.9%)
	Medium	1808 (20.2%)
	Medium-high	1471 (16.4%)
	High	1252 (14.0%)
Current education level; *n* (%)	Mandatory secondary high school	7529 (84.1%)
	Post obligatory high school pre university studies	1066 (12.0%)
	Post obligatory basic professional education	25 (0.3%)
	Post obligatory middle and superior grades	324 (3.6%)
Type of school; *n* (%)	Public	3857 (43.1%)
	Subsidized	5004 (56%)
	Private	83 (0.9%)
Repetition course; *n* (%)	Yes	717 (8.0%)
Disorder	Without disorder	7033 (78.6%)
	Attention deficit hyperactivity disorder	491 (5.5%)
	Language/learning impairment	468 (5.2%)
	Anxiety	406 (4.6%)
	Eating disorders	189 (2.1%)
	Autism spectrum disorders	157 (1.8%)
	Depression/mood disorders	151 (1.7%)
	Borderline personality disorder	3 (0.03%)
	Posttraumatic stress disorder	2 (0.02%)
	Fetal alcohol spectrum disorder	1 (0.01%)
	Other	43 (0.5%)

[a] based on IDESCAT database https://www.idescat.cat/pub/?id=rfdbc

Note. Language/learning impairment include Language disorder, Dyslexia, Dyscalculia, Dysorthographia; Eating disorders include Anorexia I or II, Bulimia or Binge Disorder.

Each of the univariate descriptive analyses was performed with available information for that measure (i.e., using listwise deletion).

Table 2. Final ESEM model (standardized parameters) for UPPS-P and omega coefficient

Factor loadings [a]	Item	F1	F2	F3	F4	F5
Negative Urgency	2. *I have trouble controlling…	**.52**	.07	.16	.04	.02
	7. *I have trouble resisting…	**.43**	.03	−.06	.16	.06
	12. *I often get involved in things…	**.31**	.28	.00	.08	.06
	17. *When I feel bad, I will…	**.35**	**.33**	−.08	.10	.02
	22. *Sometimes when I feel bad…	**.53**	.17	−.12	.11	.01
	29. *When I am upset I often…	**.72**	.00	.08	.01	.06
	34. *When I feel rejected …	**.59**	.11	.03	−.06	−.03
	39. *It is hard for me to resist.…	**.47**	.10	−.03	−.04	.03
	44. *I often make matters worse…	**.70**	.10	.08	.03	.02
	50.* In the heat of an argument …	**.70**	−.01	.03	−.03	.00
	53. I always keep my feelings...	**.44**	−.13	**.32**	.01	−.09
	58. *Sometimes I do impulsive…	**.65**	.12	.04	.01	.05
Positive Urgency	5. *When I am very happy…	.02	**.69**	.06	.02	−.01
	10.* When I am in great mood …	−.06	**.78**	.04	.09	−.01
	15. *When I am very happy…	.02	**.77**	.02	.10	−.03
	20.* I tend to lose control…	.06	**.72**	.03	.00	−.02
	25.* When I am really ecstatic…	.27	**.48**	.03	.02	.06
	30. *Others would say...	−.01	**.78**	.04	.00	−.02
	35. *Others are shocked…	−.10	**.73**	.03	.00	.01
	40. *When I get really…	−.04	**.87**	.05	.01	−.01
	45. *When overjoyed…	.07	**.64**	.02	−.04	.04
	49. *When I am really excited …	.06	**.73**	.10	−.07	.02
	52. *I tend to act without thinking…	.03	**.78**	.10	−.05	.01
	54. *When I am really happy…	.07	**.64**	−.12	.04	.00
	57. *When I am very happy, I feel…	.25	**.32**	−.07	−.01	.16
	59. *I am surprised at the things…	.02	**.58**	−.13	−.06	.07
Lack of Premeditation	1. I have a reserved and cautious…	−.01	−.03	**.50**	−.16	.11
	6. My thinking is usually careful…	.05	.01	**.42**	.23	.03
	11. I am not one of those people…	.19	.02	**.42**	−.07	−.02
	16. I like to stop and think…	.10	.03	**.64**	.05	.06
	21. I don't like to start a project…	−.22	.01	**.38**	.14	−.04
	28. I tend to value and…	−.02	.09	**.53**	.12	−.09
	33. I usually make up…	.10	.02	**.70**	.06	.00
	38. I am a cautious person.	−.01	.05	**.61**	.06	.07
	43. Before I get into a new situation…	−.12	.06	**.55**	.10	−.03
	48. I usually think carefully…	.12	.04	**.77**	−.03	.03
	55. Before making up my mind…	.03	.01	**.68**	−.02	−.03
Lack of Perseverance	4. I generally like to see things…	−.17	.06	.06	**.52**	−.04
	9. *I tend to give up easily.	.28	.05	−.18	**.46**	−.19
	14. Unfinished tasks...	−.28	.04	.13	**.49**	.04
	19. Once I get going on something…	−.21	−.17	.09	**.32**	−.11
	24. I concentrate easily.	.28	−.07	.16	**.43**	.04
	27. I finish what I start.	−.01	−.01	.01	**.78**	−.01
	32. I am able to pace myself...	.11	−.05	.17	**.45**	−.08
	37. I am a person who...	−.01	−.02	.05	**.77**	.07
	42. I almost always finish.	−.06	.03	.03	**.79**	.03
	47. *Sometimes there are so…	**.30**	.12	−.11	**.38**	.13
Sensation Seeking	3. *I generally seek new…	.05	.04	.04	−.16	**.48**
	8. *I'll try anything once.	.08	.06	.01	−.12	**.40**
	13. *I like sports and games…	−.26	.19	.06	−.18	**.31**
	18. *I would enjoy...	−.11	−.12	.01	−.04	**.63**
	23. *I quite enjoy taking...	.04	.17	.09	.08	**.59**
	26. *I would enjoy parachute...	−.01	−.12	.00	.04	**.77**
	31. *I welcome new and exciting…	.13	−.01	−.01	−.02	**.75**
	36. *I would like to learn to fly...	−.20	.04	−.03	.02	**.64**
	41. *I sometimes like...	.09	.06	−.02	.05	**.70**
	46. *I would enjoy the sensation…	.00	−.07	.00	.03	**.73**
	51. *I would like to go...	−.12	−.03	−.01	.01	**.60**
	56. *I would enjoy fast...	.11	−.04	.01	.11	**.60**
Factor correlations [b] and omega [c]	F1 (Negative Urgency)	*.88*				
	F2 (Positive Urgency)	.62	*.94*			
	F3 (Lack of Premeditation)	.19	.26	*.86*		
	F4 (Lack of Perseverance)	.19	.24	.54	*.83*	
	F5 (Sensation Seeking)	.22	.36	.10	−.10	*.87*

* Inverse items reversed prior to analysis.

[a] In bold: Salient factor loading above ≥.30. Shaded cells indicate the factor in which the item was expected to belong to

[b] For factor correlations: all *p*-values < .05

[c] In italics: internal consistency reliability (omega coefficient)

Table 3: Normative data for the Spanish adolescent UPPS-P (N = 8944)

	Negative Urgency		Positive Urgency		Lack Premeditation		Lack Perseverance		Sensation Seeking	
Score	T	Pc	T	Pc	T	Pc	T	Pc	T	Pc
10	-	-	-	-	-	-	27	1	-	-
11	-	-	-	-	27	1	29	1	-	-
12	26	1	-	-	29	1	31	2	21	1
13	27	1	-	-	31	2	33	4	23	1
14	28	1	32	1	32	4	35	7	24	1
15	30	2	34	3	34	6	37	10	25	1
16	31	3	35	5	36	8	39	15	27	1
17	32	5	36	8	38	11	41	20	28	2
18	34	6	37	11	40	15	43	26	29	3
19	35	8	38	14	41	19	45	33	31	4
20	37	10	39	17	43	24	47	40	32	5
21	38	12	40	20	45	30	49	48	33	6
22	39	15	41	22	47	37	51	56	35	8
23	41	18	42	25	49	45	53	64	36	10
24	42	22	43	28	50	53	55	71	38	12
25	43	26	45	32	52	60	57	77	39	15
26	45	30	46	35	54	67	59	82	40	18
27	46	35	47	39	56	73	61	87	42	21
28	47	40	48	43	58	79	63	90	43	24
29	49	45	49	47	59	83	65	93	44	28
30	50	50	50	51	61	87	67	95	46	32
31	52	56	51	55	63	90	69	97	47	36
32	53	61	52	59	65	92	71	98	48	41
33	54	66	53	63	67	94	73	99	50	46
34	56	71	54	67	68	96	75	99	51	51
35	57	75	55	70	70	97	78	99	52	56
36	58	79	57	73	72	98	80	99	54	61
37	60	83	58	76	74	99	82	99	55	66
38	61	86	59	79	75	99	84	99	56	71
39	62	89	60	82	77	99	86	99	58	75
40	64	91	61	85	79	99	88	99	59	79
41	65	93	62	87	81	99	-	-	60	83
42	67	95	63	89	83	99	-	-	62	87
43	68	96	64	92	84	99	-	-	63	90
44	69	97	65	93	86	99	-	-	64	93
45	71	98	66	95	-	-	-	-	66	96
46	72	99	68	96	-	-	-	-	67	98
47	73	99	69	97	-	-	-	-	68	99
48	75	99	70	97	-	-	-	-	70	99
49	-	-	71	98	-	-	-	-	-	-
50	-	-	72	98	-	-	-	-	-	-
51	-	-	73	99	-	-	-	-	-	-
52	-	-	74	99	-	-	-	-	-	-
53	-	-	75	99	-	-	-	-	-	-
54	-	-	76	99	-	-	-	-	-	-
55	-	-	77	99	-	-	-	-	-	-
56	-	-	78	99	-	-	-	-	-	-
M	29.87		30.00		23.80		21.37		33.34	
SD	7.32		9.13		5.57		4.95		7.47	
SEm	2.5		2.3		2.1		2.1		2.7	

Note. T: T-score; Pc: Percentile rank; SEm: Standard Error of Measurement

Supplementary material

Table S1: Fit indices of measurement invariance analyses for UPPS-P (N = 8944)

	Goodness-of-fit indices				Comparison			
Model fit and invariance	χ^2 (df)	CFI	TLI	RMSEA (90% CI)	Models	$\Delta\chi^2$ (Δdf)	ΔCFI	ΔRMSEA
CFA 59-item and 5-factor model	60576.0 (1642)	.842	.836	.063 (.063; .064)				
ESEM 59-item and 5-factor model	20058.9 (1426)	.950	.940	.038 (.038; .039)				
A: ESEM invariance across 3 gender groups [a]								
A0: configural (equal form)	13746.0 (4278)	.969	.962	.027 (.027; .028)				
A1: A0 plus equal FL+TH (weak+strong invariance)	11567.6 (5162)	.979	.979	.020 (.020; .021)	A1 *vs* A0	2074.6 (884)	.010	−.007
A2: A1 plus uniquenesses free (strict invariance) *	11863.4 (5044)	.977	.977	.021 (.021; .022)	A1 *vs* A2	424.6 (118)	.002	−.001
B: ESEM invariance across 3 age groups [b]								
B0: configural (equal form)	18458.8 (4278)	.960	.953	.033 (.033; .034)				
B1: B0 plus equal FL+TH (weak+strong invariance)	13386.9 (5162)	.977	.977	.023 (.023; .024)	B1 *vs* B0	1814.7 (884)	.017	−.010
B3: B2 plus uniquenesses free (strict invariance) *	13985.1 (5044)	.975	.975	.024 (.024; .025)	B1 *vs* B2	376.2 (118)	.002	−.001

Note. For categorical indicators: 1) measurement invariance models constrain factor loadings (FL) and thresholds (TH) in tandem (Model #1); and 2) test for invariance of uniquenesses proceeds backward (*): uniquenesses are first freely estimated in the second group (Model #2), and are then compared with the model in which all uniquenesses are fixed at 1 in the second group so as to be in line with the first group (Model #1), because when a factor loading and an item threshold for a categorical factor indicator are free across groups, the uniqueness for the variable must be fixed at 1 for identification purposes (Muthén & Muthén, 1998-2017). All χ^2 values in the table are statistically significant ($p < .001$).

[a] Sample size for gender groups: 4376 for males, 4417 for females, 151 for non-binary

[b] Sample size for age groups: 3075 for aged 11-13, 5084 for aged 14-16, 785 for aged 17-19

Table S2: Comparison of scale scores among gender and age for establishing norm groups

	ANOVA						Reliability	Mean of the groups		
	Gender		Age		Interaction		*SEm*	95% CI range "true" score*	Lowest	Higher	Range
UPPS-P scale	*F* (2, 8918) (*p*)	η^2	*F* (8, 8919) (p)	η^2	*F* (13, 8918) (p)	η^2					
Negative Urgency	13.46 (<.005)	0.003	0.60 (.776)	0.001	2.91 (<.005)	0.004	2.5	10	27.7	32.1	4.4
Positive Urgency	15.47 (<.005)	0.003	1.11 (.352)	0.001	1.67 (.060)	0.002	2.3	9	27.6	32.8	5.2
Lack of Premeditation	4.56 (.011)	0.001	3.85 (<.005)	0.003	0.44 (.955)	0.001	2.1	8	22.2	25.6	3.4
Lack of Perseverance	16.23 (<.005)	0.004	1.44 (.176)	0.001	1.12 (.339)	0.002	2.1	8	20.6	25.3	4.7
Sensation Seeking	10.72 (<.005)	0.002	2.28 (.020)	0.002	1.27 (.223)	0.002	2.7	11	31.2	34.8	3.6

* ± 1.96 *SEm*

Study 2: Assessing impulsivity in adolescents: Psychometric properties of the Spanish short S-UPPS-P

Montasell-Jordana, E., Penelo, E., Blanco-Hinojo, L., Lanceta, B., Gomàriz-Camacho, L., Gràcia, M., Soler, A., Pujol, J., & Deus., J. (2026). Assessing impulsivity in adolescents: Psychometric properties of the Spanish short S-UPPS-P. Psicothema, 38(1), 36-45. https://doi.org/10.70478/psicothema.2026.38.04

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Article

Assessing Impulsivity in Adolescents: Psychometric Properties of the Spanish Short S-UPPS-P

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ABSTRACT

Background: The short S-UPPS-P is a 20-item self-report tool for assessing impulsivity in adolescents, differentiating five dimensions: Negative Urgency, Lack of Perseverance, Lack of Premeditation, Sensation Seeking, and Positive Urgency. This study aimed to evaluate the psychometric properties of the Spanish S-UPPS-P and to establish normative data for adolescents in Spain. **Method**: Participants were 8,944 adolescent students (ages 11–19) from 66 high schools and 789 adolescent psychotherapy patients from 7 centers. **Results**: The expected 5-factor model, evaluated with confirmatory factor analysis (CFA), showed insufficient fit (CFI and TLI ≤ .90, RMSEA = .076). However, an exploratory approach yielded satisfactory results (CFI and TLI ≥ .97, RMSEA ≤ .036), with full measurement invariance across age, gender and sample type. Internal consistency reliability ranged from moderate to excellent (ω = .67–.82). Convergent validity with the Barratt Impulsiveness Scale total score was satisfactory (*r* = .47–.59). No significant differences in scale scores were observed across gender, age, or sample type, providing the use of a single norm. **Conclusions**: These findings support the S-UPPS-P as a valid, reliable tool for assessing impulsivity in Spanish adolescents. The availability of standardized norms enhances its utility in clinical and educational contexts.

Evaluación de la Impulsividad en Adolescentes: Propiedades Psicométricas de la Versión Corta Española S-UPPS-P

Palabras clave:
Adolescencia
Impulsividad
Baremos
S-UPPS-P
Validación

RESUMEN

Antecedentes: El S-UPPS-P es un instrumento de 20 ítems para evaluar la impulsividad en adolescentes, diferenciando cinco dimensiones: Urgencia Negativa, Falta de Perseverancia, Falta de Premeditación, Búsqueda de Sensaciones y Urgencia Positiva. Este estudio evaluó sus propiedades psicométricas y estableció datos normativos en adolescentes españoles. **Método:** Participaron 8.944 estudiantes (11-19 años) de 66 institutos y 789 pacientes adolescentes de salud mental. **Resultados:** El modelo de cinco factores, evaluado mediante análisis factorial confirmatorio (AFC), mostró ajuste insuficiente (CFI y TLI ≤ .90, RMSEA = .076). Sin embargo, un enfoque exploratorio mostró resultados satisfactorios (CFI y TLI ≥ .97, RMSEA ≤ .036), con invariancia completa del modelo de medida en función de la edad, género y tipo de muestra. La consistencia interna fue moderada a excelente (ω = .67-.82), y la validez convergente con la Escala de Impulsividad de Barratt fue adecuada (*r* = .47-.59). No se hallaron diferencias significativas en las puntuaciones según género, edad o muestra, permitiendo el uso de un único baremo. **Conclusiones**: Estos resultados apoyan al S-UPPS-P como un instrumento válido y fiable para evaluar la impulsividad en adolescentes españoles. La disponibilidad de baremos aumenta su utilidad en contextos clínicos y educativos.

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Impulsivity is a multifaceted construct defined as "a predisposition toward rapid, unplanned reactions to internal or external stimuli [with diminished] regard to the negative consequences of these reactions to the impulsive individual or others" (Potenza, 2007, p. 5). It has been suggested that high impulsivity may be associated with cognitive impairments and various problem behaviors, as well as engaging in risky behaviors that could potentially contribute to the development of mental health problems (Potenza, 2007).

Adolescence is a developmental stage characterized by heightened emotional reactivity and poor inhibitory control, which makes adolescents more prone than older individuals to impulsive actions and experimentation with potentially risky behaviors, such as drug use, suicidal behaviour, early sexual activity, or delinquent and aggressive behaviors, (Caro-Cañizares et al., 2024; Duell & Steinberg, 2019). However, the availability of assessment tools specifically validated for this population remains limited (Kulendran et al., 2016). Whiteside and Lynam (2001) developed a conceptual framework for impulsivity within the context of the five-factor model of personality (Costa & McCrae, 1985). Based on the analysis of 17 impulsivity-related scales, they identified four distinct facets of impulsivity and created a multidimensional measure known as the UPPS Impulsive Behavior Scale, which includes Negative Urgency, Lack of Premeditation, Lack of Perseverance, and Sensation Seeking. This model was later expanded by Cyders and colleagues (2007) by incorporating Positive Urgency, resulting in the UPPS-P scale. The UPPS-P scale allows for assessment of multiple aspects of impulsive personality, capturing various expressions of impulsivity that are relevant to a range of clinical manifestations in youth, such as in mood disorders (Caro-Cañizares et al., 2024), fetal alcohol spectrum disorders (Kingdon et al., 2016; Mattson et al., 2019; Carrera et al., 2024), Attention-Deficit/Hyperactivity Disorder (Miller et al., 2010) or eating disorders (Mallorquí-Bagué et al., 2020). Notably, Urgency is a core component of impulsivity and a transdiagnostic risk factor for several mental disorders, particularly during developmental adolescence (Littlefield et al., 2016; Sonmez et al., 2024).

After the UPPS-P gained wide acceptance, shorter versions were developed (Billieux et al., 2012; Cyders et al., 2014), reducing the original 59-item scale to 20 items while maintaining the original 5-factor structure. These shorter versions (S-UPPS-P) are frequently used in clinical settings to support professional judgment and streamline multi-step assessments, thanks to their brevity and ease of administration (Rammstedt & Beierlein, 2014). Their reduced cognitive load and shorter completion time make them particularly suitable for adolescents in both clinical and educational contexts (Omrani et al., 2019). Adolescents, compared to adults, are more prone to boredom, cognitive fatigue, and inconsistent adherence to response scales (Fortgang & Cannon, 2022).

Previous research has shown that the 20-item and 5-factor model of the S-UPPS-P provides an acceptable fit in adolescent samples (Donati et al., 2021; Eray et al., 2023; Pechorro et al., 2021; Wang et al., 2020) when its internal structure is evaluated using confirmatory factor analysis (CFA), mostly considering indicators as continuous. Potential competing models (such as a single factor or three interrelated factors grouping Negative and Positive Urgency [as broad urgency] and combining Lack of Premeditation and of Perseverance [labelled as deficits in conscientiousness], while Sensation Seeking remaining separated) have shown to fit worse. Higher correlations have been observed between Negative and Positive Urgency, as well as between Lack of Premeditation and Lack of Perseverance. By contrast, Sensation Seeking is recognized as a distinct dimension of impulsivity, associated with motivational aspects such as novelty seeking, excitement, and arousal, and it operates quite independently of other traits (Billieux et al., 2012). Measurement invariance has been established across various demographic characteristics, including age and gender identities, in different countries and languages (Donati et al. 2021; Fournier et al., 2025; Pechorro et al., 2021; Wang et al., 2020). S-UPPS-P scores have demonstrated poor-acceptable to good internal consistency reliability across diverse languages, with coefficients ranging from .53 to .87 (Donati et al., 2021; Eray et al., 2023; Pechorro et al., 2021; Wang et al., 2020). Regarding convergent validity, low to moderate but statistically significant correlations have been reported between S-UPPS-P Negative and Positive Urgency and Lack of Premeditation and the Barratt Impulsiveness Scale (BIS) scores (Eray et al., 2023).

When comparing scale scores by gender, most studies involving adolescents have found no significant differences, although males tend to score slightly higher than females on the Sensation Seeking subscale (Wang et al., 2020). In terms of age, findings have been more heterogeneous in youth (Sonmez et al., 2024). For instance, in adolescents, Wang et al., (2020) identified differences across all subscale scores except Sensation Seeking. However, other authors have reported no significant differences based on age (Donati et al., 2021; Montasell-Jordana et al., 2025).

