ARTÍCULO ORIGINAL

Executive Functions Scale for University Students: Protocol for the Second Version (UEF-2)

Escala para evaluar las funciones ejecutivas en estudiantes universitarios en su segunda versión: UEF-2

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Abstract

Executive Functions (EFs) comprise a set of mental skills that enable university students to consciously regulate their academic performance and learning behaviors. Re-search has identified several EFs as critical determinants of academic success, including emotion regulation, responsibility monitoring, working memory, cognitive flexibility, metacognitive learning, study planning, and decision-making. This protocol article pre-sents an enhanced version of a scale designed to assess EF in the university context. The principal innovation of this revised instrument lies in its incorporation of five additional EFs, thereby providing a more comprehensive evaluation of these cognitively demanding skills essential for academic achievement. Our proposed methodology follows a psycho-metric validation process to examine the scale's reliability, validity, and practical utility. Through this protocol, we anticipate establishing robust measurement properties for the new scale, advancing our understanding of university students' cognitive processes. Fur-thermore, we expect the findings to facilitate the development of improved assessment tools and targeted interventions to enhance executive functioning in higher education set-tings. This research contributes to the growing literature seeking to optimize academic outcomes through evidence-based cognitive evaluation and support.

Keywords: executive functions; psychometric properties; validity; confirmatory factor analysis.

Resumen

Las Funciones Ejecutivas (FE) comprenden un conjunto de habilidades mentales que permiten a los estudiantes universitarios regular de manera consciente su desempeño académico y sus conductas de aprendizaje. La investigación ha identificado varias FE como determinantes clave del éxito académico, entre ellas la regulación emocional, el monitoreo de la responsabilidad, la memoria de trabajo, la flexibilidad cognitiva, el aprendizaje metacognitivo, la planificación del estudio y la toma de decisiones. El presente artículo de protocolo presenta una versión ampliada de una escala diseñada para evaluar las FE en el contexto universitario. La principal innovación de este instrumento revisado radica en la incorporación de cinco funciones ejecutivas adicionales, lo que permite una evaluación más integral de estas habilidades cognitivas complejas, esenciales para el logro académico. La metodología propuesta sigue un proceso de validación psicométrica destinado a examinar la fiabilidad, validez y utilidad práctica de la escala. A través de este protocolo, se espera establecer propiedades de medición sólidas para la nueva escala, avanzando en la comprensión de los procesos cognitivos de los estudiantes universitarios. Además, se prevé que los hallazgos faciliten el desarrollo de mejores herramientas de evaluación e intervenciones específicas orientadas a fortalecer el funcionamiento ejecutivo en contextos de educación superior. Esta investigación contribuye a la literatura emergente que busca optimizar los resultados académicos mediante la evaluación y el apoyo cognitivo basado en la evidencia.

Palabras clave: funciones ejecutivas; propiedades psicométricas; validez; análisis factorial confirmatorio.

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Introduction

Executive Functions (EFs) are higher-order cognitive and socioemotional processes that allow individuals to focus on specific goals, regulate their behavior, and adapt to new or complex situations. It involves advanced cognitive processes such as working memory, organization, planning, cognitive flexibility, social inhibition, and self-regulation, supporting skills such as critical thinking and decision-making, among others.[1,2] The neuroanatomical basis of EFs is predominantly linked to the prefrontal cortex (PFC) and other brain regions, such as the posterior parietal cortex and the thalamus.[3,4]

Two prominent models have been proposed to explain the functioning of EFs based on their underlying nature: the single-factor and the multifactorial model. The single-factor model suggests that EFs are best understood as a unitary construct driven by a single underlying trait influencing various executive processes.[5] Research indicates that this model may be more applicable in young children, in whom EFs remain less differentiated.[6,7]

Conversely, the multifactorial model proposes that EFs consist of distinct yet interrelated subdomains. One of the most widely recognized frameworks is the three-factor model, identifying inhibition, shifting, and updating as the core components of EFs.[8-10] Empirical support of the multifactorial model shows that EFs in adults are best described by this model; nonetheless, growing concerns have recently emerged regarding the adequacy of the three-factor model in capturing the complexity of EFs.[11] Thus, the model selection varies according to the specific research question, the population under study, and the context in which EFs are examined.