Although the shortened UPPS-P (S-UPPS-P) has been translated into many languages, adapted, and validated for use in adolescents (Donati et al., 2021; Eray et al., 2023; Pechorro et al., 2021; Wang et al., 2020), to our knowledge, it has been evaluated in adults (Candido et al., 2012), but no study has yet evaluated the psychometric properties of the S-UPPS-P for adolescents in Spanish. This study aimed to fill this gap by pursuing three specific objectives, both in a community and a clinical sample: a) to test the factor structure, measurement invariance across gender, age, and sample type, and internal consistency of the S-UPPS-P derived scale scores; b) to examine its convergent validity with an alternative self-reported measure of impulsivity (BIS-11-A); and c) to explore the relationship between S-UPPS-P scores and participant characteristics, specifically gender, age, and sample type, and accordingly, to provide normative data for the Spanish adolescent population. Based on previous findings of internal structure, we expect to obtain the best fit for the 5-factor model. We hypothesize a low correlation for Sensation Seeking and a medium correlation for the other S-UPPS-P scale scores with the total BIS-11-A score. We do not expect to find differences in S-UPPS-P scale scores based on age, gender or sample type due to the variety of results of the previous validation studies available.

Method

Participants

In this study, we utilized both a community and a clinical subsample to evaluate the psychometric properties of the Spanish S-UPPS-P scale for adolescents. Participants for the community subsample were recruited using a multi-stage cluster sampling from schools located throughout the territory of Catalonia, Spain. The database of the Department of Education of the Generalitat de Catalunya (Government of Catalonia, 2022a, 2022b) was used to

select schools of different types (private, public and subsidized), as well as different academic courses. Additionally, demographic information regarding population density and family income levels was obtained from the Institut d'Estadística de Catalunya (IDESCAT, 2022a, 2022b) to guide the clustering of the selected schools. A total of 66 secondary schools were randomly selected and considered for the study during the academic year 2021-2022. The inclusion criterion for participants enrolled in these schools was being aged between 11 and 19. Students were excluded if they were in special education or adapted courses, or if they had an insufficient level of reading comprehension in Spanish. For the clinical subsample, a convenience sampling method was used to enroll consecutively admitted inpatients receiving psychotherapy and individuals undergoing day hospital treatment from seven hospitals and day clinics within the (blind) network. These centers provide treatment for people with various mental disorders referred from the main public hospitals. The inclusion criterion for the clinical subsample was the same as those for the community one, with participants aged between 11 and 19. Patients were excluded if they had an IQ below 80 (as assessed by the Wechsler Intelligence Scale [WISC-V]) or the Wechsler Adult Intelligence Scale [WAIS-IV] following the internal protocol of the clinical centers) or if they had an inadequate level of reading comprehension in Spanish.

The initial sample comprised 9929 participants (9024 from community and 905 from clinical settings) who agreed to take part in the study. Data of participants who omitted information or left the administration blank during the data collection process (n = 64), those who fell outside the specified age range (n =108), and those who did not complete the tests (n =24) were excluded, resulting in a final sample of 9733 participants (8944 for the community subsample and 789 for the clinical subsample). Students self-reported socio-demographic information in an *ad hoc* survey, which also included questions on possible mental health disorders. Participants were asked to indicate any diagnoses provided by mental health professionals, referencing a detailed list of specific disorders, with an open-ended option for unlisted diagnoses. In fewer than 10% of schools, psychological disorders were identified by the school's psychological services following survey administration. For the clinical subsample, psychological disorders were diagnosed collaboratively by the Neuropsychology department and the Psychiatry department of Ita Salud Mental using the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition [DSM-V] (American Psychiatric Association, 2013) or the International Classification of Diseases (10th or 11th version) [ICD] (World Health Organization (WHO), 1992; 2024). Sample characteristics are displayed in Table 1.

Instruments

Sociodemographic data. This data was collected *ad-hoc* to characterize the sample, including different variables as place of birth, type of school, disorders self- reported, if they had siblings, or had repeated any course and socioeconomic status of the student population.

S-UPPS–P Impulsivity scale (Cyders et al., 2014; Verdejo-García et al., 2010). This self-report questionnaire consists of 20 items and aims to assess five distinct personality pathways to impulsive behavior: Negative Urgency (e.g., "When I feel rejected, I will often say things that I later regret"), Lack of Perseverance (e.g., "Once I get going on something I hate to stop"), Lack of Premeditation (e.g., "I like to stop and think things over before I do them"), Sensation Seeking (e.g., "I quite enjoy taking risks"), and Positive Urgency (e.g., "I tend to lose control when I am in a great mood"). Each item is rated on a 4-point Likert-type scale ranging from 1 (*strongly agree*) to 4 (*strongly disagree*). Subscale scores are calculated by summing the item responses (reversed when necessary) with higher scores indicating higher levels of each trait. Verdejo-García et al. (2010) used a college sample from Granada (Spain) exclusively to validate the long version of the UPPS-P in young adults.

BIS-11-A (Barratt Impulsiveness Scale, version 11 for Adolescents; Fossati et al., 2002). We used the Spanish version adapted for adolescents by Martínez-Loredo et al. (2015) to evaluate convergent validity, since this test is the most widely used psychometric instrument in the field of impulsivity. The BIS-11-A comprises 30 items measuring motor, unplanned, and attentional aspects of impulsivity. Each item in BIS-11-A presents a statement describing impulsivity-related thoughts or behaviors in different situations. The items are scored on a 4-point Likert-type scale, ranging from 1 (*rarely/never*) to 4 (*almost always/always*). The total score is obtained by summing the item responses, with items reversed when necessary, with higher scores indicating higher levels of impulsivity. In our sample, we found good internal consistency reliability, with an omega coefficient of .84. BIS-11-A views impulsivity as a more global, unidimensional construct involving motor, attentional, and planning-related aspects.

Procedure

The procedure received approval from the ethics committee of (CEEAH nº 6494) and also authorization from the Department of Education of the Government of Catalonia (Spain) for recruiting centers (Register: nº: 9067/490777/2021).

For the community subsample, initial contact was established with the school principals, who were provided with an overview of the research goals and a request for cooperation. Upon agreement to participate, each institution's administration reviewed and approved the detailed study protocol. An information sheet outlining the study was given to each participating institution, along with a video document explaining the study's characteristics, objectives, and guidelines for parental communication. A 2-week notice period was provided to parents, during which they could opt their minor children out of the study. The self-reported questionnaires and an *ad-hoc* survey for socio-demographics and mental health problems were administered collectively during a 1-hour academic session. A teacher assisted with the administration, and the first-author was present to oversee the process. The questionnaires were administered using an online platform to facilitate data collection. All students received an information sheet confirming that their data would be treated confidentially and used solely at the group level. In four centers, the *ad-hoc* socio-demographic survey did not include the section on mental health problems, and diagnoses of mental disorders were reported directly to the first-author by the school services, following their internal data protection protocols.

For the clinical subsample, an information sheet was provided to the centers with a document explaining the characteristics, objectives and procedures for subsequent data handling. Parental consent for minors (< 18) was obtained by email and also collected during

Table 1
Sociodemographic Characteristics of the Final Sample (N = 9733)

		Community (n = 8944)	Clinical (n = 789)
Age; *M* (*SD*)	(Years)	14.7 (1.5)	16.3 (1.7)
Gender; *n* (%)	Male	4376 (48.9%)	168 (21.3%)
	Female	4417 (49.4%)	610 (77.3%)
	Non-binary	151 (1.7%)	7 (0.9%)
	Not-reported	0 (0.0%)	4 (0.5%)
Place of birth; *n* (%)	Spain	8274 (92.5%)	668 (84.6%)
	Other European countries	163 (1.8%)	59 (7.5%)
	Outside Europe	507 (5.7%)	62 (7.9%)
Siblings; *n* (%)	Yes	7520 (84.1%)	663 (84.0%)
Socio-economic status [a]; *n* (%)	Low	1021 (11.5%)	[b]
	Medium-low	3392 (37.9%)	[b]
	Medium	1808 (20.2%)	[b]
	Medium-high	1471 (16.4%)	[b]
	High	1252 (14.0%)	[b]
Current education level; *n* (%)	Primary	0 (0.0%)	3 (0.3%)
	Mandatory secondary high school (ESO)	7529 (84.1%)	461 [c] (58.6%)
	Post obligatory High School pre university studies (ESPO)	1066 (12.0%)	197 (25.0%)
	Post obligatory basic professional education (PFI/FPB)	25 (0.3%)	5 (0.6%)
	Post obligatory formation for middle and superior grades (CFGM/CFGS)	324 (3.6%)	75 (9.5%)
	University	0 (0.0%)	47 (6.0%)
Type of school; *n* (%)	Public	3857 (43.1%)	[b]
	Subsidized	5004 (56%)	[b]
	Private	83 (0.9%)	[b]
Repetition course; *n* (%)	Yes	717 (8.0%)	179 (22.7%)
Disorder	Without disorder	7033 (78.6%)	0 (0.0%)
	Attention deficit hyperactivity disorder	491 (5.5%)	88 (11.1%)
	Language/learning impairment	468 (5.2%)	0 (0.0%)
	Anxiety	406 (4.6%)	47 (6.0%)
	Eating disorders	189 (2.1%)	240 (30.4%)
	Autism spectrum disorders	157 (1.8%)	97 (12.3%)
	Depression/mood disorder	151 (1.7%)	78 (9.9%)
	Borderline personality disorder	3 (0.0%)	77 (9.8%)
	Substance use disorder	0 (0.0%)	60 (7.6%)
	Posttraumatic stress disorder	2 (0.0%)	58 (7.3%)
	Fetal alcohol spectrum disorders	1 (0.0%)	42 (5.3%)
	Other	43 (0.5%)	2 (0.3%)
Treatment	Inpatients	NA	515 (65.3%)
	Day hospital	NA	274 (34.7%)

[a] based on IDESCAT database https://www.idescat.cat/pub/?id=rfdbc. [b] detail not available. [c] Each of the univariate descriptive analyses was performed using list-wise deletion. NA = Not Applicable. *Note.* Language/learning impairment include Developmental Oral Language disorder, Dyslexia, Dyscalculia, Dysorthographia; Eating Disorders include Anorexia I or II, Bulimia or Binge Disorder.

monthly parents' group meetings at each clinical center by the first-author. A 2-week notice period was given to parents, during which they could opt their minor children out of the study. The self-reported questionnaires and the *ad-hoc* survey for socio-demographics were administered collectively during a 1-hour group therapy session with the assistance of a psychologist or individually with any of the research authors who were clinicians. The questionnaires were administered in paper-and-pencil format. All patients received and signed an information sheet assuring them that their data would be treated confidentially and only be used at the group level.

Data Analysis

We conducted the analyses using SPSS 29 and MPlus 8.9 programs. Internal structure of S-UPPS-P items was analyzed with weighted least squares means and variance adjusted (WLSMV) estimator and, when applicable, theta parameterization. First, three models were analyzed with confirmatory factor analysis (CFA) to test whether a single-factor model (Model A1: all items loading on a single factor), a 5-factor model (Model A2: items loading on the expected five intercorrelated factors), or a 3-factor model (Model A3: three intercorrelated factors -broad urgency, lack of conscientiousness, and sensation-seeking-) showed the best fit to the data, following previous research on the S-UPPS-P items. Second, a cross-validation design was used to determine the dimensionality from a more non-restricted (or "exploratory") approach. This was done by splitting the sample randomly into two subsamples of approximately the same size. In the first subsample, exploratory factor analysis (EFA) with the extraction of 1 to 5 factors was conducted, with geomin rotation for multidimensional solutions

(Models B#). For determining the number of factors to retain, we relied on eigenvalues and Cattell's scree test, since parallel analysis is not available in Mplus for categorical indicators. Acceptable salient loadings were considered above .35. In the second subsample, exploratory structural equation modeling (ESEM; Asparouhov & Muthén, 2009) with target rotation was conducted to test if the best EFA solution could be replicated (Model C). ESEM is considered a more flexible approach than CFA because, with target rotation, ESEM estimates the factor loadings of all items on all factors while constraining non-target loadings to be as close to zero as possible. In contrast, CFA restricts each item to load solely onto its intended factor, with all cross-loadings on non-intended factors fixed at zero. For all the factor analyses aforementioned, the common fit indices were used to assess goodness-of-fit (Jackson et al., 2009): Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Root Mean Square Error of Approximation (RMSEA). The following thresholds were applied (Brown, 2015): an excellent fit was defined as CFI and TLI > .95 and RMSEA < .05, while a moderate fit was considered for CFI and TLI > .90 and RMSEA < .08. And third, for the best-fitting model, measurement invariance of ESEM across gender, age, and sample type (community without disorder, community with any disorder, and clinical) was tested (Models D#, E#, and F#), following the standard sequence (e.g., Vandenberg & Lance, 2000). The process involved testing four models across each group of responses, the last three models each nested in the previous one: configural (resulting ESEM taken as baseline model, with all parameters free across groups except those for model identification), metric or weak invariance (fixing factor loading to be equal), scalar or strong invariance (fixing also item thresholds to be equal), and strict invariance (fixing also uniquenesses to be equal). The factor variance strategy was used for model identification (for detailed steps, see Ezpeleta & Penelo, 2015). Because group sizes were unequal, specific criteria were used to indicate a meaningful worsening of fit and, consequently, non-invariance when comparing nested models: decrease in CFI > .004 and increase in RMSEA > .02 (Chen, 2007). In other words, evidence for the more parsimonious model and, therefore, support for invariance at each step was considered if CFI and RMSEA were as good as or better than for the more complex model (i.e., less constrained): an increase in CFI or a decrease of up to .004 (change up to −.004), and a decrease in RMSEA or an increase of up to .02.

Omega coefficient (McDonald, 1999) was used for evaluating internal consistency reliability of the S-UPPS-P scale scores. The convergent validity with BIS-11-A impulsivity total score was assessed with Pearson's correlation coefficients.

Finally, differences across gender and age (2-factor mixed), and among sample type (1-way) were evaluated with analysis of variance (ANOVA) to establish the need for separate normative data by groups. To define the age stages, we based our categorization on WHO guidelines (2024), Specifically, early adolescence includes ages approximately 10 to 13, middle adolescence from 14 to 16, and late adolescence from 17 to 20, an age range that aligns with our sample distribution. Three criteria were combined to determine the relevant differences of these variables on raw scores. As the main criterion, η^2 effect-size was used applying Cohen's rules of thumb of 0.01 for small, 0.06 medium and 0.14 for large effect (Cohen, 1988). In addition, the following information was considered. The standard error of measurement (SE*m*) was obtained based on the reliability coefficient and standard deviation of the raw scores, and then the 95% CI or range of true scores around the SE*m* values was derived. Lastly, a difference greater than 5-6 points on raw subscale scores was considered as an indicator of practical importance. Normative data for each subscale score were then calculated on the relevant normative reference groups, using T-scores and percentile ranks.

Results

Missing responses for the 20 S-UPPS-P items were very low (Graham, 2009): 0.01%; only 10 participants (0.10%) exhibited missing values for one or more items. Item mean (and standard deviation) values ranged from 1.65 to 2.97 (0.73-1.19). Median (in absolute value) of skewness was 0.35 and kurtosis was 0.81. None of the items showed floor or ceiling effects.

Goodness-of-fit indexes for CFA were insufficient both for the 1-factor and 3-factor models (Table S1, Models A1 and A3: CFI and TLI ≤ .803; RMSEA ≥ .097), and better but not acceptable enough for the 5-factor model (Table S1, Model A2: CFI = .899; TLI = .880; RMSEA = .076, 90% CI [.075, .077]). Moving to an exploratory approach, and regarding EFA in the first subsample of the cross-validation design, the first four observed eingenvalues were above 1 (5.37-1.13), the fifth very little below (0.98), and from the sixth all were clearly below 1 (≤ 0.76). Cattell's scree test also suggested the extraction of three or five factors, the profile clearly flattening from the sixth factor onwards. The 5-factor solution with EFA showed the best fit (Table S1, Model B5: CFI = .985; TLI = .972; RMSEA ≤ 0.36, 90% CI [.034, .039]) and also showed the simplest and most interpretable loading structure (Table 2, left). Fit for this model (consisting of 20 items and five correlated factors) with ESEM in the second subsample was also satisfactory (Table S2 from supplementary material, Model C: CFI = .987, TLI = .975, RMSEA = .035, 90% CI [.032, .037]), and results for factor loadings and factor correlations were very similar (Table 2, right). Both with EFA/ESEM, the pattern of salient factor loadings of S-UPPS-P was as expected: all the items showed the highest factor loading on their intended factor, with values above .35 (all ≥ .41/.45); factor loadings on non-intented factors were all below .20, except for two/one items (.26-.27/.20, which could explain the poor fit, buy by very little, of the 5-factor model when analyzed with CFA). The expected pattern of factor correlations was also observed: .64/.69 between Urgency factors, .46/46 between Lack of Premeditation and Lack of Perseverance, and lower values involving Sensation Seeking (.10-.43/.12-.39 in absolute value).

Subsequently, the ESEM model was used as the baseline configural model for the tests of equivalence of factor loadings (weak or metric invariance), item thresholds (strong or scalar invariance), and item uniquenesses (strict invariance) across gender, age and sample type. Full weak, strong and strict measurement invariance was supported across all types of groups (CFI increased or at most decreased ≤ .004; RMSEA decreased or at most increased ≤ .002). These findings support the cross-group comparability of S-UPPP-P across gender, age and sample types (Table S1, Models D#, E#, and F#).

Table 2

Cross-validation Exploratory Factor Analysis (Standardized Parameters) for S-UPPS-P and Omega Coefficient

		EFA with geomin rotation (n = 4860)					ESEM with target rotation (n = 4873)				
Factor loadings [a]	Item (original numeration)	F1	F2	F3	F4	F5	F1	F2	F3	F4	F5
Negative urgency	6. *When I feel bad, I will…	**.56**	.17	−.04	.06	.03	**.59**	.18	−.11	.10	.02
	8. *Sometimes when I feel bad…	**.74**	.00	−.01	.03	.01	**.82**	−.07	−.12	.06	.03
	13. *When I am upset I often…	**.59**	.02	.19	−.08	.05	**.61**	−.03	.19	−.08	.05
	15. *When I feel rejected …	**.48**	.13	.09	−.08	−.03	**.51**	.10	.06	−.09	−.06
Positive urgency	3.* When I am in great mood …	.04	**.68**	.05	.05	.04	.07	**.64**	.04	.04	.03
	10.* I tend to lose control…	.03	**.80**	−.03	−.03	−.04	.05	**.76**	.00	−.04	−.03
	17. *Others are shocked…	−.04	**.69**	.00	.03	.02	−.03	**.71**	−.03	.03	.02
	20. *I tend to act without thinking…	.02	**.74**	.07	−.03	.02	.01	**.77**	.06	−.03	.03
Lack of premeditation	2. My thinking is usually careful…	.05	.04	**.41**	.26	.00	−.01	.01	**.45**	.20	.03
	5. I like to stop and think…	−.01	.01	**.71**	.06	.05	.01	.00	**.72**	.02	.07
	12. I tend to value and…	.03	.03	**.48**	.18	−.07	−.03	.07	**.58**	.10	−.10
	19. I usually think carefully…	−.01	−.01	**.83**	−.03	.01	−.01	.02	**.83**	−.07	.02
Lack of perseverance	1. I generally like to see things…	.00	.03	−.08	**.68**	.01	.04	.05	−.02	**.69**	.01
	4. Unfinished tasks...	−.12	−.01	.05	**.62**	.06	−.09	.05	.01	**.64**	.08
	7. Once I get going on something…	−.12	−.19	.02	**.46**	−.08	−.14	−.13	.00	**.48**	−.07
	11. I finish what I start.	.16	.00	.05	**.69**	−.01	.18	−.02	.16	**.59**	−.06
Sensation seeking	9. *I quite enjoy taking...	.09	.11	.03	.13	**.64**	.09	.10	.11	.01	**.61**
	14. *I welcome new and exciting…	.11	−.04	−.02	−.01	**.73**	.12	−.05	.03	−.06	**.68**
	16. *I would like to learn to fly...	−.27	.10	−.02	−.02	**.56**	−.18	.07	−.10	.02	**.58**
	18. *I would enjoy the sensation…	−.08	−.05	.04	−.04	**.70**	−.02	−.07	−.03	.02	**.77**
Factor correlations [b] and omega [c]											
	F1 (Negative urgency)	*.74*					*.74*				
	F2 (Positive urgency)	.64	*.82*				.69	*.82*			
	F3 (Lack of premeditation)	.33	.43	*.76*			.35	.44	*.75*		
	F4 (Lack of perseverance)	−.02	.13	.46	*.67*		−.05	.11	.46	*.68*	
	F5 (Sensation seeking)	.30	.43	.24	−.10	*.73*	.28	.39	.18	−.12	*.73*

* Inverse items reversed prior to analysis.

[a] In bold: Salient factor loading above ≥.35. Shaded cells indicate the factor in which the item was assigned, taken into account the content.

[b] For factor correlations: all p-values < .05

[c] In italics: internal consistency reliability (omega coefficient)

Internal consistency reliability ranged from moderate (.67-.68 for Lack of Perseverance) to excellent values (.82 for Positive Urgency) (Table 2, bottom). In terms of convergent validity with the BIS-11-A, the total score correlated highly-moderately with the theoretically most closely related S-UPPS-P subscale scores: .47 with Negative Urgency, .51 with Positive Urgency, and .59 with Lack of Premeditation. Lower correlations were observed for Lack of Perseverance (.27) and Sensation Seeking (.22).

Results from the 3 × 3 two-way ANOVA (gender [females, males, and non-binary] × age [11-13, 14-16, and 17-19 years] (Table S2 from supplementary material, top) and from the one-way ANOVA (sample type [community sample, clinical sample]) (Table S2 from supplementary material, bottom) for S-UPPS-P scores showed very small or null effects for all terms, including interaction for the former (all $\eta^2 \leq 0.033$). In addition, the 95% CI for range of "true" scores based on *SEm* was wider than the range between the highest and the lowest observed group mean (for cells with $n > 30$), which in turn did not exceed the threshold of 5-6 points considered as a cut point of practical importance for the raw scores. Taken as a whole, differences among gender, age and sample type were considered negligible. Therefore, we calculated norms based exclusively on the total sample for each derived scale score. T-scores and percentile ranks are provided in Table 3.

Table 3

Normative Data for the Spanish Adolescent S-UPPS-P (N = 9733)

	NeUr		PoUr		LPrm		LPrs		SeSe	
Score	T	Pc	T	Pc	T	Pc	T	Pc	T	Pc
4	30	2	37	8	31	2	32	3	28	1
5	33	5	40	20	35	8	37	10	32	4
6	36	10	43	30	39	15	41	20	35	9
7	40	17	47	41	44	26	46	35	38	14
8	43	26	50	53	48	42	50	52	42	22
9	47	38	53	65	52	59	55	69	45	31
10	50	50	57	74	56	73	59	82	48	41
11	53	62	60	82	60	84	64	91	51	53
12	57	73	64	89	64	91	68	96	55	65
13	60	83	67	94	68	96	73	98	58	76
14	64	90	70	97	72	98	77	99	61	85
15	67	95	74	99	77	99	82	99	64	92
16	70	98	77	99	81	99	86	99	68	98
M	10.02		7.98		8.57		7.96		10.59	
SD	2.95		2.95		2.43		2.22		3.06	
SEm	1.5		1.3		1.2		1.3		1.6	

Note. T: T-score; Pc: Percentile rank; NeUr: Negative urgency; PoUr: Positive urgency; LPrm: Lack of premeditation; LPrs: Lack of perseverance; SeSe: Sensation seeking. SEm: Standard Error of Measuremen

Discussion

The aim of the present study was to evaluate the psychometric properties of the S-UPPS-P scale and to provide normative data for the Spanish adolescent population. Overall, our results supported the expected internal structure, demonstrating equivalent across gender, age and sample type, along with acceptable internal consistency reliability. Regarding, convergent validity, the S-UPPS-P subscale scores showed moderate to high correlations with the total BIS total score, except for Lack of Perseverance. Furthermore, negligible or no differences were observed in raw scores across gender, age and sample type, allowing for the derivation of a single set of normative data for the entire sample.

The results obtained from the present adolescent sample supported the expected 5-factor internal structure of the S-UPPS–P items, consistent with the original UPPS-P model (Lynam et al., 2006; Whiteside & Lynam, 2001) and previous findings (Donati et al., 2021; Eray et al., 2023; Pechorro et al., 2021). Measurement invariance analyses provided key insights into the comparability of S-UPPS-P scale scores across gender, age, and sample type. Specifically, full measurement invariance was established across all groups, supporting the equivalence of factor loadings and thresholds, and allowing for meaningful group comparisons (Meredith, 1993). This finding partially aligns with previous research, which reported full measurement invariance across age and gender (Wang et al; 2020), only across gender (Donati et al., 2021; Fournier et al., 2024), or failed to achieve it (Pechorro et al., 2021). Our results suggest that the relationships between the items and their underlying latent constructs (e.g., impulsivity traits) are consistent across age, gender and sample types. To our knowledge, no previous study has examined the S-UPPS-P measurement invariance across clinical and community adolescent samples.

Regarding dimensionality, all items had a salient factor loading above .35 on their intended factor. Factor correlations ranged from moderate to strong, except for the value involving Sensation Seeking, which showed lower correlations, evidencing related but distinguishable factors, aligned with the theoretical model underlying the test, with varying magnitudes among different pairs of factors. In line with prior research, the strongest correlations were identified between dimensions more closely linked from a theoretical standpoint (Donati et al., 2021; Eray et al., 2023; Pechorro et al., 2021), such as Negative Urgency and Positive Urgency (Fisher-Fox et al., 2024), and Lack of Premeditation and Lack of Perseverance (Gomez & Watson, 2023). Predictably, Sensation Seeking showed low correlations with the other factors, supporting its distinct nature (Smith et al., 2007). The low correlation between Lack of Perseverance and both Urgency scale scores obtained as in previous research (Donati et al., 2021, Wang et al., 2020) may reflect two different processes as Lack of Perseverance and Lack of Premeditation (cognitive impulsivity) are linked to top-down processing, and Negative Urgency and Positive Urgency (emotional impulsivity) dimensions can be linked to bottom-up processing both linked as for example in Attention-Deficit/Hyperactivity Disorder [ADHD] (Gomez & Watson, 2023).

In relation to internal consistency, the subscale scores exhibited coefficient values ranging from moderate to excellent (ω between .67-.68 for Lack of Perseverance and .82 for Positive Urgency). Our findings align with those obtained in several validation studies of short versions in adolescent populations of the S-UPPS-P (Wang et al., 2020). Notably, Lack of Perseverance has presented smaller internal consistency coefficients than the other scale scores in other short studies in adolescents (Eray et al., 2023; Pechorro et al., 2021).

In assessing convergent validity, Lack of Premeditation showed a moderate to high correlation with the BIS-11-A global score, which was expected given that several items in the BIS-11-A specifically measure aspects of non-planning impulsiveness. The S-UPPS-P provides a more nuanced and clinically informative assessment between profiles or risk factors (e.g., emotional vs. cognitive impulsivity). However, contrary to our expectations Lack of Perseverance scores showed a low correlation with the BIS-11-A global score. Eray et al (2023) is the only study to report a low correlation between Lack of Perseverance and motor impulsivity subscale score of the BIS-11-A. A possible explanation for this low correlation may involve social desirability, as perseverance is seen as a valued trait in adolescence, potentially leading to biased responses (Carvalho et al., 2023; Holden & Passey, 2010; Schoenmakers et al., 2024; Wu, 2025). Additionally, the link between Perseverance and cognitive effort might partially account for this result. Given the ongoing development of executive functions during adolescence, adolescents may exhibit more variability in the capacity to sustain effort, which could attenuate its relationship with impulsivity measures such as the BIS-11-A (Fortgang & Cannon, 2022). Furthermore, the relatively lower reliability observed for the Lack of Perseverance subscale most likely has attenuated the convergent relation with the BIS scale score. Perseverance performance requires a certain level of sustained effort, but beyond a specific point increasing this effort does not lead to further improvement and instead remains constant. This nonlinear performance may partially explain the lower correlation value (Bandalos, 2018). This suggests that Perseverance may counterbalance the tendency to avoid cognitive effort, which often drives impulsivity, especially in adolescence (Patzelt et al., 2019). This is especially relevant in neurodevelopmental disorders like ADHD or fetal alcohol spectrum disorders (FASDs), where impairments in Perseverance contribute to risk-taking behaviors (Eray et al., 2023; Kingdon et al., 2016; Mattson et al., 2019; Miller et al., 2010; Wagner et al., 2024). Finally, Sensation Seeking exhibited a low correlation, as expected taking into account that the BIS-11-A does not specifically assess Sensation Seeking as one of its facets (Smith et al., 2007).

Since the observed differences by gender, age and sample type were considered negligible, normative data were ultimately calculated based on the total sample for each derived scale score. A single S-UPPS-P norm for adolescents aligns with previous studies reporting no literature of no gender differences (Montasell-Jordana et al., 2025; Fournier et al., 2025). This finding matches with the availability of undifferentiated norms by age and gender both in adults (Gialdi et al., 2021; Pinto et al., 2021) and in adolescents in Spain for the long version of the UPPS-P (Montasell-Jordana et al., 2025).

Several limitations must be recognized. We had no opportunity to corroborate self-reported diagnoses with professional clinical diagnoses for most of the community subsample. Resource constraints and limited access to comprehensive diagnostic data precluded the acquisition of accurate and valid diagnostic information from all participants through the psychological services of the schools. Moreover, additional resources for additional self-reported mental health or emotional well-being instruments and neuropsychological tasks to further explore

facets of impulsivity were also unavailable. The results from the non-binary group should be interpreted with caution due to the limited sample size, which may restrict the reliability of the estimates for this subgroup. Nonetheless, our results are based on a very large and diverse sample obtained through random stratification for the community sample, representing the adolescent population across family situations, school types, income levels and population densities. Furthermore, the prevalence of self-reported mental health problems in our samples closely aligns with findings from epidemiological studies of adolescents in Spain (Haro et al., 2006).

Despite these limitations, the present findings suggest that the scores for the Spanish version of the S-UPPS-P have acceptable validity and internal consistency in the adolescent population. Its reduced length may make it more suitable for clinical and survey administration among adolescents compared to longer versions (Omrani et al., 2019), which minimizes the time and effort required for respondents in this population (Fortgang & Cannon, 2022). Given that adolescence is a critical period for the emergence of impulsivity-related disorders, the S-UPPS-P may serve as a useful tool for early identification and risk assessment in clinical settings, and may complement screening efforts as well as therapeutic and clinical services (Fisher-Fox et al., 2024). Moreover, the normative data provided by this study offers a useful resource for future research. Given that adolescence is a critical period for the emergence of impulsivity-related disorders, the S-UPPS-P may serve as a useful tool for early identification and risk assessment in clinical settings (Um et al., 2018). Specifically, it can be incorporated into screening protocols in primary care or mental health services to detect adolescents exhibiting elevated levels of specific impulsivity traits (e.g. Negative Urgency or Lack of Premeditation) as for specific risk profiles for suicide behaviors (Lynam et al., 2011), which are associated with emotional dysregulation or externalizing behaviors.

Author Contributions

Esteve Montasell-Jordana: Conceptualization, Investigation, Validation, Supervision, Funding acquisition, Project administration, Resources, Writing – Original draft, Writing - Review & editing. **Eva Penelo:** Conceptualization, Methodology, Software, Data curation, Validation, Formal analysis, Supervision, Writing – Review & editing. **Laura Blanco-Hinojo**: Conceptualization, Data curation, Supervision, Visualization, Writing – Review & editing. **Beatriz Lanceta**: Investigation, Project administration, Resources. **Laura Gomàriz-Camacho**: Investigation, Project administration, Resources **Anna Soler**: Investigation, Project administration, Resources**. Jesús Pujol**: Conceptualization, Validation, Writing – Review & editing. **Joan Deus**: Conceptualization, Validation, Supervision, Project administration, Resources, Writing – Review & editing.

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Declaration of Interests

The authors declare that there is no conflict of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon request. Supplementary material can be found here: https://figshare.com/s/29528f85a8c8ca5d4fff

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Study 3: Psychometric properties and normative data for the Spanish 15-item Barratt Impulsiveness Scale in adolescents (BIS-15-A)

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Abstract

The Barratt Impulsiveness Scale (BIS 15-item version) has not been validated in adolescents in Spain. We aimed to evaluate the psychometric properties of the Spanish BIS-15 in adolescents (N = 8520) aged 11-19 years from 62 different Spanish high schools and established normative data. Exploratory factor analysis with Promax rotation identified two moderately correlated latent factors (r = .42): Drive Action, which includes Motor control-related items potentially linked to cortical-subcortical motor and premotor areas, and Executive Control, encompassing items related to Attentional processes and planning, potentially reflecting the efficiency of prefrontal cortex-related functions. This 2-factor model is hypothesized to capture the neuroanatomical distinctions between prefrontal executive functions and motor control, accounting for 42.0% of the total initial variance of BIS-15-A responses. Internal consistency reliability was acceptable (ω = .77 to .83). BIS-15-A Drive Action and Executive Control scale scores showed moderate to high (r = .55 to .63) correlations with UPPS-P subscale scores, except Sensation Seeking. Our results suggest that the BIS-15-A is a valid and reliable instrument for adolescents. We provide whole population normative data regardless of gender or age. BIS-15-A scores can contribute to determining whether a particular impulsive behavior might stem from executive dysfunction or issues with motor control.

Keywords: adolescents; Barratt; impulsivity; normative data; validation

Psychometric properties and normative data for the 15-item Spanish Barratt Impulsiveness Scale in adolescents (BIS-15-A)

Introduction

Impulsivity is defined as "*a predisposition toward rapid, unplanned reactions to internal or external stimuli with diminished regard to the negative consequences of these reactions to the impulsive individual or to others*" (Potenza & Taylor, 2009, p. 1). Adolescence is a developmental stage marked by heightened emotional reactivity and reduced inhibitory control, making individuals more susceptible to impulsive actions and engagement in potentially risky behaviors such as substance use, self-damaging behavior, risky sexual activity, or delinquent and aggressive conduct compared to older age groups which underscores the importance of assessing impulsivity in adolescent populations (Shulman et al., 2016; Steinberg, 2010).

Barratt (1959) conceptualized impulsivity as a multidimensional trait encompassing both cognitive and behavioral components, leading to the development of the Barratt Impulsiveness Scale (BIS). Subsequent work further differentiated impulsivity and anxiety as distinct higher-order personality dimensions, with impulsivity linked to action-oriented tendencies and anxiety to mood-related processes (Barratt, 1987). This distinction paved the way for later theoretical frameworks separating behavioral activation processes from regulatory and affective control systems. Subsequent refinements, particularly by Patton et al. (1995), resulted in the BIS-11, a 30-item measure widely used to assess impulsivity. This work reinforced the view that impulsivity is not a unidimensional construct. However, despite its broad adoption, the factor structure of the BIS-11 has shown inconsistencies across studies, and its underlying model remains controversial, with ongoing debate regarding the optimal representation of impulsivity dimensions (Barratt, 1987; Stanford et al., 2009; Vasconcelos et al., 2012). In particular, the BIS version proposed by Spinella had not been psychometrically evaluated in Spanish adolescents prior to this study.

Regarding demographic variables, most studies found no significant differences between male and female adults and adolescents on BIS scores (Stanford et al., 2009). However, some studies reported higher scores for males, but with only marginal significance (Bhat et al., 2018; Fossati et al., 2002; Spinella, 2007), whereas others found the opposite (Yao et al., 2007). In terms of age, from

adolescents to older adults, adults generally reported lower levels of impulsivity traits, particularly on the Non-planning score, with gradual decline over the years (Spinella, 2007; Vasconcelos et al., 2012). Most studies have found no significant gender or age differences in BIS scores, which justifies examining these demographic variables to clarify whether impulsivity, a construct with developmental aspects, shows consistent patterns across groups.

One of the most widely abbreviated versions used is the BIS-15 (Spinella, 2007), consisting of 15 items selected from the original BIS-11. BIS-15 offers the benefit of reduced length, minimizing time and effort for respondents in this developmental stage, which can otherwise contribute to bias (Fortgang & Cannon, 2022). It is also a useful tool for early identification advantages in schoolbased psychological assessments and risk assessment in clinical settings (Martínez-Loredo et al., 2015), particularly when incorporated into primary care or mental health screening to detect adolescents with elevated impulsivity traits (e.g., substance use, eating disorders). This shorter version has been adapted into different languages and used with adolescent populations (Bhat et al., 2018; Rousselle & Vigneau, 2016). Spinella (2007) identified a 3-factor structure in a community sample: Non-planning impulsivity (lack of future orientation or forethought), Motor impulsivity (acting without thinking), and Attentional impulsivity (lack of focus or concentration). This 3-factor structure of the BIS-15 was supported by the work of Meule et al. (2011) and Bhat et al. (2018) but not by other studies (Rousselle & Vigneau, 2016; Vasconcelos et al., 2012). Hence, findings on its internal structure have been inconsistent, with some items (particularly Attentional and Motor items) not loading on the expected factors. Moreover, other studies have proposed a 2-factor model (Charles et al., 2021; Reise et al., 2013), combining the Non-planning and Attentional factors (Cognitive Impulsivity) and maintaining the Motor (Behavioural Impulsivity) factor separately. In addition, the BIS-15 scores showed internal consistency coefficients ranging from poor to acceptable reliability, as reported in several studies (e.g., Stanford et al., 2009; Vasconcelos et al., 2012). Regarding convergent validity, Spinella (2007) found moderate to strong relationships between the BIS-15 and the Frontal Systems Behavior Scale scores (Grace & Malloy, 2001), particularly with the Disinhibition and Executive Dysfunction scale scores, as well as with the Executive Function Index (Spinella, 2005). Furthermore, BIS-15 scale scores were found to correlate with specific impulsivity traits measured by facets of the UPPS-P Impulsive Scale

(Lynam et al., 2006; Meule et al., 2011), such as Lack of Premeditation (the tendency to act without regard for potential consequences) and Negative Urgency (impulsive responding triggered by heightened negative affect).

For adolescents, the most recent version of the BIS-11, the BIS-11-A (Fossati et al., 2002), introduced modifications to certain items (e.g., rewording items related to the professional/work sphere) to better suit this population while maintaining the same six first-order factor structure as in adults but considering only Non-planning and Motor impulsiveness as second-order factors (Vasconcelos et al., 2012). Even though the BIS-15 is widely used, its internal structure in adolescent populations remains unclear. Previous studies conducted in adolescents have reported inconsistent factor solutions, with both 3-factor and 2-factor models emerging depending on the sample, language, and analytic approach, and with frequent cross-loadings between Attentional and Non-planning items (Rousselle & Vigneau, 2016; Vasconcelos et al., 2012). These inconsistencies suggest that the original adult-derived factor structure may not fully capture the organization of impulsivity during adolescence. From a developmental perspective, adolescence is characterized by ongoing maturation of executive and self-regulatory systems, during which core cognitive control processes such as inhibitory control, attentional regulation, planning, working memory, and cognitive flexibility may still be insufficiently differentiated (Leshem & Glicksohn, 2007; Shulman et al., 2016). In this context, it is theoretically plausible that attentional and planning-related aspects of impulsivity cluster together within a broader regulatory dimension, whereas more overtly action-oriented tendencies toward rapid responding may form a separate dimension. This view is also broadly compatible with multidimensional frameworks of impulsivity, such as the UPPS model (Whiteside & Lynam, 2001), in which difficulties related to premeditation and perseverance are more closely aligned with regulatory aspects of behavior than with overt motor impulsivity (Barratt,1987; Lynam et al., 2006). Accordingly, when examining the psychometric properties of the BIS-15 scores in adolescents (BIS-15-A), it is methodologically appropriate not only to test the originally proposed 3-factor model, but also to explore theoretically plausible 2-factor alternatives that may better reflect the developmental organization of impulsivity during this life stage. Table S1 (supplementary material) summarizes the factor models obtained in previous research conducted on adolescents.

In the Spanish language, several versions of the BIS have been developed. In adolescents, and following Fossati's version of the BIS-11-A (2002), Martinez- Loredo et al. (2015) identified a 2-factor structure. However, review studies such as that by Vasconcelos et al. (2012) did not identify a stable solution (whether 2- or 3-factor) across studies using comparable statistical approach. Furthermore, both confirmatory and exploratory factor analysis conducted to date have failed to converge on a consistent internal structure in adolescent samples. In parallel, few psychometric investigations of short versions of the BIS have been conducted in adolescence to date, particularly in educational settings where time constraints and respondent burden are critical considerations (Diersch & Walther, 2016). Crucially, despite the widespread use of the BIS-15, this short version has not been uniformly validated across developmental stages and cultural contexts. In particular, while Spanish adaptations of longer versions of the BIS for adolescents are available, no psychometric validation of the BIS-15-A has been conducted specifically in Spanish-speaking adolescent populations.

Against this background, in this study, we aimed (a) to test whether the original 3-factor structure proposed by Spinella (2007) for the BIS-15-A presents adequate psychometric properties in the adolescent population, and, if not, to identify the most optimal factor structure; (b) to establish the internal consistency of the BIS-15-A dimensions; (c) to examine the convergent validity of the BIS-15-A scores with another self-reported measure of impulsivity (the UPPS-P Impulsive Behavior Scale; Lynam et al., 2006); (d) to explore the relationship between the BIS-15-A and demographic aspects such as gender and age; and (e) to provide normative data for the Spanish adolescent population.

Materials and Methods

Participants

Participants were recruited by using cluster sampling of students from secondary schools located across the territory of Catalonia, Spain. The database of the Department of Education of the Generalitat de Catalunya (Government of Catalonia, 2022a, 2022b) was used to select schools of various types (private, public, and subsidized) and different high school academic courses. Data clustering was based on population density and family income level, as indicated by the Institut

d'Estadística de Catalunya (IDESCAT, 2022a, 2022b). A total of 62 secondary schools participated in the study during the academic year 2021-2022. The inclusion criterion for participants enrolled in these schools was being between 11 and 19 years old. Exclusion criteria comprised students who were enrolled in special education or adapted courses, as well as those with insufficient reading comprehension in Spanish.

The initial sample included 8600 participants who agreed to take part in the study. Participants who omitted sociodemographic data or left the survey blank during the data collection process (n = 64) and those who fell outside the specified age range (n = 16) were not considered, resulting in a final sample of 8520 participants. Sociodemographic variables were self-reported by the students in an ad hoc survey, which also included questions about mental health disorders. Specifically, participants were asked to report any diagnoses made by mental health professionals, with a detailed list of specific disorders provided for reference; an open-ended question captured any additional disorders not listed. In fewer than 10% of the schools, psychological disorders were instead identified by the school's psychological services after survey administration. Sample characteristics are displayed in Table 1.