The theoretical construction of EFs relies on several key models. Luria, who laid the foundational work that preceded modern theories of EFs, identified three functional brain units: alertness and motivation, originating in the limbic system; reception, processing, and storage of information, in post-rolandic cortical areas; and programming, control, and verification of activity, located in the prefrontal cortex. Among the most widely recognized theoretical models of EFs are Anderson's four-component framework, Brown's six-factor model, and Gioia's and Norman and Shallice's three-dimensional organization of EFs.[12]

Nonetheless, the conceptualization of EF remains a subject of ongoing debate, with controversies surrounding three primary challenges: the lack of consensus regarding precise definitions and scope, rendering some established models as "outdated"; the disputed validity of distinguishing between emotionally significant EFs processes and purely cognitive EFs components; and fundamental difficulties in reconciling diverse theoretical frameworks, methodological approaches, and operational definitions.[13,14]

Numerous studies on EFs have been conducted across diverse contexts and populations. Research in educational settings, for instance, demonstrated that executive functioning plays a significant role in explaining and enhancing academic performance among children and adolescents.[15,16] Within the framework of enhancing EFs methods, research has shown that video games can improve specific EFs, such as visual selective attention.[17]

In contrast, the existing evidence remains insufficient to determine whether sports and physical exercise enhance EFs or whether EFs directly contribute to improved sports performance.[18] Furthermore, deficits in EFs have been linked to the emergence of externalizing disorders, such as alcohol use and ADHD. Nonetheless, these findings must be considered within the broader context of the multifactorial nature of such behaviors.[19]

EFs are essential in daily living, as they contribute to activities that involve decision-making and problem-solving skills, such as meal preparation, shopping, scheduling, finance management, and using transportation. Thus, these functions support a good quality of life, enabling independence, flexibility, and adaptation to shifting circumstances and unforeseen situations.[20,21]

EFs also play a pivotal role in the academic success of university students. These functions are essential for task management and emotional regulation, enabling students to assess and adjust their learning behaviors while contributing to their overall well-being.[22] For example, self-regulation can help mitigate challenges such as high dropout and low graduation rates, which are prevalent in higher education, particularly in Latin American countries.[23]

Additionally, EFs facilitate the development of social skills, which are increasingly important in university life.[24] In this context, Social Cognition, a set of cognitive processes involving perception, processing, and encoding of social cues, is fundamental for positive social interactions in learning environments. Its adequate functioning has been linked to higher academic engagement and improved learning outcomes, highlighting the importance of collaborative educational settings.[25-27]

Given the relevance of EFs throughout development, various assessment instruments have been proposed.[28,29] Performance-based tests such as the Wisconsin Card Sorting Test, Stroop Color-Word Test, Hayling Test, Trail Making Test, Tower Tests, and Verbal Fluency Test are widely used. Each instrument targets specific EFs components, making the measurement process

inherently complex.[30] Furthermore, concerns have been raised regarding the exclusive use of such instruments due to their low ecological validity, which limits their applicability to real-world contexts.[31] As an alternative, inventories such as the Adult Executive Functioning Inventory (ADEXI),[32] the Behavior Rating Inventory of Executive Function (BRIEF),[33] and the Barkley Deficits in Executive Functioning Scale (BDEFS)[34] include items that assess the individual's daily life demands. Although these instruments have undergone cross-cultural adaptations in various countries,[35-37] they do not specifically address the challenges faced in university settings.

To address this gap, Ramos-Galarza et al.[38] developed the Executive Functions Scale for a University Setting (UEF), a 31-item instrument designed to assess EFs components essential for academic performance and behavioral regulation in university students. The initial study included 1,373 university students from Chile and Ecuador, aged 17 to 33 years, representing diverse educational institutions. Confirmatory factor analysis demonstrated satisfactory model fit indices, supporting a seven-factor structure: conscious monitoring of responsibilities (UEF1), supervisory attention system (UEF2), conscious regulation of behavior (UEF3), verification of behavior to learn (UEF4), decision making (UEF5), conscious regulation of emotions (UEF6) and management of elements to solve tasks (UEF7). The reliability indices (Cronbach's alpha and McDonald's omega) for each factor ranged from 0.65 to 0.85, with significant inter-factor correlations between 0.41 and 0.70.

This background underscores the need for developing EFs assessment programs that facilitate the early identification of potential deficits and the implementation of targeted interventions for their rehabilitation. Recognizing the importance of EFs strategies in higher education and the need for standardized instruments to assess them, the present study aims to introduce the second version of the Executive Functions Scale for a University Setting (UEF-2) and present the cross-cultural adaptation project for Brazilian university students. The specific objectives include obtaining content validity evidence for the Brazilian versions of the UEF-2; conducting internal structure analysis of the UEF-2 versions in both Spanish and Portuguese; analyzing the relationship between the UEF-2 and other instruments that evaluate similar constructs; and performing reliability analysis of the UEF-2.