Instruments

BIS-11-A. As a starting point, we used the 30-item Spanish version of the BIS-11 for adolescents adapted by Martínez-Loredo et al. (2015), which addressed content-related modifications to certain items from the adult version when applied to adolescents (Table S2). The present study aimed to examine the psychometric properties of the BIS-15 as originally proposed by Spinella (2007), rather than to develop a new abbreviated version. We used the Spinella 15 item's version (2007) to preserve conceptual consistency and facilitate comparability with previous and future studies (detailed information on item number, content, original factor assignment and correspondence between versions is available in Table S3). Each item is a statement about impulsivity-related thoughts or behaviors in different situations (e.g., "I concentrate easily" or "I plan tasks carefully") and is scored on a 4-point Likert-type scale ranging from 1 (*rarely/never*) to 4 (*almost always/always*). Subscale scores are calculated by summing the corresponding item responses (reversing scores when necessary).

UPPS–P Impulsivity Scale (Lynam et al., 2006). We used the Spanish version of the UPPS-P

adapted by Verdejo-García et al. (2010) and validated by [Blinded]. This self-report questionnaire consists of 59 items designed to assess five distinct personality pathways to impulsive behavior: Negative Urgency, Lack of Perseverance, Lack of Premeditation, Sensation Seeking, and Positive Urgency. Each item is rated on a 4-point Likert scale ranging from 1 (*strongly agree*) to 4 (*strongly disagree*). Subscale scores are calculated by summing the item responses (reversed when necessary). In the present sample, internal consistency reliability was satisfactory (omega coefficients ranged from .83 to .94).

Procedure

The study received approval from the ethics committee of [blinded institution] and authorization from the Department of Education of the Government of Catalonia (Spain) for recruiting centers (Register: [blinded]). Initial contact with schools was established with their directors, who were provided with an overview of the research goals and a request for cooperation. Upon the schools' agreement to participate, each institution's administration reviewed and approved the detailed study protocol. An information sheet was provided to each participating institution, and a video document explaining the study's characteristics, objectives, and guidelines was sent to the school administration for parental communication. Parents were provided with a 2-week period to withdraw their child from participating in the research. Finally, written informed consent was obtained from all participating adolescents. The self-reported questionnaires and the ad hoc survey for sociodemographics and mental health problems were administered collectively during a 1-hour academic session. A teacher assisted in the administration, and the main researcher was present at that time. An online platform was used to facilitate data collection. All students received an information sheet assuring them that their data would be treated confidentially and only used at the group level. In four centers, the ad hoc survey for sociodemographics did not include the mental health section, and school services reported the diagnosis of mental disorders directly to the first author (on the basis of their own internal data protection protocols). Part of the data used in the current study has already been published in the context of a research paper focusing on the psychometric properties of the UPPS-P Impulsive Behavior Scale (Blinded).

Statistical Analysis

Analyses were conducted with SPSS29 and MPlus 8.10 programs. To evaluate the internal structure, a confirmatory factor analysis (CFA) was initially performed to test the originally proposed 3-factor model (Spinella, 2007), consisting of the dimensions of Non-planning impulsivity, Motor impulsivity, and Attentional impulsivity, of 5 items each. We used weighted least squares means and variance adjusted (WLSMV) estimator, a robust estimator which does not assume normally distributed variables and provides the best option for modelling categorical or ordered data, and the factor-variance strategy for model identification. The following goodness-of-fit indices were used (Jackson, et al., 2009): root mean square error of approximation (RMSEA), comparative fit index (CFI), and Tucker and Lewis index (TLI). We followed the conventional cutoff points for interpretation (Brown, 2015): RMSEA < .05 and CFI and TLI > .95 for excellent fit, and RMSEA < .08 and CFI and TLI > .90 for moderate fit. Given that this CFA did not provide adequate fit indices, we examined the internal structure by using exploratory factor analysis (EFA) with WLSMV estimator and oblique Promax rotation using the default Mplus setting for power (exponent) value. Eigenvalues above 1 and the Cattell's scree test were used as criteria for determining the number of factors to be retained. Items exhibiting salient cross-loadings (>.30) were assigned to the factor with the highest loading when the difference with respect to the second highest value was above .20; in contrast, when such difference was below .20, the content of the item was taken into account, considering its theoretical importance in defining the construct, to ensure content validity, before making a final decision about its retention or removal.

The internal consistency reliability of the BIS-15-A scale scores was assessed by using the omega coefficient (McDonald, 1999). Pearson’s correlation coefficients were calculated to evaluate the relationship between BIS-15-A scores and UPPS-P scores.

To establish normative data groups, we assessed gender and age differences by using a 2-factor mixed analysis of variance (ANOVA). To define age stages, we followed the World Health Organization [WHO] guidelines (2024). Specifically, early adolescence was defined as ages 10 to 13, middle adolescence as 14 to 16, and late adolescence as 17 to 20, which aligns with the distribution of our sample. In our study, participants aged 11 to 19 years were included, since students younger than 11 were not enrolled in the participating schools. Three criteria were combined to identify significant

differences in raw scores for these variables. We used Cohen's guidelines for η^2 values: 0.01 for small, 0.06 for medium, and 0.14 for large effects (Cohen, 1988) to determine the effect size as a primary criterion. Next, from the omega coefficient and the standard deviation of the raw scores, we calculated the standard error of measurement (SEm). From the SEm values, a 95% confidence interval (CI) was established, offering a range for the "true" scores. Also, a difference above 5-6 points on raw subscale scores was considered an indicator of practical importance. Normative data for each factor were calculated by using T-scores and percentile ranks based on the designated normative reference groups.

Results

Item mean (and standard deviation) values ranged from 1.87 (0.87) to 2.70 (1.08). The median (in absolute value) skewness was 0.38 and kurtosis was 0.90. None of the items showed floor or ceiling effects. There were no missing item responses.

Goodness-of-fit indexes for the 3-factor model with CFA were inadequate (CFI = .864, TLI = .836, RMSEA = .102, 90% CI [.100, .104]). From this result, we conducted an EFA. The first four factors showed an eigenvalue > 1 (4.592, 1.707, 1.215, and 1.060), whereas the fifth was below (0.926). The scree plot suggested extracting only two factors (Figure S1), which accounted for 42.0% of the total variance (sum of squared loadings after extraction and rotation: 2.60 and 2.35, for the first and second factors, respectively). Goodness-of-fit indexes for the 2-factor model with EFA were mostly adequate (CFI = .896, TLI = .856, RMSEA = .062, 90% CI [.059, .064]).

From the magnitude of the factor loadings and the interpretability of the factors related to item content, we retained the model shown in Table 2. This model consists of a first factor that we labeled Drive Action, which consists of items that reflect impulsive behaviors, including motor control-related items potentially linked to cortical-subcortical motor and premotor areas (Dalley & Robbins, 2017) and a second factor that we labeled Executive Control, as it contains items that reflect functions as inhibitory control, working memory or cognitive flexibility (e.g., Diamond, 2013). Items 2 ("I do things without thinking"; F1 = .43, F2 = .50) and 14 ("I say things without thinking"; F1 = .50, F2 = .40) showed cross-loadings with a difference less than .20 between their primary and alternative factor loadings. The items were maintained as they reflect action-oriented impulsivity involving both motor output and higher-order cognitive control, consistent with hierarchical models of control and

inhibitory regulation (Badre & Nee, 2018; Dalley & Robbins, 2017). The factor correlation was moderate (.42). In addition, CFAs comparing this 2-factor proposed model against the original 3-factor model and other competing 2-factor models showed better fit to the data for the former (CFI = .854 vs. ≤ .826, TLI = .823 vs. ≤ .801, RMSEA = .106 vs. ≥ .112, SRMR = .063 vs. ≥ .067) (detailed information upon request). Standardized parameters for the EFA 2-factor solution are displayed in Table 2.

Internal consistency reliability was satisfactory for all BIS-15-A scale scores, with omega values of .80 for Drive Action, .77 for Executive Control, and .83 for the total score (Table 2, bottom left). Regarding convergent validity with the UPPS-P, Lack of Premeditation and Lack of Perseverance scores correlated highly to moderately with the Spanish BIS-15-A Executive Control and the total score. Negative and Positive Urgency scores correlated highly to moderately with Executive Control, Drive Action, and the total score. The correlation with Sensation Seeking was much lower with all BIS-15-A scale scores (Table 3).

Table 4 displays the results of the 3 × 9 ANOVA, with the analysis of Spanish BIS-15-A scale scores based on gender (females, males, and non-binary) and age (from 11 to 19 years old). The analysis indicates very small or null effects for both main effects (gender η^2 .002 - .003; age η^2 .001 - .002) and their interaction ($\eta^2 \leq .003$). Furthermore, the 95% CI for the range of "true" scores, based on the SEm, was wider than the range between the highest and lowest observed group means (for cells with $n > 30$). Overall, gender and age differences were considered negligible. As a result, we calculated norms exclusively on the basis of the total sample for each derived scale score. The T-scores and percentile ranks for the Spanish BIS-15-A are displayed in Table 5.

Discussion

Our aim in this study was to examine the psychometric properties of the Spanish version of the BIS-15-A in terms of its factor structure, internal consistency, convergent validity with the UPPS-P, and relationships with gender and age. We also aimed to provide normative data for the BIS-15-A in the Spanish adolescent population. Our findings did not support the original 3-factor model proposed by Spinella (2007), as evidenced by poor fit indices in the CFA (e.g., CFI and TLI = .84-.86, RMSEA = .10). Overall, our results suggest an acceptable internal consistency reliability and

convergent validity with the UPPS-P Lack of Perseverance, Lack of Premeditation, and Negative Urgency scores. Furthermore, minimal differences were observed in terms of gender and age, and subsequently the normative data were calculated for the whole sample.

Contrary to the expected 3-factor structure proposed by Spinella (2007), our results supported a more parsimonious 2-factor structure, with factors showing a moderate intercorrelation, reflecting a still-maturing but relatively balanced during this developmental stage. The factor structure found in the current study, which differs from that found in previous studies conducted on various versions of the BIS, can be attributed to several reasons, including the type of sample and item content. For example, Spinella's (2007) validation study included participants 15 to 80 years old, whereas our sample included the adolescent period, from preadolescence to late adolescence. In terms of item content, adolescents' responses may incorporate different linguistic meanings and generational changes in social desirability compared with adult responses and parental reports (Carvalho et al., 2023), making adolescents a complicated population for assessment. Our 2-factor structure aligns with findings from the Spanish version of the BIS-11-A in preadolescents (Martínez-Loredo et al., 2015) and with prior evidence in adolescents indicating instability in the factorial structure of impulsivity measures (Charles et al., 2021; Durmuş et al., 2022; Kata & Poleszak, 2021; Rousselle & Vigneau, 2016; Shulman et al., 2016; Yao et al., 2007; Vasconcelos et al., 2012). At the same time, our results diverge from studies that retained a clearer 3-factor structure or a factor distribution closer to the original Spinella proposal (e.g., Bhat et al., 2018). These inconsistencies across studies may reflect differences in developmental stage, suggesting that the factorial structure of impulsivity becomes more differentiated with age as executive and motor systems mature (Badre & Nee, 2018; Dalley & Robbins, 2017; Freis et al., 2022; Leshem & Glicksohn, 2007; Menon & D'Esposito, 2022; Morean et al., 2014; Reise et al., 2013) as well as variations in the expression of impulsivity across psychopathological conditions (Schaub et al., 2023; Zelazo, 2020). Overall, the literature indicates that no single factorial solution has consistently demonstrated cross-cultural stability in adolescent samples (Vasconcelos et al., 2012). We propose a 2-factor model in which the original "attention-related" items are divided between both factors.

The decision to allocate two items (Items 2 and 14) to both factors was based on their capacity ability to capture action-oriented impulsivity, that which integrates motor execution with higher-order cognitive control processes, consistent with hierarchical models of hierarchical cognitive control (Badre & Nee, 2018; Dalley & Robbins, 2017). Behaviors such as acting or speaking without thinking involve inhibitory control, contextual regulation, and coordination of motor and premotor systems, as well as prefrontal mechanisms supporting schematic representations (e.g., cognitive maps) and decision-making (Menon & D'Esposito, 2022).

Developmental and Psychological Perspectives

The 2-factor structure proposed in the current study (Drive Action and Executive Control) is theoretically consistent with established frameworks of executive function and impulsivity (Diamond, 2013; Whiteside & Lynam, 2001). First, the traditional 3-factor structure of the BIS-15, which includes Attentional, Non-planning, and Motor factors, can be contextualized in the executive functions model (Diamond, 2013), which includes inhibitory control (Fino et al., 2014) working memory (Whitney et al., 2004), and cognitive flexibility (Yu et al., 2020) for the Attentional and Non-planning factors. Both executive functions and impulsivity are components of self-regulation (e.g., those regulated by affectivity, impatience, boredom, or decision making) linked to psychopathology (Schaub et al., 2023, Zelazo, 2020). Similarly, from a developmental perspective, impulsive behaviors change from a lack of cognitive inhibition to behavioral inhibition that extends from executive control to motor action (Bari & Robbins, 2013; Menon & D'Esposito, 2022). Cognitive and motor inhibition share overlapping brain networks, as suggested by findings that psychiatric patients are typically impaired on tasks that assess inhibition of motor responses and inhibition of cognitive material (Bari & Robbins, 2013; Schaub et al., 2023). During adolescence, cognitive breakdowns and impaired response inhibition linked to inefficient executive control are associated with an increased risk of general psychopathology across academic and social domains (Zelazo, 2020).

Neurobiological and System Models

The 2-factor structure identified in the present study appears to be broadly consistent with established neuroanatomical frameworks of impulsivity. Neuroanatomically, adolescence is a crucial period in life for the development of the executive systems and self-regulation (Luna et al., 2015).

Dalley and Robbins (2017) discriminated between two systems of impulsivity: "waiting impulsivity" and "stopping impulsivity," which align with our 2-factor structure. Waiting impulsivity, which primarily depends on top-down prefrontal cortical interactions, encompasses aspects such as planning and organization, as seen in the Planification and Organization subscale of the Executive Function Index (Spinella, 2005) and in the Attentional and Non-planning dimensions of the adult BIS-11 subscales under the Executive Control factor. Stopping impulsivity, which depends on dissociable neuronal circuitry involving cortical motor areas (such as the primary motor cortex, supplementary motor area [SMA]/pre-SMA, dorsal premotor area, and subcortical areas, among others), covers motor components and motivational drive subscales, such as the BAS Drive subscale from the Behavioral Inhibition and Activation Systems Scales (Carver & White, 1994), which are encompassed in the Drive Action factor. The low to moderate correlation observed between the two factors supports their relative independence, yet interconnected nature, which aligns with theories positing that top-down executive processes and bottom-up impulsive responses rely on distinct, albeit interactive, neural mechanisms (Badre & Nee, 2018). Similarly, the 2-factor structure aligns with Steinberg's (2010) dual systems model, which proposes an early-maturing affective system sensitive to reward and novelty, and a slower-developing cognitive control system.

In terms of convergent validity, the Spanish BIS-15-A showed the strongest correlations with the UPPS-P Lack of Perseverance, Lack of Premeditation, and Negative and Positive Urgency scores. Specifically, Lack of Premeditation and Lack of Perseverance were more related to Executive Control than to Drive Action, probably due to the core symptoms derived from the Non-planning and Attentional classical subscales of the BIS, which reflect fundamental executive characteristics (Freis et al., 2022). At the same time, the correlations of the Urgency subscale scores with both BIS-15-A factors were similar, with a slightly higher correlation for Drive Action. Researchers have theorized that the relationship between emotional experiences and actions involves the activation of the motor cortex by subcortical structures (Cyders & Smith, 2008). For instance, studies targeting substance use and addictive disorders have shown that emotional stimuli, regardless of their valence, may enhance motor cortex excitability (Braine & Georges, 2023). Since the Drive Action factor reflects impulsive, action-oriented behaviors, these emotion-driven problem behaviors (i.e., disorderly alcohol use, online

gambling disorder, obsessive-compulsive disorder behaviors or social media addiction) may explain the stronger correlation observed (Willie et al., 2022).

Regarding demographic variables, we did not find substantial differences in the BIS-15-A subscale scores, similar to previous research regarding both gender (Stanford et al., 2009) and age (Leshem & Glicksohn 2007; Stanford et al., 2009). This can be partially explained by the fact that impulsivity tends to decrease during the transition to adulthood (Leshem & Glicksohn, 2007). Regarding gender, the absence of significant differences in impulsivity scores among adolescents may be related to two other factors. First, socialization pressures, particularly among females, may encourage responses aligned with socially desirable norms (Carvalho et al., 2023; Holden & Passey, 2010). Second, the association between depressive symptomatology and engagement in risky behaviors, particularly those driven by negative urgency, may partially account for the absence of significant differences (Petitet et al., 2021; Porcelli et al., 2023).

Taken together, our findings suggest that impulsive behavior is not a unitary construct but reflects diverse phenotypes with distinct mechanisms. This supports dismantling the broad notion of impulsivity in favor of a more nuanced framework distinguishing sensation seeking from impulsivity, executive from effortful control, and impulsivity as deficit versus stable trait (Cross et al., 2011; Strickland & Johnson, 2021).

Several limitations must be acknowledged. The sample was drawn exclusively from adolescents in Catalonia, which may limit the generalizability of the findings to adolescents from other sociocultural regions of Spain. The framework for proposing our 2-factor solution, based on Diamond's (2013) work on executive functions, is not the only model for executive function theory, and there is currently no consensus on a single framework (Sambol et al., 2023). Moreover, our proposal regarding the theoretical and neuroanatomical underpinning of the two factors identified in the current study should be confirmed by further research by using neuroanatomical data and/or neuropsychological assessment (e.g., behavioral tasks assessing executive functions). An additional limitation concerns the non-uniform identification of pre-existing mental health conditions across participating centers, as most data was obtained via self-report, while a small proportion of cases (less than 10%) was derived from institutional records. As this information was collected solely for

descriptive purposes and not included into any psychometric analyses, the potential impact of this heterogeneity is likely limited and confined to the interpretation of sample characteristics. Importantly, all other aspects of the data collection protocol including questionnaire administration procedures, instructions, and assessment conditions were fully standardized across centers. The study relied exclusively on self-report measures. Future research would benefit from incorporating multi-method approaches, including behavioral tasks and informant reports, to provide a more comprehensive assessment of impulsivity. Although the online platform offered several technical advantages, reliance on self-report measures collected within a single session may have introduced common method variance (e.g., response style effects), which should be considered when interpreting the observed associations.

Despite these limitations, our findings are based on a very large and diverse sample that represents the adolescent population across various family situations, types of schools, income levels, and population densities. In addition, our self-reported data on disorders closely mirrors the prevalence observed in adolescent epidemiological studies in Spain (Haro et al., 2006). Furthermore, our Spanish BIS-15-A conceptual model aligns with the transdiagnostic approach involving neurocognitive endophenotypes, whereby changes in behavioral or cognitive processes are associated with discrete deficits in defined neural systems (Schaub et al., 2023; Freis et al., 2022).

Our findings suggest that the BIS-15-A is a valid and reliable instrument for adolescents, offering the benefit of reduced length, minimizing the time and effort required for respondents in this population (Fortgang & Cannon, 2022). We also provide normative data for future application in Spain. Upcoming studies on the BIS-15-A could consider additional cross-cultural validation studies to further evaluate its internal structure in clinical and nonclinical settings.

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Table 1: Sociodemographic characteristics of the final sample (N = 8520)

Characteristic	Value
Age, *M* (*SD*), years	14.7 (1.5)
Gender; *n* (%)	
Male	4153 (48.8%)
Female	4220 (49.5%)
Non-binary	147 (1.7%)
Place of birth; *n* (%)	
Spain	7895 (92.7%)
Other European countries	154 (1.8%)
Outside Europe	471 (5.5%)
Have siblings; *n* (%)	7158 (84.0%)
Socio-economic status [a]; *n* (%)	
Low	990 (11.6%)
Medium-low	3163 (37.1%)
Medium	1644 (19.3%)
Medium-high	1252 (14.7%)
High	1471 (17.3%)
Current education level; *n* (%)	
Mandatory secondary high school	7233 (84.9%)
Post-obligatory high school preuniversity studies	961 (11.3%)
Post-obligatory basic professional education	13 (0.1%)
Post-obligatory middle and higher grades	313 (3.7%)
Type of school; *n* (%)	
Public	3662 (43.0%)
Subsidized	4775 (56.0%)
Private	83 (1.0%)
Is a repeat course; *n* (%)	667 (7.8%)
Disorder	
Without disorder	6682 (78.4%)
Attention deficit hyperactivity disorder	470 (5.5%)
Language/learning impairment	451 (5.3%)
Anxiety	386 (4.5%)
Eating disorders	185 (2.2%)
Autism spectrum disorders	150 (1.8%)
Depression/mood disorders	148 (1.7%)
Epilepsy	13 (0.2%)
Other	35 (0.4%)

[a] Based on IDESCAT database: https://www.idescat.cat/pub/?id=rfdbc

Note. For participants with more than one diagnosis, only the main diagnosis was analyzed. Language/learning impairment includes language disorder, dyslexia, dyscalculia, dysorthographia; eating disorders include anorexia I or II, bulimia, or binge disorder. The "Other" category predominantly includes intellectual giftedness (26 of 35).

Table 2: Exploratory factor analysis with Promax rotation (standardized parameters) for BIS-15-A items and omega coefficients of derived scale scores

Item factor loadings [a]	F1	F2
2. I do things without thinking [M]	**.43**	**.50**
14. I say things without thinking [M]	**.50**	**.40**
17. I act on impulse [M]	**.55**	**.34**
19. I act on the spur of the moment [M]	**.31**	.00
22. I buy things on impulse [M]	**.31**	.23
11. I squirm at plays or lectures [A]	**.82**	−.17
18. Easily bored solving thought problems [A]	.29	.24
28. I am restless at lectures or talks [A]	**.84**	−.10
5. I don't pay attention [A]	.27	**.39**
9. *I concentrate easily [A]	.11	**.46**
1. *I plan tasks carefully [NP]	−.13	**.64**
10. *I save regularly [NP]	.00	**.39**
13. *I plan for the future [NP]	−.23	**.51**
20. *I am a careful thinker [NP]	−.03	**.70**
16. I change my mind about what I will do when I grow up [NP]	.24	.03
Factor correlation [b]	*.42*	
Internal consistency reliability (omega coefficient)		
F1 (Drive Action)	*.80*	
F2 (Executive Control)		*.77*
Total score BIS	*.83*	

Note. Original item numeration has been maintained from the BIS-11-A. In brackets: original BIS-15 subscale from Spinella et al. (2007): A = Action; M = Motor; NP = Non-planning.

* Inverse items reversed prior to analysis.

[a] In bold: Salient factor loading ≥.30; shaded cells indicate the factor to which the item was allocated.

[b] For factor correlation: p-value < .05.

Table 3: Pearson's correlations of BIS-15-A with UPPS-P scores

UPPS-P scores	F1 (Drive Action)	F2 (Executive Control)	Total score BIS
Negative Urgency	.58	.50	.59
Positive Urgency	.55	.48	.56
Lack of Premeditation	.46	.63	.59
Lack of Perseverance	.35	.58	.53
Sensation Seeking	.22	.13	.19

Table 4: Comparison of BIS-15-A scale scores by gender and age for establishing norm groups

	ANOVA						Reliability	Mean of subgroups		
	Gender		Age		Interaction		95% CI range true score**	Lowest	Higher	Range
BIS score	*F* (2, 8494) (*p*)	η^2	*F* (8, 8494) (*p*)	η^2	*F* (13, 8494) (*p*)	η^2				
Drive Action	10.94 (<.005) *	.003	1.87 (.059)	.002	1.84 (.052)	.002	9	18.0	22.1	4.0
Executive Control	7.91 (<.005) *	.002	0.85 (.559)	.001	1.10 (.354)	.001	9	17.4	19.9	2.5
Total score	11.54 (<.005) *	.003	1.27 (.254)	.001	1.40 (.152)	.001	12	31.8	37.0	5.2

* All Cohen's *d* values ≤ 0.16 (in absolute value).

** ± 1.96 *SEm.*

Table 5: Normative data for the Spanish adolescent BIS-15-A (*N* = 8520)

	Drive Action		**Executive Control**		**Total score**	
Raw score	T	Pc	T	Pc	T	Pc
8	-	-	28	1	-	-
9	30	1	30	2	-	-
10	32	1	32	3	-	-
11	34	3	35	6	-	-
12	36	6	37	10	-	-
13	38	11	39	15	-	-
14	40	17	41	20	-	-
15	42	23	43	27	25	1
16	44	30	46	34	27	1
17	46	37	48	42	28	1
18	48	44	50	50	29	1
19	50	52	52	58	31	2
20	52	59	54	66	32	3
21	53	66	56	74	34	4
22	55	72	59	80	35	6
23	57	77	61	86	36	8
24	59	82	63	90	38	11
25	61	86	65	93	39	14
26	63	89	67	95	40	18
27	65	92	70	97	42	22
28	67	94	72	98	43	26
29	69	96	74	99	44	31
30	71	97	76	99	46	35
31	73	98	78	99	47	40
32	75	99	81	99	48	45
33	77	99	-	-	50	51
34	79	99	-	-	51	56
35	81	99	-	-	53	61
36	83	99	-	-	54	66
37	-	-	-	-	55	71
38	-	-	-	-	57	75
39	-	-	-	-	58	79
40	-	-	-	-	59	82
41	-	-	-	-	61	86
42	-	-	-	-	62	88
43	-	-	-	-	63	91
44	-	-	-	-	65	93
45	-	-	-	-	66	94
46	-	-	-	-	67	95
47	-	-	-	-	69	96
48	-	-	-	-	70	97
49-50	-	-	-	-	72-73	98
51-54	-	-	-	-	74-79	99
55-60	-	-	-	-	≥ 80	99
M	19.22		18.05		33.12	
SD	5.12		4.57		7.36	
*SE*m	2.3		2.2		3.0	

Note. T = T-score; Pc = percentile rank; SEm = standard error of measurement.

Table S1 Supplementary Material

Adolescent BIS internal structures

BIS version	Study	Sample				Factor method/Rotation	Factor solution
		N	*M* age (*SD*)	Age range	Sex F/M Nº		
Adult version	Salvo & Castro (2013)	763	16.0 (1.2)	14-19	390/373	EFA/Promax	6-factor first-order solution but not 3-factor second-order solution Perseverance (Per) Motor (M) Attention (Aten) Cognitive instability (Cog Ins) Self-control (Self Con) Cognitive complexity (Cog Com)
3 factors identical to original proposed	Orozco-Cabal et al. (2010)	164 psychiatric outpatients	25.94 (9.37)	18-65	NP	EFA/Varimax	Motor impulsivity[a] (Per + M factors) Attentional impulsivity[b] (Aten + Cog Ins factors) Non-planning impulsivity[c] (Self Con + Cog Com factors)
		283 undergraduates	19.59 (1.73)	18-65	NP		
	Soodsawang et al. (2019)	900	NP	13-22	444/456	CFA	Motor impulsivity (Per + M factors) Attentional impulsivity (Aten + Cog Ins factors) Non-planning impulsivity (Self-Con + Cog Com factors)
	Niv et al. (2012) 27 items	750 pairs of twins	14.69 (.63)	11-16	384/366	EFA/CFA	Motor impulsivity (Per + M factors) Attentional impulsivity (Attention + Cog Ins factors) Non-planning impulsivity (Self-Con + Cog Com factors)
	Wan et al. (2016)	406 Community sample	17.78 (3.69)	12-26	208/198	CFA	Motor impulsivity (Per + M factors) Attentional impulsivity (Aten + Cog Ins factors) Non-planning impulsivity (Self Con + Cog Com factors)
		258 mental health disorders	Female sample 17.25 (3.72) Male sample 17.02 (4.22)	12-26	130/126		
		331 delinquent juveniles	Female 20.28 (3.02) Male 19.02 (2.56)	14-25	65/266		

BIS version	Study	Sample				Factor method/Rotation	Factor solution
		N	*M* age (*SD*)	Age range	Sex F/M Nº		
Short version 3 factors	Spinella (2007)	Study 1 700	29.3 (12.9)	15-89	418/279/3 (NP)	EFA/Varimax	Motor impulsivity (Per + M factors) Attentional impulsivity (Aten + Cog Ins factors) Non-planning impulsivity (Self Con + Cog Com factors)
		Study 2 100	27 (11.2)	17-57	49/51		
3-factor models	von Diemen et al. (2007)	464	17.3 (1.7)	15-20	NP	EFA/Varimax	Factor 1: Non-planning impulsivity + Attentional impulsivity items Factor 2: Motor impulsivity + Non-planning impulsivity items Factor 3: Non-planning impulsivity items
	Willhelm et al. (2020)	304	15.36 (1.16)	13-18	116/188	CFA + WLSMV (version of 12 items)	Motor impulsivity (Per + M factors) Attentional impulsivity (Aten + Cog Ins factors) Non-planning impulsivity (Self Con + Cog Com factors)
	Hartmann et al. (2011)	659	13.30 (2.58)	10-20	355/304	EFA/Promax	Factor 1: Motor impulsivity + Attentional impulsivity items Factor 2: Non-planning impulsivity items Factor 3: Motor impulsivity items
	Pechorro et al. (2015)	221 Forensic sample	16.75 (1.41)	13-20	Only male	CFA/EFA/Promax	6-factor first-order solution but not 3-factor second-order solution ((Per,M, Aten,Cog Ins, Self Con, Cog Com)
	Pechorro et al. (2017)	103 Forensic sample	16.41 (1.19)	14-19	Only female	CFA	6-factor first-order solution but not 3-factor second-order solution (Per,M, Aten,Cog Ins, Self Con, Cog Com)
		274 Community sample	16.17(1.44)	14-19			
3 factors different than original proposed Spinella factors	Bhat et al. (2018)	1806	17.14 (1.64)	14-20	866/940	Principal component analysis	Different item distribution on factors. Two of the three dimensions (Non-planning and Attentional impulsivity) showed slight variations from the original in their number of items
	Maggi et al. (2022)	534	36.82 (13.65)	18-61	382/152	PCA	pure impulsivity planning and thinking lack of attention and concentration and impulsive buying
2-factor structure	Yao et al. (2007)	396	16.2 (.95)	14-19	200/196	CFA	6 first-order factors General impulsivity (Atten, M, and Cog Ins) Non-planning impulsivity (Self-Con, Cog Com, Per)
	Fossati et al. (2002)	563	16.4 (1.5)	13-19	354/209	CFA	6 first-order factors (Lack of Delay instead of Cog Ins) Motor impulsivity (M, *Lack of Delay*, Aten, Per) Non-planning impulsivity (Cog Com + Self Con)
	Martínez-Loredo et al. (2015)	1183	12.98 (.54)	12-14	533/650	EFA/Promin rotation	2 factors General impulsivity (items related to attentional, motor, and cognitive aspects of impulsiveness)

BIS version	Study	Sample				Factor method/Rotation	Factor solution
		N	*M* age (*SD*)	Age range	Sex F/M Nº		
							Non-planning impulsivity (mainly compounded by items loaded in the Self-Con and Cog Com factors of Fossati's adaptation) Items 16, 21, 23, 24, and 27 had weights lower than .30, being not adequate in that sample
2 factors (Morean et al., 2014)	Benk et al. (2022)	116	15.22 (1.58)	13-18	39/77	EFA/Varimax	Poor self-regulation (as difficulty in focusing on goal-oriented thoughts and behaviors) Impulsive behavior (defined as a tendency to react quickly to various stimuli and the inability to restrict or prevent these responses) The loading of Item 4 ("I am self-controlled") on a different subscale may be caused by cultural differences or a factor arising from translation or language differences
		175	15.16 (1.86)	13-18	68/107		
	Mathias et al. (2018)	356 controls	NP	10-17	204/152	CFA	2-factor solution Poor self-regulation Impulsive behavior
		302 Family history of substance use disorder group	NP	10-12	151/151		
		322 Patient group	NP	12-17	163/159		
2 factors (Reise et al., 2013). Not evaluated in Adolescents 28 items	Reise et al., (2013)	691 Community sample	NP	21–50	325/366	EFA/CFA	Factor cognitive impulsivity Factor behavioral impulsivity **Note from the authors: "We note, however, that an alternative interpretation is that these factors are "method" factors reflecting items that are phrased in terms of constraint and items that are phrased in terms of impulsivity. Further research is needed to clarify the meaning of these factors.*
	Lindstrøm et al., (2016)	110 patients (47 controls; 43 Parkinson; 20 chronic headache)	37.6 (NP) 69.5 (NP) 41.1 (NP)	20–52 42–85 21–63	38/9 13/30 16/4	EFA/CFA Promax rotation	Factor cognitive impulsivity Factor behavioral impulsivity items 10, 22, and 25 loaded almost exclusively on factor 2, while items 2, 5, and 14 had large loadings on both factors two factors
2 factors (Haden & Shiva, 2008). Not evaluated in Adolescents. 23 items.		425 male forensic psychiatric inpatients	33.75 (10.91)	18-64	-/425	PCA/Varimax rotation	Factor Motor Impulsivity Factor Non planning Impulsivity
1 factor (Steinberg, et al., 2013), 8 items	Rousselle & Vigneau (2016)	366	20.29 (3.02)	16-40	236/104/26 (NP)	PCA + CFA	Unidimensional

BIS version	Study	Sample				Factor method/Rotation	Factor solution
		N	*M* age (*SD*)	Age range	Sex F/M Nº		
	Kata & Polezak (2021)	6710	15.51 (1.72)	12-20	3355/3355	EFA main components and non-orthogonal rotation	2-factor solution Poor self-control Impulsive behavior
	Charles et al. (2021)	315	16.72 (0.72)	16-19	59/256	CFA with maximum-likelihood estimation	2-factor solution Poor self-regulation Impulsive behavior
Child-preadolescent version structure Barratt Impulsiveness Scale-11 for children (Cosi et al., 2008)	Cosi et al. (2008)	377	10.4 (0.9)	8-12	195/182	EFA WLSMV/Promin/oblique rotation	Motor impulsivity (Per + M factors) Attentional impulsivity (Aten + Cog Ins factors) Non-planning impulsivity (Self Con + Cog Com factors) Different item loading. Attentional impulsivity included only 3 items
	Chahin et al. (2010)	616	13 (2.38)	8-16	310/306	EFA WLSMV/Promin/oblique rotation	Motor impulsivity (Per + M factors) Attentional impulsivity (Aten + Cog Ins factors) Non-planning impulsivity (Self Con + Cog Com factors)
Studies did not investigate the scale factor structure	Paaver et al. (2007)	483	15.3 (.50)	15	261/222	NC	NC

Note. EFA = exploratory factor analysis; CFA = confirmatory factor analysis; NC = not calculated; Per = perseverance; Self Con = Self-control; Cog Ins = cognitive instability; Cog Com = cognitive complexity; Aten = attention; M = motor; WLSMV = weighted least squares means and variance adjusted.

[a] Motor impulsivity: An action without inhibition of prepotent or ongoing responses. Includes the first-order factor solution Perseverance (giving up on things quickly) and Motor (doing things without thinking about them first).

[b] Attentional impulsivity: Includes the first-order factor solution Attention (defined as an inability to focus attention or concentrate) and Cognitive Instability (having extraneous thoughts when thinking).

[c] Non-planning impulsivity: Involved in lack of ‘‘futuring” or forethought. Includes the first-order factor solution Self-control (having difficulty refraining from certain actions, such as spending money) and Cognitive complexity (having difficulty focusing on a problem).

Table S2

Item selection from Martínez-Loredo et al. (2015)

(1) Planifico lo que tengo que hacer (I plan tasks carefully)
(2) Hago las cosas sin pensarlas (I do things without thinking)
(3) Tomo decisiones rápidamente (I make up my mind quickly)
(4) Soy una persona despreocupada (I am happy-go-lucky)
(5) No presto atención a las cosas (I do not ‘‘pay attention’’)
(6) Mis pensamientos van demasiado rápido (My thoughts are racing too fast)
(7) Planifico mi tiempo libre (I plan my spare time)
(8) Soy una persona que se controla bien (I am self-controlled)
(9) Me concentro fácilmente (I concentrate easily)
(10) Soy ahorrador (I save regulary)
(11) No puedo estar quieto en el cine o en la escuela (I cannot stand still at movies or school)
(12) Me gusta pensar y darle vueltas a las cosas (I like to think carefully about things)
(13) Planifico mi futuro (I plan for my future)
(14) Digo cosas sin pensarlas (I say things without thinking)
(15) Me gusta pensar en problemas complicados (I like to think about complex problems)
(16) Cambio de parecer sobre lo que quiero hacer cuando sea mayor (I change my mind about what I will do when I grow up)
(17) Actúo impulsivamente (I act ‘‘on impulse’’)
(18) Me aburro fácilmente cuando trato de resolver problemas mentalmente (I am easily bored when solving thought problems)
(19) Actúo según el momento (I act on the spur of the moment)
(20) Pienso bastante bien las cosas (I am a careful thinker)
(21) Cambio de amigos (I change friends)
(22) Compro cosas por impulse (I buy things on impulse)
(23) Puedo pensar en un solo problema a la vez (I can think about one problem at a time)
(24) Cambio de aficiones y deportes (I change hobbies and sports)
(25) Gasto más de lo que debería (I spend more than Ishould)
(26) Cuando pienso en algo, otros pensamientos se agolpan en mi mente (When I think about something, other thoughts pop up in my mind)
(27) Estoy más interesado en el presente que en el futuro (I am more interested in the present than in the future)
(28) Estoy inquieto en los cines y en las clases (I am restless at the movies or lectures)
(29) Me gustan los juegos de tablero como el ajedrez, las damas o el parchís (I like to play chess or checkers)
(30) Pienso en el futuro (I am future oriented)

Selected items are shown in bold.

Table S3

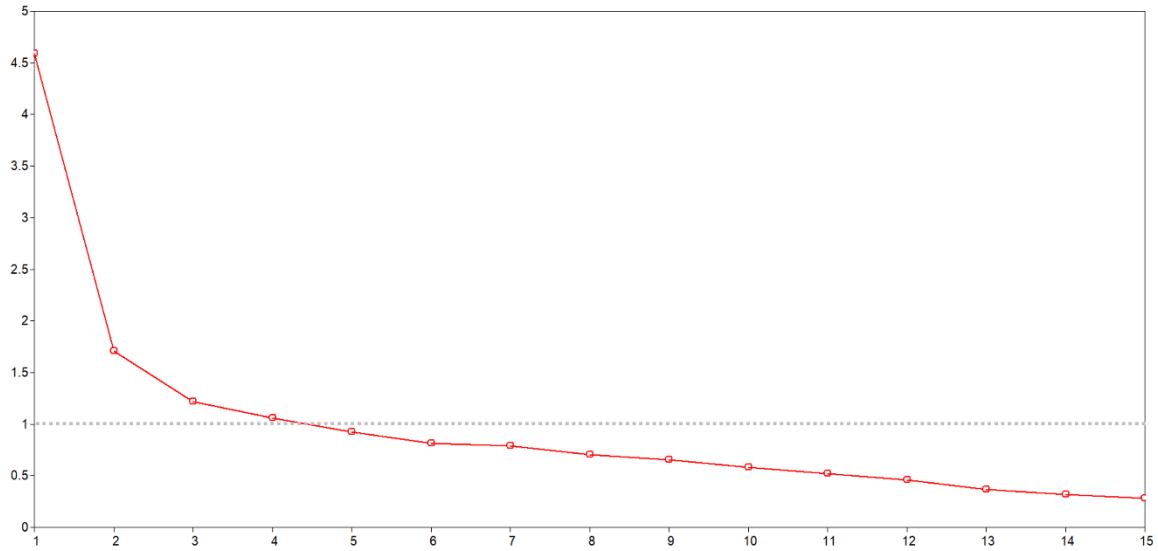
Cross-reference of items and factor assignments between Spinella (2007) and Martínez-Loredo et al. (2015) versions.

Original Spinella item	Spinella factor	Spinella item content	Martínez-Loredo et al. (2015) Item	Martínez-Loredo et al. factor	Martínez-Loredo et al. Item content	Mapping Type	Authors' factor
1	Motor	I act on impulse. [inverted]	17	General impulsivity	I act on impulse. [inverted]	Exact match	Drive Action
2	Motor	I act on the spur of the moment.	19	General impulsivity	I act on the spur of the moment.	Exact match	Drive Action
3	Motor	I do things without thinking.	2	General impulsivity	I do things without thinking.	Exact match	Executive Control + Drive Action
4	Motor	I say things without thinking.	14	General impulsivity	I say things without thinking.	Exact match	Drive Action + Executive Control
5	Motor	I buy things on impulse.	22	General impulsivity	I buy things on impulse.	Exact match	Drive Action
6	Attentional	I plan for job security. [inverted]	16	Excluded (loading < .30)	I change my mind about what I will do when I grow up.	Adapted (Fossati et al., 2002) → Excluded†	Drive Action
7	Attentional	I plan for the future. [inverted]	13	Non-planning impulsivity	I plan for the future. [inverted]	Exact match	Executive Control
8	Attentional	I save regularly. [inverted]	10	Non-planning	I save regularly. [inverted]	Exact match	Executive Control
9	Attentional	I plan tasks carefully. [inverted]	1	Non-planning	I plan tasks carefully. [inverted]	Exact match	Executive Control
10	Attentional	I am a careful thinker. [inverted]	20	Non-planning	I am a careful thinker. [inverted]	Exact match	Executive Control
11	Non-planning	I am restless at lectures or talks.	28	General impulsivity	I am restless at lectures or talks.	Exact match	Drive Action
12	Non-planning	I squirm at plays or lectures.	11	General impulsivity	I squirm at plays or lectures.	Exact match	Drive Action
13	Non-planning	I concentrate easily. [inverted]	9	Non-planning	I concentrate easily. [inverted]	Exact match	Executive Control
14	Motor	I don't pay attention.	5	General impulsivity	I don't pay attention.	Exact match	Executive Control
15	Motor	I am easily bored solving thought problems.	18	Non-planning	I am easily bored solving thought problems.	Exact match	Drive Action

Notes: Items are mapped from Spinella (2007) to Martínez-Loredo et al. (2015). Mapping Type: Exact match = identical wording. † Item 6 ('I plan for job security') from Spinella (2007) was adapted by Fossati (2002) as 'I change my mind about what I will do when I grow up.' Martínez-Loredo et al. (2015) retained this adapted version but excluded it from their factorial solution due to a factor loading below .30.

Figure S1

Scree plot of eigenvalues for determining the number of factors to be retained



Note: Factors with eigenvalues above 1: 4 factors; relevant changes in slope based on Cattell's scree test: first elbow at factor 2 suggesting 1 factor and second elbow at factor 3 suggesting 2 factors

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DISCUSSION

The overarching goal of this thesis was to advance the assessment of impulsivity in Spanish adolescents by evaluating the psychometric properties of three self-report measures, providing normative data, and clarifying the conceptual complementarity between the UPPS-P framework and the Barratt model. Studies 1 and 2 focused on the full and short forms of the UPPS-P, examining their factorial structure, reliability, measurement invariance, and convergent validity, and deriving normative reference values in a large adolescent sample. Study 3 focused on the BIS-15-A, examining its psychometric properties and deriving normative data, while clarifying the extent to which this Barratt-derived measure provides information that is complementary to the UPPS-P framework rather than serving exclusively as a convergent validity criterion. Given the long-standing influence of the BIS in impulsivity research, this analysis provided an opportunity to reconsider its structural organization from a contemporary developmental and psychometric perspective.