Method

Hypothesis Research

This study will examine the following hypotheses regarding the psychometric properties of the restructured scale:

H_1. The revised scale content will demonstrate adequate comprehensibility among university students from Brazil and Ecuador.

H_2. Items comprising each executive function subscale will exhibit satisfactory internal consistency and inter-item correlations.

H_3. Each executive function subscale will demonstrate good reliability as measured by internal consistency indices ($\alpha > 0.70$, $\omega > 0.70$).

H_4. The confirmatory factor analysis will yield acceptable model fit indices (CFI ≥ 0.90, RMSEA ≤ 0.08, SRMR ≤ 0.08).

H_5. Measurement invariance testing will reveal non-significant differences across comparison groups (country and gender).

Study Design

This study adopts a quantitative research design to examine the psychometric properties of a neuropsychological measurement instrument. Following classical test theory methodology, we employ a cross-sectional temporal framework to assess the scale's reliability and validity.

The Second Version of the Executive Functions Scale for University Students

The Executive Functions Scale for university students was developed in response to the need to assess these cognitive abilities at this educational level, as they significantly determine the academic success of university students.[39] The scale was designed to assess seven EFs: (a) the supervisory attentional system, (b) the deliberate regulation of emotions, (c) the conscious monitoring of responsibilities, (d) the verification of behavior for learning, (e) the management of elements to solve tasks, (f) the conscious regulation of behavior, and (g) decision-making. The scale consists of 31 items that evaluate the daily activity of EFs in a real-world context where university students are required to actively employ these skills.[38] Table 1 presents the items that comprise the scale.

Given the high complexity of the context in which university students operate, it has been observed that a more significant number of EFs are involved in their daily activities. For this reason, it was decided to develop a second version of the scale that encompasses additional EFs relevant to the everyday life of university students. In the second version, five new EFs are proposed to complement the original scale. Following the previous classification, the new EFs are: (h) working memory in the university context, (i) cognitive flexibility of university students, (j) metacognitive learning, (k) study planning, and (l) social cognition in university stu-

dents. Table 2 displays the items that constitute the second version of the scale. The new scale in English (see Appendix A.1 and Appendix A.1.1), Spanish (see Appendix A.2 and Appendix A.2.1), and Portuguese (see Appendix A.3 and Appendix A.3.1) is presented in the appendix section.

Participants

This study will be conducted in Ecuador and Brazil. In each country, a sample of 1,000 participants will be included. This sample size will ensure adequate statistical power for both studies, with an average of 16.39 participants per item on the applied scale. The age range of participants included in the study will be between 18 and 28 years old. All participants will be required to provide informed consent to take part in this study voluntarily. The participants are exclusively affiliated with universities in Ecuador and Brazil. The exclusion criteria include unwillingness to participate, failure to sign the informed consent form, a prior psychiatric diagnosis, or the presence of a disability.

Table 1. Executive Function Scale for University Students – Version I.

	UEF-1	Executive Functions
1	It is easy to collect and leave my things organized when asked to do so.	Management of elements to solve tasks
2	I can finish a university assignment when it is very long.	Conscious monitoring of responsibilities
3	I always act thinking and reflecting on the consequences of my actions.	Conscious regulation of behavior
4	I properly regulate my emotions.	Deliberate regulation of emotions
5	I can make decisions independently.	Decision making
6	I have my things in the right place and organized.	Management of elements to solve tasks
7	I have an easy time finding my materials by looking for them in my room or desk.	Management of elements to solve tasks
8	I can complete college assignments independently and without help from others.	Conscious monitoring of responsibilities
9	I successfully complete my university assignments.	Conscious monitoring of responsibilities
10	I can concentrate well.	Supervisory attentional system
11	I can be still and calm while I wait.	Conscious regulation of behavior
12	I can solve problems at university as well as in my personal life.	Decision making
13	I focus on my university activities, leaving irrelevant things aside.	Supervisory attentional system
14	I can maintain my attention on an activity.	Supervisory attentional system
15	I can do my assignments without someone supervising me. (Puedo realizar mis trabajos sin que alguien me supervise).	Conscious monitoring of responsibilities
16	It is easy for me to behave appropriately in social gatherings.	Conscious regulation of behavior
17	When someone asks me to, I can easily stop doing something that distracts me.	Conscious regulation of behavior
18	I let others speak, without interrupting.	Conscious regulation of behavior
19	I can anticipate the consequences of my actions.	Conscious regulation of behavior
20	I verify that my university assignments are well done and without errors, before giving them to the professor.	Verification of the fulfillment of objectives
21	I can make decisions without difficulty, even in the most complicated things.	Decision making
22	It is easy for me to concentrate on my college activities.	Supervisory attentional system
23	I check the spelling and wording of my college assignments before I finish them.	Verification of the fulfillment of objectives
24	I remember to take home assignments, materials, or college papers.	Verification of the fulfillment of objectives
25	I can keep calm easily.	Deliberate regulation of emotions
26	I pick up my mess without others having to do it for me.	Management of elements to solve tasks
27	I finish my college assignments on time.	Conscious monitoring of responsibilities
28	I maintain good study habits.	Supervisory attentional system
29	My moods are stable.	Deliberate regulation of emotions
30	At the end of a university activity, I verify that I have achieved what I planned.	Verification of the fulfillment of objectives
31	I can regulate my emotions.	Deliberate regulation of emotions