Psychometric properties

Factorial structure

None of the three instruments exhibited floor or ceiling effects, suggesting that item responses were well distributed across the response range and that the measures showed adequate variability for assessing individual differences in impulsivity among adolescents (Nunnally and Bernstein, 1994).

In Study 1, the evaluation of the UPPS-P factorial structure revealed inadequate fit under confirmatory factor analysis (CFA), with CFI and TLI values below recommended thresholds. However, a substantially improved fit was observed when employing the more flexible exploratory structural equation modeling (ESEM) approach, with indices reaching satisfactory levels (CFI = .950; TLI = .940; RMSEA = .038). This pattern is consistent with the multidimensional nature of impulsivity and suggests that the assumption of zero cross-loadings imposed by CFA may be overly restrictive. In contrast, ESEM allows for a more realistic representation of the underlying structure by accommodating minor cross-loadings, thereby providing a better approximation of the data (Asparouhov & Muthén, 2009). Consistent with previous research, correlations among the UPPS-P dimensions were stronger between the two Urgency dimensions and between Lack of Premeditation and Lack of Perseverance, whereas Sensation Seeking showed weaker associations with the remaining dimensions (Berg et al., 2015; Bussio et al., 2023; Smith, 2007).

A similar pattern was observed in Study 2 for the S-UPPS-P: traditional CFA models provided limited support, with insufficient fit observed for the 1- and 3-factor solutions and only marginally acceptable fit for the expected five-factor model. Moving to an exploratory approach, EFA results supported the adequacy of a 5-factor solution, which showed the best

fit and the most interpretable structure, consistent with previous adolescent studies (Donati et al., 2021; Pechorro et al., 2021; Pompeia et al., 2018; Wang et al., 2020). This solution was subsequently confirmed using ESEM in an independent subsample, yielding excellent model fit (CFI ≥ .985; TLI ≥ .972; RMSEA ≈ .035). Across both EFA and ESEM, the loading pattern was clear and theoretically consistent: all items loaded most strongly on their intended factors, with minimal cross-loadings. Factor correlations were also in line with expectations, with stronger associations between the Urgency dimensions and between Lack of Premeditation and Lack of Perseverance, and weaker associations involving Sensation Seeking. These findings indicate that, despite its brevity, the S-UPPS-P retains a well-defined multidimensional structure when more flexible modeling approaches are applied.

These results contribute to the growing body of evidence suggesting that impulsivity is best conceptualized as a set of related but distinct dimensions, rather than as a set of strictly independent factors. The replication of the factorial structure across both community-only and combined community-clinical samples further supports the structural robustness of the UPPS-P framework (Fournier et al., 2025).

In Study 3, as expected, the BIS-15-A showed poor fit under the original 3-factor CFA model, consistent with previous psychometric findings questioning the stability of the BIS structure across developmental stages and samples (e.g., Benk-Durmuş et al., 2022; Charles et al., 2021; Fossati et al., 2002; Kata & Poleszak, 2021; Martínez-Loredo et al., 2015). Both incremental (CFI = .864; TLI = .836) and absolute fit indices (RMSEA = .102) indicated substantial model misspecification. The alternative 2-factor solution derived from EFA improved model fit (RMSEA = .062), although incremental indices remained below optimal thresholds (CFI = .896), suggesting only partial adequacy. The discrepancy between the theoretical and empirically derived structures indicates that the multidimensional differentiation proposed by the original BIS framework may not be fully replicated in adolescent samples (Vasconcelos et al., 2012). Instead, the results point toward a more condensed configuration of impulsivity dimensions, potentially reflecting overlap between subcomponents or limited discriminant validity among factors. Overall, this pattern may indicate that, whereas UPPS-based measures showed strong factorial support under flexible modeling approaches, the BIS-15-A exhibits a less robust and less clearly differentiated factorial structure.

Our results indicated redundancy across several items, consistent with previous psychometric concerns (Reise et al., 2013). Accordingly, we evaluated the 15-item short version proposed by Spinella (2007) using the most recent Spanish adaptation of the BIS (Martínez-Loredo et al., 2015) as a parsimonious alternative solution.

In contrast, several studies have retained a reduced set of items to preserve the original 3-factor structure (e.g., Hartmann et al., 2011), an approach that has been widely criticized when unsupported by adequate factor loadings, as it reflects model misspecification and compromises both construct validity and replicability (Bandalos, 2019; Kline, 2016).

Regarding explained variance, the 2-factor solution of the BIS-15-A accounted for 42.0% of the total variance, which can be considered moderate and comparable to values reported in previous adolescent and adult studies using different versions of the BIS (**Table 20**).

Reference	№ factors	%Variance explained
Martínez-Loredo et al. (2015)	2-factor	34 %
Tsatali et al. (2021)	2-factor	37.96 %
Hartmann et al. (2011)	3-factor	24,9 %
von Diemen et al. (2007)	3-factor	29 %
Janavičiūtė & Šinkariova, (2020)	3-factor	32.25 %
Spinella, (2007)	3-factor	33.4 %
Orozco-Cabal et al. (2010)	3-factor	47.87 %
Meule et al. (2011)	3-factor	53 %
Patton et al. (1995)	6-factor	47.3 %
Pechorro et al. (2015)	6-factor	55.5 %

Table 20. Variance estimates reported in studies using the Barratt Impulsiveness Scale.

Taken together, these findings suggests that the UPPS-P framework provides a more differentiated, yet partially overlapping, representation of impulsivity, whereas the BIS appears to capture broader and less distinct dimensions. Such differences likely reflect underlying conceptual distinctions between the instruments, with the UPPS-P explicitly modelling multiple impulsivity facets and the BIS reflecting a more global construct. Consistent with previous literature (Leshem & Glicksohn, 2007; Vasconcelos et al., 2012) the BIS structure appears less stable and less differentiated, particularly in adolescent populations (Sharma et al., 2014; Steinberg, 2008).

Reliability

In terms of internal consistency, the results obtained in the present thesis were robust. Notably, higher reliability coefficients were observed for both the UPPS-P and the S-UPPS-P compared to other available versions (**see Tables 7 and 8, in page 43**)

The results indicated excellent internal consistency for the UPPS-P in Study 1 (ω = .83–.94), with somewhat lower but still acceptable values for the S-UPPS-P in Study 2 (ω = .67–.82). This pattern is consistent with expectations, as longer instruments tend to yield higher reliability coefficients due to the greater number of items contributing to each subscale score (McDonald, 1999; Nunnally and Bernstein, 1994).

In line with this, Lozano et al. (2018) reported that the UPPS-P provides greater measurement precision across its dimensions compared to the S-UPPS-P. Nevertheless, the factorial structure and item distribution of the S-UPPS-P appear to be largely preserved relative to the original UPPS-P. Despite these differences, concordance analyses have shown strong correlations between scores obtained from both versions, supporting their overall comparability. From a scale reduction perspective, these findings suggest that the abbreviated

S-UPPS-P represents a more efficient instrument, albeit with some expected reduction in measurement precision (Fournier et al., 2025)

For Study 3, internal consistency estimates for the BIS-15-A were acceptable, with ω values ranging from .77 to .83. Specifically, reliability coefficients were .80 for the Drive Action dimension, .77 for Executive Control, and .83 for the total score. Overall, these results can be considered mixed. On the one hand, they are comparable to those reported for other short BIS versions (e.g., Haden & Shiva, 2008) and slightly higher than those observed in the abbreviated version proposed by Steinberg et al. (2013). On the other hand, they remain somewhat lower than those reported for the more recent Spanish adaptation by Martínez-Loredo et al. (2015). Nonetheless, it is also important to consider that some prior versions have included broad factors, such as "general impulsivity," which may represent a heterogeneous aggregation of items, potentially inflating reliability estimates.

Furthermore, compared with the UPPS-P literature, where reliability estimates tend to be reported more consistently across dimensions, a notable limitation of the BIS literature is the inconsistent reporting of reliability indices (**see Table 2, page 28**). Several studies fail to provide Cronbach's alpha (α) or McDonald's omega (ω) coefficients for specific subscales and the total score. This lack of comprehensive reporting constrains comparisons across studies and may obscure meaningful variability in the reliability of the different BIS dimensions.

Convergent validity

As expected, UPPS-P dimensions showed meaningful convergent associations with the BIS total score, particularly for Urgency, Lack of Premeditation, and Lack of Perseverance (Lynam et al., 2026; Patzelt et al., 2019), whereas Sensation Seeking showed a weaker correlation. Similarly, the S-UPPS-P showed the same pattern as the full UPPS-P (Eray et al., 2023), with weaker correlation for Sensation Seeking than for the remaining impulsivity dimensions (Smith et al., 2007). These findings align with prior research in adult populations (Argyriou et al., 2020; Cyders, 2013) and adolescents (Donati et al., 2021), as well as Spanish-speaking samples, including adults (Candido et al., 2012; Verdejo-García et al., 2010) and adolescents (Bussio et al., 2023).

Subsequently, in Study 3, BIS-15-A Executive Control (EC) and Drive Action (DA) scores showed meaningful correlations with UPPS-P dimensions, particularly those related to Urgency, Lack of Premeditation, and Lack of Perseverance. Consistent with Barratt's (1987) distinction between mood-feelings and action-oriented impulsivity, both Drive Action and Executive Control showed comparable associations with UPPS Urgency dimensions and with Lack of premeditation and Lack of Perseverance. Specifically, Urgency dimensions appear to reflect the mood-feelings component described by Barratt, whereas Lack of Premeditation and Lack of Perseverance align more closely with action-oriented processes. This convergence supports the view that impulsive behavior emerges through the interaction of affective-reactive and executive-action systems, consistent with neurocognitive models implicating frontoparietal and subcortical regulatory networks (Dalley & Robbins, 2017).

This finding is not unexpected, given that the construction of the UPPS-P incorporates items derived from multiple self-report impulsivity-related instruments, including the Barratt Impulsiveness Scale. The overlap between the Urgency dimensions and the higher-order "mood-feeling" factors described by Barratt (1987), as well as the correspondence between "action-oriented" tendencies and the UPPS-P dimensions of Lack of Premeditation and Lack of Perseverance, supports the substantial conceptual and empirical convergence between these measures (Lange et al., 2017). In contrast, Sensation Seeking appears to relate more closely to reward sensitivity and motivational processes, distinguishing it from the original factors proposed in Barratt's impulsivity–anxiety framework, which emphasized an orthogonal relationship between these constructs. This distinction aligns with dual-systems accounts of adolescent behavior, in which socioemotional and regulatory systems follow partially dissociable developmental trajectories (Duell & Steinberg, 2019; Steinberg, 2008, 2010; Shulman et al., 2015, 2016).

Measurement invariance

A key aspect of the present findings concerns the convergence between measurement invariance, group comparisons, and the derivation of normative data across instruments. For both the UPPS-P and S-UPPS-P, full configural, metric, scalar, and strict invariance were established using ESEM models, indicating that the underlying factorial structure and item loadings, thresholds, and residuals were equivalent across groups. While the UPPS-P demonstrated invariance across gender and age, the S-UPPS-P extended these findings by additionally establishing invariance across community and clinical samples, with negligible changes in fit indices (ΔCFI $\leq$ .004; ΔRMSEA $\leq$ .002). This provides particularly strong evidence for the applicability of the S-UPPS-P in heterogeneous adolescent populations and represents a significant extension beyond prior research, where invariance has typically been tested only across demographic variables (Fournier et al., 2025).

However, this apparent cross-group similarity should be interpreted with caution. While invariance supports equivalence at the measurement level, it does not preclude the existence of meaningful variability within groups. In particular, the absence of differences between community and clinical samples in S-UPPS-P scores may reflect the aggregation of heterogeneous diagnostic profiles, potentially masking more specific patterns of impulsivity across distinct clinical conditions (Berg et al., 2015; MacKillop et al. 2016; Schaub et al., 2023, Sonmez et al., 2024). Future research should therefore examine whether differences emerge when considering more narrowly defined clinical subgroups, particularly within hospital-based samples including diverse diagnoses (Littlefield et al., 2015). Such an approach would allow for a more precise evaluation of the role of impulsivity as a transdiagnostic versus disorder-specific construct.

In contrast, measurement invariance was not evaluated for the BIS-15-A. This decision was methodologically grounded, as the original factorial structure was not supported and an alternative 2-factor solution was derived through exploratory analyses. In such contexts, where the internal structure is still being established, conducting invariance testing may be premature, as it requires a well-defined and stable measurement model (Meredith, 1993;

Vandenberg & Lance, 2000). Nevertheless, this limits the extent to which cross-group comparability can be formally established for this instrument.

Although negligible differences across gender and age were observed for the BIS-15-A, and unified normative data were derived, the absence of formal invariance testing warrants a more cautious interpretation. It remains unclear whether the lack of group differences reflects true equivalence in the underlying construct or potential measurement limitations associated with its less stable factorial structure. For the BIS-15-A, future research should therefore prioritize the confirmation of its factorial structure and the evaluation of measurement invariance, particularly across clinical subgroups, to clarify its suitability for comparative and diagnostic applications.

Clinical Implications

The present findings provide important insights into the role of impulsivity in adolescent populations. In Study 1, the robust factorial structure identified through ESEM analyses, together with evidence of measurement invariance across demographic groups, supports the structural validity of the UPPS-P-based instruments and the equivalence of score interpretation across age and gender. In Study 2, these results were extended by demonstrating full measurement invariance across demographic and clinical groups, further supporting the applicability of the instrument in both community and clinical samples. Notably, the absence of significant differences between community and clinical samples in Study 2 suggests that impulsivity as measured by the UPPS-P framework may not function as a disorder-specific characteristic nor as a pathognomonic feature of any particular clinical condition (Joyner et al., 2021). Instead, these findings are consistent with a transdiagnostic conceptualization of impulsivity, whereby it represents a shared dimension across multiple forms of psychopathology (Berg et al., 2015; Halcomb et al., 2019; King et al., 2018; Morris and Mansell, 2018; Schaub et al., 2023). Importantly, this interpretation is aligned with the original formulation of the instrument, in which the authors explicitly discourage the use of the total score, as it is considered to add limited psychometric or conceptual value (Lynam et al., 2006). From a clinical perspective, it may therefore be more useful for identifying vulnerability-related impulsivity profiles that can inform targeted interventions (Mungo et al., 2025; Um et al., 2018, Zapolski et al., 2010).

Importantly, measurement invariance supports the comparability of score interpretation across groups by indicating that the instruments assess the same underlying psychological dimensions. However, it does not imply equivalence in symptom intensity, functional impact, or clinical expression. For example, Urgency dimensions may show a unique predictive value for general risk-taking that does not interact with frequency and intensity of emotional experience. However, when risky behavior occurs specifically under intense emotional states, the relationship becomes more complex and context-dependent (Cyders &

Coskunpinar, 2010; Feil et al., 2020; Howard & Khalifa, 2016; King et al., 2025; Mostajabi et al., 2025). Consequently, although UPPS-P-based scores appear structurally equivalent across community and clinical samples, meaningful differences may still emerge at the level of severity and impairment when examined within more homogeneous diagnostic groups (Littlefield et al., 2015).

A comprehensive assessment of impulsivity should not rely exclusively on impulsivity-specific instruments, but instead incorporate related psychological domains that may modulate or amplify its expression. In particular, difficulties in emotion regulation, cognitive rigidity, perfectionism, anxiety, and executive dysfunction may play a critical role in shaping the manifestation and clinical impact of impulsive behaviors (Christian et al., 2021). Integrating these constructs into assessment frameworks may therefore provide a more ecologically valid and clinically informative understanding of impulsivity, particularly in adolescent clinical populations (Ellingson et al., 2018; Kulendran et al., 2016). Although impulsivity is generally observed to decline with age (Leshem & Glicksohn, 2007), the present findings suggest that evaluating it in isolation may not adequately capture its complexity (Cyders & Coskunpinar, 2011, 2012; Hedge et al., 2018). In line with recent theoretical perspectives, impulsivity may be better conceptualized as an emergent outcome of broader regulatory systems, whereby impulsive behaviors arise when these systems become dysregulated or insufficiently engaged (Strickland & Johnson, 2021; Feil et al., 2020)

For Study 3, the less stable factorial structure of the BIS-15-A may be partially understood in terms of a jingle–jangle fallacy within the domain of executive functioning, particularly as reflecting conceptual overlap among executive-function-related constructs, especially executive attention and planning. It may be argued that previous difficulties in replicating the factorial structure of the BIS reflect underlying conceptual ambiguities, which could be addressed through a more explicit integration of neuropsychological and neuroanatomical perspectives.

Barratt's original formulation, which emphasized psychomotor efficiency and its association with impulsivity, was conceptually appropriate given the scientific context at the time; however, it has not been fully re-evaluated from a contemporary neuropsychological standpoint. More recent accounts have proposed a neuroanatomically informed distinction between executive and motor processes (e.g., Badre & Nee, 2018; Dalley & Robbins, 2017; Schilling et al., 2012). From this perspective, the historically posited association between impulsivity and anxiety (Stanford et al., 2009) can be understood as theoretically grounded within earlier frameworks, while also highlighting the need for updated conceptualizations aligned with current evidence.

From a developmental and clinical perspective, alternative factorial solutions may better capture BIS-15-A responses in adolescence, particularly because the original structure appears to conflate higher-order processes (e.g., planning) with more basic cognitive and motor processes operating at different levels of analysis (Diamond, 2013). In Diamond's (2013)

framework (**see Figure 1 page 21**), planning is not equivalent to executive attention (as operationalized in Barratt's attentional factor), but rather reflects a higher-order executive function that relies on core components such as working memory, inhibition, and cognitive flexibility. These core executive functions support attentional and behavioral control processes through top-down regulation, but operate at a higher hierarchical level within the cognitive control system.

Planning processes, in turn, may be more closely related to constructs such as Lack of Premeditation and Lack of Perseverance in the UPPS-P model, which also reflect higher-order regulatory processes within impulsivity. Empirically, executive attention, including working memory, inhibitory control, and related core executive functions, contributes to modulating as performance on planning tasks such as the Tower of London (Albert & Steinberg, 2011; Kavanaugh et al., 2024). However, these processes may be less distinguishable when assessed via self-report instruments, where shared method variance can increase apparent overlap between constructs (Cyders & Coskunpinar, 2011, 2012; Hedge et al., 2018; Hedge et al., 2020; Sharma et al., 2014).

Within this framework, the parsimonious 2-factor structure identified in the present study, distinguishing an Executive Control factor (encompassing attentional and executive processes) and a Drive Action factor (reflecting action-oriented behaviors) may represent a conceptually coherent solution supported by multiple theoretical models. This interpretation is consistent with Barratt's (1987) formulation of impulsivity and anxiety as orthogonal higher-order traits, in which *"in summary, impulsiveness and anxiety as measured by self-report questionnaires are personality traits that load on separate higher order personality traits that we have labeled action-oriented and mood-feeling."* (Barratt, 1987, p. 455).

In Barratt's model, impulsivity was further subdivided into cognitive, motor, and non-planning components, with non-planning hypothesized to reflect frontal lobe processes, whereas cognitive and motor impulsivity were associated with timing- and rhythm-related performance mechanisms (Barratt, 1987, pp. 453–455). Barratt (1987) described these dimensions as follows: "*From both empirical research and a clinical viewpoint, we have identified three subtraits of impulsiveness: cognitive (Ic), motor (Im), and nonplanning (Inp). Inp is hypothesized to relate to frontal lobe brain processes, while Ic and Im are more related to neural mechanisms that control performance on tasks with 'timing-and-rhythm' demands*" (pp. 453–455). From a contemporary perspective, this division can be reinterpreted in terms of a frontoparietal executive-control system and a motor–action system, consistent with current network-based models (Badre & Nee, 2018; Dalley & Robbins, 2017). In parallel, Barratt's "mood-feeling" dimension may be more closely aligned with contemporary personality frameworks such as the Big Five model (Costa & McCrae, 1985) and its later integration within impulsivity research through the UPPS-P framework (Lynam et al., 2006). Within this model, Urgency-related traits may reflect failures in the interaction between executive control and affective regulation systems (Berg et al., 2015; Halcomb et al., 2019; King et al., 2018).

Overall, these results can be interpreted as a return to Barratt's original conceptual intuition of two higher-order dimensions of impulsivity, while refining the internal structure of the BIS-15-A in light of contemporary neuropsychological models and aligning factor labels with broader cognitive and neurobehavioral systems (Badre & Nee, 2018; Dalley & Robbins, 2017).

By comparison, the UPPS-P framework conceptualizes impulsivity as a multidimensional personality construct, integrating dispositional traits that may predispose individuals to maladaptive behaviors. In line with Dickman's (1991) distinction between functional and dysfunctional impulsivity, the UPPS-P captures both deficits (e.g., Lack of premeditation, Lack of perseverance) and excesses (e.g., Urgency), reflecting different ways in which regulatory processes may fail. This dimensional approach allows for the transdiagnostic integration of behavioral patterns characterized by both undercontrol (e.g., rash action) and overcontrol (e.g., excessive rigidity or perseveration). In this sense, extreme expressions of certain facets, particularly those related to control and regulation may be associated not only with impulsive behaviors but also with maladaptive overregulation, such as compulsive tendencies, reduced cognitive flexibility, or perfectionism (Christian et al., 2021; Hollander et al., 2016, Mestre-Bach, 2019; Morris and Mansell, 2018).

In contrast, the BIS-15-A, as conceptualized in the present study, shifts the emphasis from broad personality traits to executive-control-related dimensions of impulsivity. The proposed 2-factor structure, encompassing Executive Control and Drive Action, is conceptually related to core neurocognitive processes such as inhibition, working memory, and cognitive flexibility. Our proposal for Executive Control is consistent with Nigg's definition (2017, p.38) of executive and cognitive control for top-down cognition: "*the ability to flexibly adjust behavior in the context of dynamically changing goals and task demands […] as a set of superordinate functions that encode and maintain representation of the current task (and engage) working memory, attention and response inhibition. Herein, closely related to 'lower level' EF and enables 'higher level' EF*". Similarly Drive Action can be interpreted in relation to Nigg's definition of behavioral inhibition; a component of a bottom-up cognition and reactive aspects of self-regulation: "*The bottom-up interruption of a behavior sequence in response to novel, ambiguous, or threatening stimulus; mediated by internal state of anxiety* "(Nigg, 2017, p. 38).

From this perspective, impulsivity is not primarily understood as a dispositional trait, but as the self-reported expression of variations in executive system functioning. This approach may help characterize whether maladaptive behaviors are associated with deficits or imbalances in core cognitive control processes, which may differentially impact performance across contexts, particularly during adolescence.

Taken together, these frameworks reflect complementary levels of analysis. The UPPS-P captures relatively stable personality-related tendencies in impulsivity, describing *how* impulsive behaviors are expressed across contexts. In contrast, the BIS-15-A focuses more on cognitive and regulatory aspects of impulsivity, providing information closer to the processes

that may underlie impulsive responding. Within this framework, impulsivity can be understood as emerging from the interaction between dispositional tendencies and cognitive control processes. Overall, these findings support a transdiagnostic and multidimensional view of impulsivity in adolescence that cannot be fully captured by a single measure. Accordingly, the UPPS-P and BIS-15-A provide complementary, rather than interchangeable, perspectives on adolescent impulsivity, capturing trait-like dispositions and cognitive-regulatory components, respectively, and reinforcing impulsivity as a clinically relevant but non-pathognomonic dimension

Across the three studies, the derivation of unified normative data for self-reported impulsivity represents an important point of discussion in the assessment of adolescents. Previous research on normative data have similarly supported the use of unified norms in adults (Gialdi et al., 2021; Pinto et al., 2021), but, to our knowledge, no previous normative data have been established for the UPPS-P in adolescents. In contrast, the UPPS-P framework has gained broad acceptance in research contexts, being widely used to investigate impulsivity across a range of clinical and non-clinical populations (Albein-Urios et al., 2014; Anestis et al., 2007; Arntz et al., 2023; Barreno et al., 2019; Basting et al., 2024; d'Acremont & Van der Linden, 2007; Lynam et al., 2011; Ortin-Peralta et al., 2024; Peckham et al., 2019; Petitet et al., 2021). However, despite this strong research presence and robust psychometric support, the UPPS-P remains relatively underutilized in routine clinical practice, including in Spain, where its application is still primarily confined to research or specialized assessment contexts. This asymmetry between research adoption and clinical implementation highlights a broader gap between psychometric evidence and routine assessment practices in the field of impulsivity.

A further issue emerging from the literature concerns the limited integration of the clinical implications associated with the use of the BIS-15-A and its related versions. Although multiple studies across different cultural contexts have consistently reported instability in its factorial structure and recurrent deviations from the original theoretical model, these psychometric limitations are rarely addressed in relation to its continued clinical use. Despite this, the BIS, across its various versions, remains widely implemented in applied and hospital settings, suggesting a clear misalignment between psychometric evidence and routine clinical practice. This discrepancy raises concerns regarding the validity of the inferences drawn from its scores, particularly when used for assessment, case formulation, or monitoring purposes in clinical practice. In contrast, the short form of the UPPS-P (S-UPPS-P) may represent a more efficient alternative in time-constrained clinical contexts, such as residential programs or outpatient services (e.g. hospital networks), while preserving the multidimensional structure of impulsivity.

In addition, the use of normative data constitutes a further source of potential bias that is often insufficiently examined. Norms are not neutral benchmarks and must be selected with careful attention to their demographic representativeness and temporal validity. The reliance on outdated or non-representative normative data may lead to systematic misestimation of

individuals' scores, thereby compromising interpretation and clinical decision-making (Mitrushina et al., 2005; Sherman et al., 2022; Strauss et al., 2006). Within this context, the uncritical application of instruments with unstable factorial structures and potentially obsolete norms may compound interpretative errors, reinforcing the need for a more rigorous integration of psychometric evidence into clinical practice (Reid et al., 2014).

Limitations

Several limitations should be considered when interpreting the findings of this thesis.

First, the research is based primarily on a cross-sectional design, which precludes any inference regarding developmental stability, intra-individual change, or causal mechanisms underlying impulsivity during adolescence. Although the inclusion of a large sample and a broad age range provides meaningful developmental coverage, longitudinal designs are required to clarify how impulsivity dimensions evolve over time and how they predict later psychological and behavioral outcomes. This limitation is particularly relevant given that impulsivity is conceptualized as a dynamic and developmentally sensitive construct.

Second, the thesis relies predominantly on self-report measures of impulsivity. While these instruments capture relevant trait-like and subjective aspects of the construct, they do not fully represent its behavioral, cognitive, or neuropsychological manifestations (Ellingson et al., 2018). This limitation is compounded by the well-documented partial convergence between self-report and performance-based measures, which may reflect overlapping but non-identical underlying processes (Cyders & Coskunpinar, 2011, 2012). From a construct validity perspective, this also relates to the jingle–jangle problem, insofar as similarly labeled instruments may not necessarily assess equivalent constructs, and different operationalizations of impulsivity may capture distinct components of a broader domain (Ellingson et al., 2018; Kulendran et al., 2016). Although the present work was framed within a multimethod perspective, the integration of questionnaire and neuropsychological indicators remained limited and was not systematically implemented across studies.

In addition, the UPPS-P was administered as a standalone instrument rather than within a broader clinical assessment battery. As a result, impulsivity scores cannot be interpreted as diagnostically specific indicators. Instead, and consistent with its transdiagnostic conceptualization, the UPPS-P should be understood as capturing dimensional vulnerability traits that cut across psychiatric conditions rather than serving a diagnostic classification function. However, focusing exclusively on impulsivity also implies a limited view of the broader cognitive, affective, and contextual mechanisms that may underlie or trigger impulsive behavior. Without concurrent assessment of related psychological domains (e.g., emotional regulation, executive functioning, or psychopathological symptoms), it constrains the ability to disentangle the processes that give rise to impulsive behavior. Finally, the UPPS-P is grounded in trait-based models of personality developed primarily within Western industrialized populations (Laajaj et al., 2019) and has been subject to broader theoretical critiques regarding its limited capacity to capture and integrative aspects of personality functioning (McAdams, 1992).

Third, the inclusion of clinical participants was uneven across studies. Although the clinical subsample contributed to the validation of the S-UPPS-P, the main psychometric evidence of the thesis is derived primarily from community adolescent samples. Accordingly, the generalizability of the findings to clinical adolescent populations should be interpreted with

caution. Moreover, clinical participants were recruited from specialized mental health services within a single clinical network, which may limit the representativeness of the sample across other healthcare systems and service delivery models.

Fourth, despite efforts to enhance heterogeneity through a stratified recruitment strategy, participation depended on the availability and willingness of schools and institutions to collaborate. In addition, all samples were drawn from Catalonia (Spain), which may restrict the generalizability of the normative data and psychometric findings to adolescents from other contexts.

Fifth, comparisons across instruments should be interpreted cautiously, as the UPPS-P, S-UPPS-P, and BIS based measures were not used in identical methodological roles across studies. Depending on the study, instruments were either treated as primary psychometric targets or as convergent validity criteria. While this reflects the logic of a compendium thesis and allows complementary perspectives on impulsivity to be examined, it introduces asymmetry that limits strict cross-instrument comparability.

Sixth, the translational scope of the research was constrained by practical and methodological limitations. Although the thesis aimed to bridge academic and clinical perspectives, it was not feasible to collect all relevant types of data across settings. In particular, while clinical data collection was supported through collaboration with a neuropsychology unit, complementary neuropsychological performance measures could not be obtained in community samples. This limits the degree of multimodal integration across levels of impulsivity assessment.

Finally, the work was conducted without external funding or dedicated research personnel, alongside full-time clinical responsibilities as a neuropsychologist. These constraints necessarily limited the scale, pace, and breadth of data collection and analysis. Despite these limitations, the thesis provides a coherent empirical and psychometric foundation for future research aimed at extending the multimethod assessment of impulsivity through longitudinal designs, broader clinical sampling, and deeper integration of behavioral and self-report measures.

CONCLUSIONS

This doctoral thesis achieved its general aim of providing a comprehensive psychometric and applied evaluation of impulsivity assessment in Spanish adolescents, integrating evidence from the UPPS-P framework and the Barratt model across community and clinical samples. Overall, the findings can be organized across psychometric, conceptual, and clinical levels, yielding a multi-layered account of impulsivity assessment in adolescence

The following conclusions may be excerpts from the studies that make up this thesis.

Psychometrically

- The UPPS-P demonstrated a robust and replicable five-factor structure in Spanish adolescents, supported by strong reliability, full measurement invariance across gender, age, and clinical status, and consistent factorial validity across analytic approaches.
- S-UPPS-P showed that a shortened version of the UPPS-P preserves the multidimensional structure of impulsivity while maintaining adequate reliability, validity, and full measurement invariance, supporting its use as an efficient alternative for applied and clinical contexts. Given its brevity, the S-UPPS-P is expected to retain acceptable psychometric performance (Lozano et al., 2018) and clinical interpretability in adolescent populations (Fournier et al., 2025, Sonmez et al., 2024; Um et al., 2018).
- The BIS-15-A did not support its original 3-factor structure in adolescents; instead, evidence indicated a more parsimonious 2-factor solution (executive control and Drive Action), suggesting reduced structural stability compared to UPPS-based models.
- Convergent validity analyses confirmed systematic relationships between UPPS-P and BIS measures, particularly for Urgency, Lack of Premeditation, and Lack of Perseverance, while Sensation Seeking showed weaker overlap, supporting both shared and distinct components of impulsivity.
- No substantial differences emerged between community and clinical samples, and strong measurement invariance supported the interpretation of impulsivity as a transdiagnostic dimensional construct rather than a disorder-specific marker.
- The normative data generated for the UPPS-P and S-UPPS-P provide clinically useful reference values for Spanish adolescents, improving interpretability and supporting their application in both research and clinical assessment.

Conceptually

- Findings support a conceptual distinction between dispositional and mechanistic levels of impulsivity, with the UPPS-P capturing personality traits and the BIS-15-A reflecting underlying executive control processes.

- The combined evidence supports a multidimensional and integrative model of impulsivity in adolescence, in which personality traits and cognitive control systems interact to produce observable impulsive behavior, highlighting the complementary rather than interchangeable nature of the UPPS and Barratt frameworks, as they capture different levels of analysis of the construct.
- Impulsivity should not be assessed in isolation, as single-method approaches, particularly self-report. It provides a limited and potentially incomplete view of the underlying mechanisms driving impulsive behavior. This is especially relevant in adolescence, where multimethod assessment integrating neuropsychological and behavioral measures is preferred to capture the cognitive and regulatory processes involved (Cyders & Coskunpinar, 2011, 2012; Ellingson et al., 2018). In this framework, the UPPS-P reflects a broader, trait-level (macro) perspective, whereas the BIS captures more observable, process-oriented (micro) manifestations. The lack of clear sex and age differences further suggests that impulsivity expression may depend less on demographic factors and more on underlying cognitive control mechanisms that modulate its activation and regulation.

Clinically

- The findings lie in the convergence of multiple interacting factors characteristic of adolescence, including rapid neurodevelopment, ongoing personality and identity formation, and increased exposure to novel experiences. Together, these processes heighten susceptibility to risk-taking and exploratory behaviors. From a conceptual standpoint, the expression of impulsivity may be understood through a simplified mechanical analogy: behavior is not determined solely by the "pressure" applied (i.e., dispositional tendencies), but also by the efficiency of the regulatory system that modulates this output. In this framework, personality traits such as Urgency may reflect the intensity of behavioral drive, whereas executive functions such as inhibition, working memory, and cognitive flexibility operate as regulatory mechanisms that determine whether such impulses are effectively controlled or expressed. When these regulatory processes are still developing or inefficient, as is often the case during adolescence, the likelihood of maladaptive impulsive behaviors increases (**see figure 13**).

- Consistent with this perspective, our findings suggest that demographic variables such as age and gender may be less informative than the individual capacity to regulate internal experiences. Accordingly, instruments such as the UPPS-P may benefit from being interpreted alongside complementary measures targeting related

domains, including emotional regulation, executive functioning, and other transdiagnostic processes. This integrative approach may facilitate a more nuanced understanding of impulsive behavior and help reconcile inconsistencies in the literature regarding demographic differences (e.g., Dir et al., 2014; Barreno et al., 2019; Basting et al., 2024), by shifting the focus from group-based comparisons to underlying regulatory mechanisms

- The debate regarding whether impulsivity constitutes a psychological construct remains open (Strickland & Johnson, 2021; Feil et al., 2020). From a psychometric and theoretical perspective, the present findings support a model in which impulsivity is best understood as an umbrella construct that gains explanatory value through its underlying differentiated components rather than through global total scores. In this sense, the utility of the construct does not lie in its aggregation into a single index, but in its decomposition into distinct, measurable processes as captured by multidimensional frameworks such as the UPPS-P. This perspective aligns with the broader evidence of structural heterogeneity observed across impulsivity instruments and reinforces the importance of construct differentiation for theoretical clarity. Accordingly, the value of impulsivity as a scientific construct depends on its internal articulation into more specific mechanisms, rather than on undifferentiated global scores, which are of limited explanatory relevance at the psychological level.

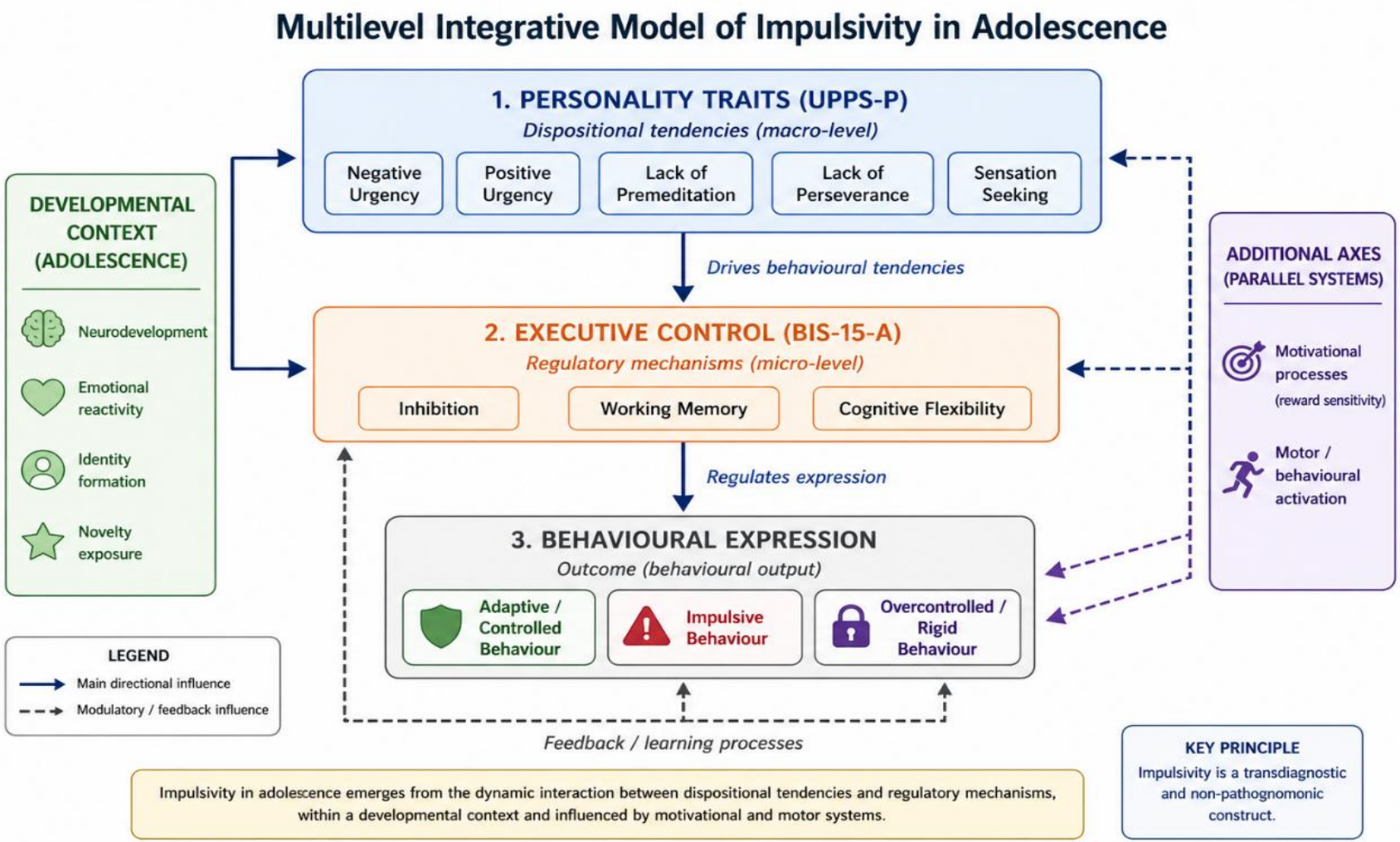


Figure 13. Proposed multilevel integrative model of impulsivity in adolescence. This figure illustrates a multilevel conceptual model of impulsivity in adolescence, integrating personality traits, executive control processes, and behavioral output within a transdiagnostic framework. Impulsive behavior is conceptualized as the result of dynamic interactions between dispositional tendencies (e.g., Urgency), regulatory mechanisms (e.g., inhibition, working memory, cognitive flexibility), and contextual or developmental influences.

Future research

Building on these findings, future research should aim to integrate self-report measures, such as the UPPS-P and BIS-15-A, with neuropsychological assessments and clinical samples to capture the full spectrum of impulsivity in adolescents. Future research will integrate the three collected samples and extend the present work beyond initial psychometric evaluation to include a more comprehensive examination of the instruments' psychometric properties, as well as a systematic evaluation of their clinical performance across diverse applied settings.

Cross-linguistic adaptation

The translation and adaptation of the UPPS-P, S-UPPS-P, and BIS-15-A into Catalan. Expanding these instruments into multiple languages can enrich the literature, increase accessibility, and facilitate cross-cultural comparisons (Fournier et al., 2025).

Clinical and applied studies related to Impulsivity and diagnosis in adolescence

Unsubmitted manuscript: *The value of Impulsivity to define DSM diagnostics, internalizing – externalizing dimensions: UPPS-P model as a transdiagnostic process to define subgroups of impulsive Adolescents: A Latent Class Analysis*). The study will be descriptive and stratified with sequential and convenience inclusion during January 2021 to December 2022 for this clinical sample (N=789). It will pursue some of the following objectives:

- Assess differences in impulsivity traits across various clinical populations compared to community samples.
- Compare UPPS-P and BIS-15-A ability to discriminate DSM-5-R and Achenbach's model diagnosis.

Stroop Scores and Impulsivity profiles in adolescents

Unsubmitted manuscript: *The value of Stroop 4th part. Is Inhibition harder or Switching for Adolescents?)* The study will focus on the Stroop task itself, analyzing a fourth component of the task to complement classical inhibition and switching measures. The study will be descriptive and stratified with sequential and convenience inclusion during February 2016 to September 2025 for this clinical sample (N = 598).

Expanded neuropsychological performance and normative data

Future studies will leverage the clinical sample with an extended clinical sample (N = 1.270) which includes adolescents with ADHD, ASD, restrictive anorexia, BPD, FASD, cannabis use disorder, PTSD, depression, and control sample. A sequential and convenience inclusion during February 2016 to September 2025 for this clinical sample.
Objectives include generating normative data for: the Rey–Osterrieth Complex Figure, TAVECI, RAVLT, Tower of London, COWAT, Animals test, Symbol Digits Oral Test, Stroop Test, Continuous Performance Test (CPT-III) Hooper Visual Organization test, and Judgment Line Orientation test.

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Annex

- Correction guidelines for instruments
- BIS-Barratt 15-A scale ion (Spanish, English and Catalan)
- S-UPPS-P scale (Spanish and Catalan)
- UPPS-P scale (Spanish, English and Catalan)

BIS Barrat 15-A	Number items	Items contributing to each subscale
Executive Control	8	2,14,5,9*,1*,10*,13*,20*
Drive Action	9	2,14,17,19,22,11,18,28,16
Total Score	15	2,4, 5,9*,1*,10*,13*,20*,17,19,22,11,18,28,16
*reverse scored items. Items 2 and 14 contribute to both factors		

UPPS-P	Number items	Items contributing to each subscale
Negative Urgency	12	2*,7*,12*,17*,22*,29*,34*,39*,44*,50*,53, 58*
Positive Urgency	14	5*,10*,15*,20*,25*,30*,35*,40*,45*,49*,52*,54*,57*,59*
(lack of) Premeditation	11	1,6,11,16,21,28,33,38,43,48,55
(lack of) Perseverance	10	4,9*,14,19,24,27,32,37,42,47*
Sensation Seeking	12	3*,8*,13*,18*,23*,26*,31*,36*,41*,46*,51*,56*
*reverse scored items.		