Table 2. Executive Function Scale for University Students – Version II.

1	It is easy to collect and leave my things organized when asked to do so.	Management of elements to solve tasks
2	I can finish a university assignment when it is very long.	Conscious monitoring of responsibilities
3	I can recall and apply information from previous classes while studying.	Working Memory in university
4	I always act thinking and reflecting on the consequences of my actions.	Conscious regulation of behavior
5	I change my study strategies when I realize they are not working.	Cognitive Flexibility of University Student
6	I properly regulate my emotions.	Deliberate regulation of emotions
7	I can make decisions independently.	Decision making
8	I set specific goals for what I want to achieve during my university studies.	Study Planning
9	I have my things in the right place and organized.	Management of elements to solve tasks
10	I have an easy time finding my materials by looking for them in my room or desk.	Management of elements to solve tasks
11	I maintain an updated calendar with all important dates, such as deadlines and exam dates.	Study Planning
12	I can complete college assignments independently and without help from others.	Conscious monitoring of responsibilities
13	I easily remember instructions given during class.	Working memory in university
14	I successfully complete my university assignments.	Conscious monitoring of responsibilities
15	I can adjust my study plan based on changes in the academic schedule or new deadlines.	Cognitive Flexibility of University Student
16	I can concentrate well.	Supervisory attentional system
17	I plan and organize my study schedule in advance.	Study Planning
18	I can be still and calm while I wait.	Conscious regulation of behavior
19	I can retain information from the beginning of a lesson while new information is being presented.	Working memory in university
20	I can solve problems at university as well as in my personal life.	Decision making
21	I adapt my study methods based on feedback from my professors.	Cognitive Flexibility of University Student
22	I focus on my university activities, leaving irrelevant things aside.	Supervisory attentional system
23	I reflect on which study methods work best for me.	Metacogntive Learning
24	I can remember lengthy instructions.	Working memory in university.
25	I can maintain my attention on an activity.	Supervisory attentional system
26	When working in a group, I adjust my ideas and strategies as needed to collaborate better with others.	Cognitive flexibility of university student
27	I can do my assignments without someone supervising me.	Conscious monitoring of responsibilities
28	I dedicate time each week to review and update my study plan.	Study planning
29	It is easy for me to behave appropriately in social gatherings.	Conscious regulation of behavior
30	I can remember what I am doing in the middle of an activity.	Working memory in university.
31	When someone asks me to, I can easily stop doing something that distracts me.	Conscious regulation of behavior
32	If I realize I do not understand a text, I change my strategy to better comprehend it.	Cognitive flexibility of university student
33	I allow others to speak without interrupting.	Conscious regulation of behavior
34	I create summaries or mind maps of the studied content to facilitate review.	Metacognitive Learning
35	I can anticipate the consequences of my actions.	Conscious regulation of behavior
36	I plan my week, striving for a balance between studies and leisure.	Study Planning
37	I can complete academic tasks or activities with multiple steps without losing the sequence.	Working memory in university.
38	I verify that my university assignments are well done and without errors, before giving them to the professor.	Verification of the fulfillment of objectives
39	I can modify my behavior to learn effectively with professors with whom I find it difficult to earn good grades.	Cognitive flexibility of university student
40	I can make decisions without difficulty, even in the most complicated things.	Decision making
41	It is easy for me to concentrate on my college activities.	Supervisory attentional system
42	I check my understanding during or after reading a text.	Metacognitive learning
43	I check the spelling and wording of my college assignments before I finish them.	Verification of the fulfillment of objectives
44	When I get home, I keep my university tasks in mind.	Working memory in university
45	I remember to take home assignments, materials, or college papers.	Verification of the fulfillment of objectives
46	Before attending a new class, I review and prepare its content.	Study Planning
47	I can keep calm easily.	Deliberate regulation of emotions
48	I pick up my mess without others having to do it for me.	Management of elements to solve tasks
49	I use strategies, such as rereading or summarizing, to improve my understanding of a text.	Metacognitive learning
50	I finish my college assignments on time.	Conscious monitoring of responsibilities
51	I maintain good study habits.	Supervisory attentional system
52	My moods are stable.	Deliberate regulation of emotions
53	I can identify when my classmates are feeling discomfort, even if they do not explicitly tell me.	Social cognition in university
54	I organize the contents of the subjects to learn efficiently.	Working memory in university
55	At the end of a university activity, I verify that I have achieved what I planned.	Verification of the fulfillment of objectives
56	I am able to understand my classmates' points of view, even if I disagree with them.	Social cognition in university
57	When I realize that someone is upset by my behavior, I am able to change it.	Social cognition in university
58	I can identify the main idea and key concepts of a text.	Metacognitive learning
59	I understand the reasons behind my classmates' behavior.	Social cognition in university
60	I can regulate my emotions.	Deliberate regulation of emotions
61	I am able to work in group settings with classmates with whom I do not have a good relationship.	Social cognition in university

Procedure

This research will commence following approval from the ethics committees in Brazil and Ecuador. The first phase involves evaluating the content validity of the scales and conducting a pilot study to identify potential improvements. Subsequently, we will administer the full-scale survey using Google Forms, including the informed consent form as the initial requirement for voluntary participation. The estimated time for completing the materials is approximately 25 minutes.

Upon reaching the predetermined sample size, we will proceed with statistical analysis. All data collected through the survey will be handled with strict confidentiality and maintained anonymously throughout the study.

Statistical Analysis

Once the database has been constructed, we will proceed with the statistical analysis. The first step will involve identifying potential missing data or errors within the dataset. Following this, we will employ descriptive statistical methods to summarize the measurements using central tendency and dispersion metrics.

Subsequently, we will analyze the scale's internal consistency and assess how each item contributes to the validity of the executive function measures. At this stage, we will apply Cronbach's alpha and McDonald's omega as reliability indices.[40] Items demonstrating adequate psychometric properties will be retained for further analysis, followed by a correlation analysis between individual items and executive functions. This analysis will help identify items that exhibit an inverse relationship with most EFs or deviate from the expected scale structure.

The next phase will involve conducting a confirmatory factor analysis (CFA) based on the scale structure presented in Table 1. The following fit indices will be considered acceptable: a Comparative Fit Index (CFI) between 0.90 and 0.95, Root Mean Square Error of Approximation (RMSEA) values below 0.10, and Standardized Root Mean Square Residual (SRMR) values less than 0.08.[41-43] Finally, we plan to perform two inferential analyses, using country and participant gender as comparative factors.

Ethics Approval

The empirical study will employ scientifically grounded methods. It will require signing an informed consent form, ensuring the voluntary nature of participation and the confidentiality of the collected data. The study will utilize non-invasive procedures, safeguarding participants' physical and moral integrity and allowing them to withdraw from the assessment at any time. In Brazil, the project was approved by the Ethics Committee of Universidade São Francisco (CAAE No. 47845021.0.0000.5514). In Ecuador, this study was authorized by the Comité para Investigación en Seres Humanos of Pontificia Universidad Católica del Ecuador (2019-58-EO).

Discussion

The assessment of EFs remains an evolving field of study. This protocol article presents the second version of the Executive Function Scale for University Students (EFS-US), an updated instrument designed to capture key EFs critical for academic success better. Building upon the previous version, this iteration incorporates five essential domains: (a) working memory, (b) cognitive flexibility, (c) metacognitive learning, (d) study planning, and (e) social cognition—all contextualized within the university setting.