S-UPPS-P

UPPS-P	Number items	Items contributing to each subscale
Negative Urgency	4	6*, 8*, 13*, 15*
Positive Urgency	4	3*, 10*, 17*, 20*
(lack of) Premeditation	4	2, 5, 12, 19
(lack of) Perseverance	4	1, 4, 7, 11
Sensation Seeking	4	9*, 14*, 16*, 18*
*reverse scored items.		

BARRAT BIS-15-A (Montasell-Jordana et al., 2026)

Instrucciones. Las personas son diferentes en cuanto a la forma en que se comportan y piensan en distintas situaciones. Ésta es una prueba para medir algunas de las formas en que usted actúa y piensa. Si raramente pasa o nunca le sucede, marque con un círculo el número 1; por el contrario si siempre te pasa o casi siempre, marca con un círculo el número 4. No te detengas demasiado tiempo en ninguna de las oraciones. Responda rápida y honestamente.

	Raramente o nunca	Ocasionalmente	A menudo	Siempre o casi siempre
1. Planifico lo que tengo que hacer				
2. Hago las cosas sin pensarlas				
3. No presto atención a las cosas				
4. Me concentro fácilmente				
5. Soy ahorrador				
6. No puedo estar quieto en el cine o en la escuela				
7. Planifico mi futuro				
8. Digo cosas sin pensarlas				
9. Cambio de parecer sobre lo que quiero hacer cuando sea mayor				
10. Actúo impulsivamente				
11. Me aburro fácilmente cuando trato de resolver problemas mentalmente				
12. Actúo según el momento				
13. Pienso bastante bien las cosas				
14. Compro cosas por impulso				
15. Estoy inquieto en los cines y en las clases				

BARRAT BIS-15-A (Montasell-Jordana et al., 2026)

Instructions. People differ in the way they behave and think in different situations. This is a test to measure some of the ways you act and think. If this rarely happens to you or never happens, circle the number 1; on the other hand, if this always happens to you or almost always, circle the number 4. Do not spend too much time on any of the statements. Answer quickly and honestly.

	Rarely or never	Occasionally	Often	Always or almost always
1. I plan tasks carefully				
2. I do things without thinking				
3. I do not "pay attention"				
4. I concentrate easily				
5. I save regularly				
6. I cannot stand still at movies or school				
7. I plan for my future				
8. I say things without thinking				
9. I change my mind about what I will do when I grow up				
10. I act "on impulse"				
11. I am easily bored when solving thought problems				
12. I act on the spur of the moment				
13. I am a careful thinker				
14. I buy things on impulse				
15. I am restless at the movies or lectures				

BARRAT BIS-15-A (Montasell-Jordana et al., 2026)

Instruccions. Les persones són diferents quant a la forma en què es comporten i pensen en diferents situacions. Aquesta és una prova per a mesurar algunes de les formes en què vostè actua i pensa. No es detingui massa temps en cap de les oracions. Si rarament passa o mai li succeeix, marqui amb un cercle el número 1; per contra si sempre et passa o gairebé sempre, marca amb un cercle el número 4. Respon ràpida i honestament.

	Rarament o mai	Ocasionalment	Sovint	Sempre o gairebé sempre
1. Planifico el que haig de fer				
2. Faig les coses sense pensar-les				
3. No paro esment a les coses				
4. Em concentro fàcilment				
5. Sóc estalviador				
6. No puc estar quiet al cinema o a l'escola				
7. Planifico el meu futur				
8. Dic coses sense pensar-les				
9. Canvi de parer sobre el que vull fer quan sigui major				
10. Actuo impulsivament				
11. M'avorreixo fàcilment quan tracte de resoldre problemes mentalment				
12. Actuo segons el moment				
13. Penso bastant bé les coses				
14. Compro coses per impuls				
15. Estic inquiet als cinemes i en les classes				

S-UPPS-P (Montasell-Jordana et al., 2026)

Instrucciones: A continuación, se presentan una serie de afirmaciones que describen formas en que las personas actúan y piensan. Para cada afirmación, indique en qué medida está de acuerdo o en desacuerdo con ella. Si está muy de acuerdo, marque con un círculo el número 1; si está algo de acuerdo, marque con un círculo el número 2; si está algo en desacuerdo, marque con un círculo el número 3, y si está muy en desacuerdo, marque con un círculo el número 4. Asegúrese de indicar su grado de acuerdo o desacuerdo con cada una de las afirmaciones que figuran a continuación.

1	2	3	4
Rotundamente de acuerdo	Algo de acuerdo	Algo en desacuerdo	Rotundamente en desacuerdo

1. Por lo general, me gusta llevar las cosas hasta el final.	1	2	3	4
2. Normalmente pienso con cuidado y determinación.	1	2	3	4
3. Cuando estoy de muy buen humor, tiendo a meterme en situaciones que podrían causarme problemas.	1	2	3	4
4. Las tareas sin terminar me molestan mucho.	1	2	3	4
5. Me gusta detenerme y pensar las cosas antes de hacerlas.	1	2	3	4
6. Cuando me siento mal, a menudo hago cosas de las que luego me arrepiento para sentirme mejor en ese momento.	1	2	3	4
7. Una vez que empiezo algo, odio tener que parar.	1	2	3	4
8. A veces, cuando me siento mal, parece que no puedo dejar de hacer lo que estoy haciendo, aunque me haga sentir peor.	1	2	3	4
9. Me gusta bastante correr riesgos.	1	2	3	4
10. Tiendo a perder el control cuando estoy de muy buen humor.	1	2	3	4
11. Termino lo que empiezo.	1	2	3	4
12. Tiendo a valorar y seguir un enfoque racional y «sensato» de las cosas.	1	2	3	4
13. Cuando estoy molesto, a menudo actúo sin pensar.	1	2	3	4
14. Me gustan las experiencias y sensaciones nuevas y emocionantes, incluso si son un poco aterradoras y poco convencionales.	1	2	3	4
15. Cuando me siento rechazado, a menudo digo cosas de las que luego me arrepiento.	1	2	3	4
16. Me gustaría aprender a pilotar un avión.	1	2	3	4
17. Los demás se sorprenden o se preocupan por las cosas que hago cuando estoy muy emocionado.	1	2	3	4
18. Me gustaría disfrutar de la sensación de esquiar a gran velocidad por la ladera de una montaña alta.	1	2	3	4
19. Normalmente pienso detenidamente antes de hacer cualquier cosa.	1	2	3	4
20. Tiendo a actuar sin pensar cuando estoy muy emocionado.	1	2	3	4

S-UPPS-P (Adaptació de Montasell-Jordana et al., 2026).

Instruccions: A continuació es presenten una sèrie d'afirmacions que descriuen formes en què les persones actuen i pensen. Per a cada afirmació, indiqui en quina mesura està d'acord o en desacord amb ella. Si està molt d'acord, marqui amb un cercle el número 1; si està una mica d'acord, marqui amb un cercle el número 2; si està una mica en desacord, marqui amb un cercle el número 3, i si està molt en desacord, marqui amb un cercle el número 4. Asseguri's d'indicar el seu grau d'acord o desacord amb cadascuna de les afirmacions que figuren a continuació.

1	2	3	4
Rotundament d'acord	Una mica d'acord	Una mica en desacord	Rotundament en desacord

1. En general, m'agrada portar les coses fins al final.	1	2	3	4
2. Normalment penso amb cura i determinació.	1	2	3	4
3.Quan estic de molt bon humor, tendeixo a ficar-me en situacions que podrien causar-me problemes.	1	2	3	4
4. Les tasques sense acabar em molesten molt.	1	2	3	4
5. M'agrada detenir-me i pensar les coses abans de fer-les.	1	2	3	4
6. Quan em sento malament, sovint faig coses de les quals després em penedeixo per a sentir-me millor en aquest moment.	1	2	3	4
7.Una vegada que començo alguna cosa, odi haver de parar.	1	2	3	4
8.A vegades, quan em sento malament, sembla que no puc deixar de fer el que estic fent, encara que em faci sentir pitjor.	1	2	3	4
9.M'agrada bastant córrer riscos.	1	2	3	4
10.Tendeixo a perdre el control quan estic de molt bon humor.	1	2	3	4
11.Acabo el que començo.	1	2	3	4
12. Tendeixo a valorar i seguir un enfocament racional i «assenyat» de les coses.	1	2	3	4
13. Quan estic molest, sovint actuo sense pensar.	1	2	3	4
14. M'agraden les experiències i sensacions noves i emocionants, fins i tot si són una mica aterridores i poc convencionals.	1	2	3	4
15. Quan em sento rebutjat, sovint dic coses de les quals després em penedeixo.	1	2	3	4
16. M'agradaria aprendre a pilotar un avió.	1	2	3	4
17. Els altres se sorprenen o es preocupen per les coses que faig quan estic molt emocionat.	1	2	3	4
18. M'agradaria gaudir de la sensació d'esquiar a gran velocitat pel vessant d'una muntanya alta.	1	2	3	4
19. Normalment penso detingudament abans de fer qualsevol cosa.	1	2	3	4
20. Tendeixo a actuar sense pensar quan estic molt emocionat.	1	2	3	4

UPPS-P

A continuación, hay una serie de frases que describen distintas formas en las que las personas pueden pensar y actuar. Por favor, indica para cada frase en qué grado estás de acuerdo o en desacuerdo con esa frase. Si estás **"Rotundamente de acuerdo"**, rodea con un círculo el **1**, si estás **"Algo de acuerdo"**, rodea con un círculo el **2**, si estás **"Algo en desacuerdo"** rodea con un círculo el **3**, y si estás **"Rotundamente en desacuerdo"**, rodea con un círculo el **4**. Asegúrate de que indicas tu acuerdo o desacuerdo con cada una de las frases de abajo. **NO dejes ninguna pregunta sin contestar**.

1	2	3	4
Rotundamente de acuerdo	Algo de acuerdo	Algo en desacuerdo	Rotundamente en desacuerdo

1. Tengo una actitud reservada y cautelosa ante la vida.	1	2	3	4
2. Tengo problemas para controlar mis impulsos.	1	2	3	4
3. Generalmente busco experiencias y sensaciones nuevas y excitantes.	1	2	3	4
4. Generalmente me gusta ver las cosas terminadas hasta el final.	1	2	3	4
5. Cuando estoy muy contento, parece que no pueda evitar hacer cosas que pueden tener malas consecuencias.	1	2	3	4
6. Mi manera de pensar es normalmente meticulosa y centrada.	1	2	3	4
7. Tengo problemas para resistir mis antojos (de comida, cigarrillos, etc).	1	2	3	4
8. Me gusta probar cualquier cosa al menos una vez.	1	2	3	4
9. Tiendo a rendirme fácilmente.	1	2	3	4
10. Cuando estoy de muy buen humor, tiendo a meterme en situaciones que podrían causarme problemas.	1	2	3	4
11. No soy una de esas personas que sueltan las cosas sin pensar.	1	2	3	4
12. Con frecuencia me involucro en cosas de las que después me gustaría librarme.	1	2	3	4
13. Me gustan los deportes y juegos en los que tienes que elegir tu siguiente movimiento muy rápidamente.	1	2	3	4
14. Me molestan realmente las tareas inacabadas.	1	2	3	4
15. Cuando estoy muy contento, tiendo a hacer cosas que pueden causarme problemas en mi vida.	1	2	3	4
16. Me gusta detenerme a pensar bien las cosas antes de hacerlas.	1	2	3	4
17. Cuando me siento mal, frecuentemente hago cosas para sentirme mejor de las que luego me arrepiento.	1	2	3	4
18. Me encantaría hacer esquí acuático.	1	2	3	4
19. Una vez que comienzo algo odio parar.	1	2	3	4
20. Tiendo a perder el control cuando estoy de muy buen humor.	1	2	3	4
21. No me gusta empezar un proyecto hasta que sé exactamente cómo proceder.	1	2	3	4
22. Algunas veces, cuando me siento mal, parece que no soy capaz de parar lo que estoy haciendo incluso aunque me haga sentir peor.	1	2	3	4
23. Disfruto mucho corriendo riesgos.	1	2	3	4
24. Me concentro fácilmente.	1	2	3	4
25. Cuando estoy realmente extasiado, tiendo a perder el control.	1	2	3	4
26. Me encantaría saltar en paracaídas.	1	2	3	4
27. Termino lo que empiezo.	1	2	3	4
28. Tiendo a valorar y a seguir una aproximación racional y sensata ante las cosas.	1	2	3	4

29. Cuando estoy irritado suelo actuar sin pensar.	1	2	3	4
30. Algunos dirían que tomo malas decisiones cuando estoy extremadamente contento por algo.	1	2	3	4
31. Me gustan experiencias y sensaciones nuevas y excitantes, aunque causen un poco de miedo y sean poco convencionales.	1	2	3	4
32. Soy capaz de regular mi ritmo para conseguir hacer las cosas a tiempo.	1	2	3	4
33. Normalmente tomo mis decisiones mediante un cuidadoso razonamiento.	1	2	3	4
34. Cuando me siento rechazado, frecuentemente digo cosas de las que luego me arrepiento.	1	2	3	4
35. Los que me rodean están conmocionados o preocupados por las cosas que hago cuando estoy muy animado.	1	2	3	4
36. Me gustaría aprender a pilotar un avión.	1	2	3	4
37. Soy una persona que siempre deja el trabajo hecho.	1	2	3	4
38. Soy una persona cautelosa.	1	2	3	4
39. Es duro para mí resistirme a actuar de acuerdo con mis sentimientos.	1	2	3	4
40. Cuando estoy realmente contento por algo, tiendo a hacer cosas que pueden tener malas consecuencias.	1	2	3	4
41. A veces me gusta hacer cosas que dan un poco de miedo.	1	2	3	4
42. Casi siempre termino los proyectos que empiezo.	1	2	3	4
43. Antes de implicarme en una nueva situación me gusta informarme sobre que puedo esperar de ella.	1	2	3	4
44. Con frecuencia empeoro las cosas porque actúo sin pensar cuando estoy irritado.	1	2	3	4
45. Cuando estoy rebosante de alegría, siento que no puedo evitar “tirar la casa por la ventana”.	1	2	3	4
46. Disfrutaría la sensación de ir esquiando muy rápido por una pendiente empinada.	1	2	3	4
47. Algunas veces hay tantas cosas por hacer que simplemente las ignoro todas.	1	2	3	4
48. Normalmente pienso cuidadosamente antes de hacer cualquier cosa.	1	2	3	4
49. Cuando estoy realmente animado, no suelo pensar en las consecuencias de mis acciones.	1	2	3	4
50. En el acaloramiento de una discusión, con frecuencia digo cosas de las que luego me arrepiento.	1	2	3	4
51. Me gustaría bucear en aguas profundas.	1	2	3	4
52. Tiendo a actuar sin pensar cuando estoy realmente animado.	1	2	3	4
53. Siempre mantengo mis sentimientos bajo control.	1	2	3	4
54. Cuando estoy realmente contento, con frecuencia me encuentro en situaciones en las que normalmente no estaría cómodo.	1	2	3	4
55. Antes de decidir sobre algo, considero todas las ventajas y desventajas.	1	2	3	4
56. Disfrutaría conduciendo deprisa.	1	2	3	4
57. Cuando estoy muy feliz, siento que está bien dejarse llevar por antojos o ser más indulgente de lo normal.	1	2	3	4
58. Algunas veces hago cosas impulsivas de las que me arrepiento después.	1	2	3	4
59. Me sorprenden las cosas que hago cuando estoy de muy buen humor.	1	2	3	4

UPPS-P Català (Versió no publicada)

A continuació hi ha una sèrie de frases que descriuen diferents formes de pensar i actuar de les persones. Si us plau, indica per a cada frase en quin grau hi estàs d'acord o en desacord. Si estàs "Rotundament d'acord" encercla el número 1, si estàs "Una mica d'acord", encercla el número 2 si estàs "Una mica en desacord", encercla el número 3 i si estàs "Rotundament en desacord" encercla el número 4. Assegura't que indiques el teu acord o desacord a cada una de les frases. **NO deixis cap resposta sense contestar**.

1	2	3	4
Rotundament d'acord	Una mica d'acord	Una mica en desacord	Rotundament en desacord

1.	Tinc una actitud reservada i cautelosa davant la vida.	1	2	3	4
2.	Tinc problemes per controlar els meus impulsos.	1	2	3	4
3.	Generalment cerco experiències i sensacions noves i excitants.	1	2	3	4
4.	Generalment m'agrada veure les coses acabades del tot.	1	2	3	4
5.	Quan estic molt content, sembla que no pugui evitar fer coses que poden tenir males conseqüències.	1	2	3	4
6.	La meva manera de pensar normalment és meticulosa i centrada.	1	2	3	4
7.	Tinc problemes per resistir els meus desitjos (de menjar, fumar, etc).	1	2	3	4
8.	M'agrada provar qualsevol cosa com a mínim una vegada.	1	2	3	4
9.	Tendeixo a rendir-me fàcilment.	1	2	3	4
10.	Quan estic de molt bon humor, tendeixo a posar-me en situacions que podrien causar problemes.	1	2	3	4
11.	No sóc una d'aquelles persones que deixen anar les coses sense pensar.	1	2	3	4
12.	Sovint m'involucro en coses de les quals després m'agradaria deslliurar-me.	1	2	3	4
13.	M'agraden els esports i jocs en què has de triar el teu següent moviment molt de pressa.	1	2	3	4
14.	Em molesten realment les feines inacabades.	1	2	3	4
15.	Quan estic molt content, tendeixo a fer coses que em poden causar problemes a la meva vida.	1	2	3	4
16.	M'agrada aturar-me a pensar bé les coses abans de fer-les.	1	2	3	4
17.	Per mi és dur resistir-me a actuar d'acord amb els meus sentiments.	1	2	3	4
18.	Quan estic realment content per alguna cosa, tendeixo a fer coses que poden tenir males conseqüències.	1	2	3	4
19.	De vegades, m'agrada fer coses que fan una mica de por.	1	2	3	4
20.	Gairebé sempre acabo els projectes que començo.	1	2	3	4
21.	Abans d'implicar-me en una nova situació m'agrada informar-me sobre què en puc esperar.	1	2	3	4
22.	Sovint empitjoro les coses perquè actuo sense pensar quan estic irritat.	1	2	3	4
23.	Quan estic molt content, sento que no puc estar-me de «llençar la casa per la finestra».	1	2	3	4
24.	Gaudiria de la sensació d'anar esquiant molt de pressa per un pendent pronunciat.	1	2	3	4
25.	Algunes vegades hi ha tantes coses a fer que simplement les ignoro totes.	1	2	3	4

26. Normalment penso amb cura abans de fer qualsevol cosa.	1	2	3	4
27. Quan estic realment animat, no acostumo a pensar en les conseqüències de les meves accions.	1	2	3	4
28. En una discussió exaltada, sovint dic coses de les quals després em penedeixo.	1	2	3	4
29. M'agradaria capbussar-me en aigües profundes.	1	2	3	4
30. Tendeixo a actuar sense pensar quan estic realment animat.	1	2	3	4
31. Sempre mantinc els meus sentiments sota control.	1	2	3	4
32. Quan estic realment content, sovint em trobo en situacions en què normalment no estaria còmode.	1	2	3	4
33. Abans de decidir sobre alguna cosa, considero tots els avantatges i desavantatges.	1	2	3	4
34. Gaudiria molt conduint de pressa.	1	2	3	4
35. Quan estic molt content, sento que està bé deixar-se portar per rampells o ser més indulgent del que és normal.	1	2	3	4
36. Algunes vegades faig coses impulsivament de les quals em penedeixo després.	1	2	3	4
37. Em sorprenen les coses que faig quan estic de molt bon humor.	1	2	3	4
38. Quan no estic bé, sovint faig coses per sentir-me millor de les quals després em penedeixo.	1	2	3	4
39. M'encantaria fer esquí aquàtic.	1	2	3	4
40. Quan començo alguna cosa odio aturar-me.	1	2	3	4
41. Tendeixo a perdre el control quan estic de molt bon humor.	1	2	3	4
42. No m'agrada començar un projecte fins que no sé exactament com engegar-lo.	1	2	3	4
43. Algunes vegades, quan no estic bé, sembla que no sóc capaç de parlar del que estic fent fins i tot encara que em faci sentir pitjor.	1	2	3	4
44. Gaudeixo molt corrent riscos.	1	2	3	4
45. Em concentro fàcilment.	1	2	3	4
46. Quan estic realment extasiat, tendeixo a perdre el control.	1	2	3	4
47. M'encantaria saltar en paracaigudes.	1	2	3	4
48. Acabo el que començo.	1	2	3	4
49. Tendeixo a valorar les coses i a fer-ne una aproximació racional i assenyada.	1	2	3	4
50. Quan estic irritat solc actuar sense pensar.	1	2	3	4
51. Alguns dirien que prenc males decisions quan estic extremadament content per alguna cosa.	1	2	3	4
52. M'agraden les experiències i sensacions noves i excitants, encara que causin una mica de por i siguin poc convencionals.	1	2	3	4
53. Sóc capaç de regular el meu ritme per aconseguir fer les coses a temps.	1	2	3	4
54. Normalment prenc les meves decisions mitjançant un curós raonament.	1	2	3	4
55. Quan em sento rebutjat, sovint dic coses de les quals després em penedeixo.	1	2	3	4
56. Els qui m'envolten estan commocionats o preocupats per les coses que faig quan estic molt animat.	1	2	3	4
57. M'agradaria aprendre a pilotar un avió.	1	2	3	4
58. Sóc una persona que sempre deixa la feina feta.	1	2	3	4
59. Sóc una persona cautelosa.	1	2	3	4