A key advancement in this revised scale is its strength-based approach, where higher scores reflect greater executive functioning abilities, as opposed to traditional deficit-focused models. This shift allows for a more constructive interpretation of executive functions, emphasizing skill development rather than impairment. Such an approach promotes a more precise conceptualization of these cognitive processes and fosters a positive framework for understanding and enhancing them.

Regarding future research directions, this project aims to pursue two main objectives: (a) cross-cultural adaptation and validation—translating the scale into additional languages and examining its psychometric properties across diverse educational contexts and (b) intervention development—designing and evaluating training programs to improve EFs in university students, with a focus on their impact on academic performance and learning-related behaviors.

A central consideration in item development was the ecological validity of the scale. We ensure relevance to students' daily experiences by grounding items in real-world university scenarios. Moving forward, this research line will focus on creating targeted interventions for students with lower EFS-US scores, thereby addressing specific areas of need within the academic environment.

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Appendix A

Appendix A.1. Executive Function Scale for University Students: UEF-2 English version.

Executive Functions Scale for University Students: UEF-2

Instructions

Below, you will find a series of statements regarding strategies that you may use in university.
Please read each statement carefully and indicate the extent to which you agree with it.
Select your response by circling one of the numbers (1 to 5) following each statement.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

	Items	Responses				
1	It is easy to collect and leave my things organized when asked to do so.	1	2	3	4	5
2	I can finish a university assignment when it is very long.	1	2	3	4	5
3	I can recall and apply information from previous classes while studying.	1	2	3	4	5
4	I always act thinking and reflecting on the consequences of my actions.	1	2	3	4	5
5	I change my study strategies when I realize they are not working.	1	2	3	4	5
6	I properly regulate my emotions.	1	2	3	4	5
7	I can make decisions independently.	1	2	3	4	5
8	I set specific goals for what I want to achieve during my university studies.	1	2	3	4	5
9	I have my things in the right place and organized.	1	2	3	4	5
10	I have an easy time finding my materials by looking for them in my room or desk.	1	2	3	4	5
11	I maintain an updated calendar with all important dates, such as deadlines and exam dates.	1	2	3	4	5
12	I can complete college assignments independently and without help from others.	1	2	3	4	5
13	I easily remember instructions given during class.	1	2	3	4	5
14	I successfully complete my university assignments.	1	2	3	4	5
15	I can adjust my study plan based on changes in the academic schedule or new deadlines.	1	2	3	4	5
16	I can concentrate well.	1	2	3	4	5
17	I plan and organize my study schedule in advance.	1	2	3	4	5
18	I can be still and calm while I wait.	1	2	3	4	5
19	I can retain information from the beginning of a lesson while new information is being presented.	1	2	3	4	5
20	I can solve problems at university as well as in my personal life.	1	2	3	4	5
21	I adapt my study methods based on feedback from my professors.	1	2	3	4	5
22	I focus on my university activities, leaving irrelevant things aside.	1	2	3	4	5
23	I reflect on which study methods work best for me.	1	2	3	4	5
24	I can remember lengthy instructions.	1	2	3	4	5
25	I can maintain my attention on an activity.	1	2	3	4	5
26	When working in a group, I adjust my ideas and strategies as needed to collaborate better with others.	1	2	3	4	5
27	I can do my assignments without someone supervising me.	1	2	3	4	5
28	I dedicate time each week to review and update my study plan.	1	2	3	4	5
29	It is easy for me to behave appropriately in social gatherings.	1	2	3	4	5
30	I can remember what I am doing in the middle of an activity.	1	2	3	4	5
31	When someone asks me to, I can easily stop doing something that distracts me.	1	2	3	4	5
32	If I realize I do not understand a text, I change my strategy to better comprehend it.	1	2	3	4	5
33	I allow others to speak without interrupting.	1	2	3	4	5
34	I create summaries or mind maps of the studied content to facilitate review.	1	2	3	4	5
35	I can anticipate the consequences of my actions.	1	2	3	4	5
36	I plan my week, striving for a balance between studies and leisure.	1	2	3	4	5
37	I can complete academic tasks or activities with multiple steps without losing the sequence.	1	2	3	4	5
38	I verify that my university assignments are well done and without errors, before giving them to the professor.	1	2	3	4	5
39	I can modify my behavior to learn effectively with professors with whom I find it difficult to earn good grades.	1	2	3	4	5
40	I can make decisions without difficulty, even in the most complicated things.	1	2	3	4	5
41	It is easy for me to concentrate on my college activities.	1	2	3	4	5
42	I check my understanding during or after reading a text.	1	2	3	4	5
43	I check the spelling and wording of my college assignments before I finish them.	1	2	3	4	5
44	When I get home, I keep my university tasks in mind.	1	2	3	4	5
45	I remember to take home assignments, materials, or college papers.	1	2	3	4	5
46	Before attending a new class, I review and prepare its content.	1	2	3	4	5
47	I can keep calm easily.	1	2	3	4	5
48	I pick up my mess without others having to do it for me.	1	2	3	4	5
49	I use strategies, such as rereading or summarizing, to improve my understanding of a text.	1	2	3	4	5
50	I finish my college assignments on time.	1	2	3	4	5
51	I maintain good study habits.	1	2	3	4	5
52	My moods are stable.	1	2	3	4	5
53	I can identify when my classmates are feeling discomfort, even if they do not explicitly tell me.	1	2	3	4	5
54	I organize the contents of the subjects to learn efficiently.	1	2	3	4	5
55	At the end of a university activity, I verify that I have achieved what I planned.	1	2	3	4	5
56	I am able to understand my classmates' points of view, even if I disagree with them.	1	2	3	4	5
57	When I realize that someone is upset by my behavior, I am able to change it.	1	2	3	4	5
58	I can identify the main idea and key concepts of a text.	1	2	3	4	5
59	I understand the reasons behind my classmates' behavior.	1	2	3	4	5
60	I can regulate my emotions.	1	2	3	4	5
61	I am able to work in group settings with classmates with whom I do not have a good relationship.	1	2	3	4	5

Appendix A.1.1. Organization of Items by Executive Function.

Factors	Items
Task-solving element management	1, 9, 10
Conscious monitoring of responsibilities	2, 12, 14, 27, 50
Conscious behavior regulation	4, 18, 29, 31, 33, 35
Deliberate emotion regulation	47, 52, 60
Decision-making	7, 20, 40
Supervisory attentional system	16, 22, 25, 41, 51
Behavioral verification for learning	38, 43, 45, 55
Working memory in university students	3, 13, 19, 24, 30, 37, 44, 54
Cognitive flexibility in university students	5, 15, 21, 26, 32, 39
Metacognitive learning	23, 42, 34, 49, 58
Study planning	8, 11, 17, 28, 36, 46
Social cognition in university students	53, 56, 57, 59, 61

Appendix A.2. Executive Function Scale for University Students: UEF-2 Spanish version.

Escala de Funciones Ejecutivas para el Estudiante Universitario: UEF-2

Instrucciones

A continuación, encontrará algunas afirmaciones sobre estrategias que puede utilizar en la universidad.
Por favor, lea cada afirmación y indique en qué grado está de acuerdo.
Elija su respuesta rodeando uno de los números (1 a 5) después de cada afirmación.

1	2	3	4	5
Totalmente en desacuerdo	Moderadamente en desacuerdo	Ni de acuerdo ni en desacuerdo	Moderadamente de acuerdo	Totalmente de acuerdo

	Ítems	Respuestas				
1	Tengo facilidad para recoger y dejar ordenadas mis cosas cuando se me pide que lo haga.	1	2	3	4	5
2	Puedo terminar una tarea universitaria cuando es muy larga.	1	2	3	4	5
3	Puedo recordar y utilizar información de clases anteriores cuando estudio.	1	2	3	4	5
4	Actúo siempre pensando y reflexionando las consecuencias de mis actos.	1	2	3	4	5
5	Cambio mis estrategias de estudio cuando me doy cuenta que no están funcionando.	1	2	3	4	5
6	Regulo adecuadamente mis emociones.	1	2	3	4	5
7	Tengo la capacidad para tomar decisiones en forma independiente.	1	2	3	4	5
8	Establezco metas específicas para lo que quiero lograr durante mis estudios.	1	2	3	4	5
9	Tengo mis cosas en el lugar adecuado y en orden.	1	2	3	4	5
10	Tengo facilidad para encontrar rápidamente mis materiales al buscarlos en mi cuarto o escritorio.	1	2	3	4	5
11	Mantengo un calendario actualizado con todas las fechas importantes, como fechas límite y fechas de exámenes.	1	2	3	4	5
12	Puedo realizar las tareas universitarias de forma independiente y sin ayuda de los demás.	1	2	3	4	5
13	Recuerdo fácilmente las instrucciones dadas durante la clase.	1	2	3	4	5
14	Logro realizar exitosamente mis trabajos de la universidad.	1	2	3	4	5
15	Puedo ajustar mi plan de estudios en función a los cambios en el cronograma académico o nuevos plazos.	1	2	3	4	5
16	Tengo buena concentración.	1	2	3	4	5
17	Planifico y organizo mi horario de estudio con antelación.	1	2	3	4	5
18	Puedo estar quieto/a y tranquilo/a mientras espero.	1	2	3	4	5
19	Puedo retener información desde el comienzo de una lección mientras se presenta información nueva.	1	2	3	4	5
20	Tengo la capacidad para resolver problemas en la universidad como en mi vida personal.	1	2	3	4	5
21	Adapto mi método de estudio en función del feedback de mis profesores.	1	2	3	4	5
22	Me concentro en mis actividades universitarias, dejando de lado las cosas irrelevantes.	1	2	3	4	5
23	Reflexiono sobre qué métodos de estudio funcionan mejor para mí.	1	2	3	4	5
24	Puedo recordar instrucciones largas.	1	2	3	4	5
25	Soy capaz de mantener la atención en una actividad.	1	2	3	4	5
26	Cuando trabajo en grupo, ajusto mis ideas y estrategias según sea necesario para colaborar mejor con los demás.	1	2	3	4	5
27	Puedo realizar mis trabajos sin que alguien me supervise.	1	2	3	4	5
28	Dedico tiempo cada semana para revisar y actualizar mi plan de estudio.	1	2	3	4	5
29	Me es fácil comportarme adecuadamente en las reuniones sociales.	1	2	3	4	5
30	Puedo recordar lo que estoy haciendo en medio de una actividad.	1	2	3	4	5
31	Cuando alguien me lo pide, puedo dejar con facilidad de hacer algo que me distrae.	1	2	3	4	5
32	Si me doy cuenta de que no entiendo un texto, cambio mi estrategia para comprenderlo mejor.	1	2	3	4	5
33	Dejo hablar a los demás, sin hacer interrupciones.	1	2	3	4	5
34	Creo resúmenes o mapas mentales del contenido estudiado para facilitar la revisión.	1	2	3	4	5
35	Puedo anticipar las consecuencias de mis actos.	1	2	3	4	5
36	Planifico mi semana, procurando un equilibrio entre estudios y ocio.	1	2	3	4	5
37	Puedo realizar trabajos o actividades académicas que tengan varios pasos, sin perder la secuencia.	1	2	3	4	5
38	Verifico que mis tareas universitarias estén bien realizadas y sin errores, antes de presentarlas al profesor.	1	2	3	4	5
39	Puedo modificar mi comportamiento para aprender con profesores que me es difícil tener buenas calificaciones.	1	2	3	4	5
40	Puedo tomar decisiones sin dificultad, incluso ante las cosas más complicadas.	1	2	3	4	5
41	Me es fácil concentrarme en mis actividades universitarias.	1	2	3	4	5
42	Compruebo mi comprensión durante o después de leer un texto.	1	2	3	4	5
43	Reviso la ortografía y redacción de mis tareas universitarias antes de finalizarlas.	1	2	3	4	5
44	Al llegar a casa tengo presente las tareas universitarias.	1	2	3	4	5
45	Recuerdo llevar a casa las tareas, materiales o trabajos de la universidad.	1	2	3	4	5
46	Antes de recibir una nueva clase, reviso y preparo su contenido.	1	2	3	4	5
47	Mantengo la calma con facilidad.	1	2	3	4	5
48	Recojo mi desorden sin que otros lo hagan por mí.	1	2	3	4	5
49	Utilizo estrategias, como releer o resumir, para mejorar mi comprensión de un texto.	1	2	3	4	5
50	Termino mis tareas universitarias a tiempo.	1	2	3	4	5
51	Mantengo buenos hábitos de estudio.	1	2	3	4	5
52	Tengo un estado de ánimo estable.	1	2	3	4	5
53	Puedo identificar el malestar de mis compañeros/as, incluso si no me dicen nada	1	2	3	4	5
54	Organizo los contenidos de las asignaturas para aprender eficientemente	1	2	3	4	5
55	Al finalizar una actividad universitaria, verifico que haya logrado lo planificado.	1	2	3	4	5
56	Soy capaz de comprender los puntos de vista de mis compañeros/as, incluso si no están de acuerdo conmigo	1	2	3	4	5
57	Cuando me doy cuenta que alguien se siente mal por mi conducta soy capaz de cambiarla	1	2	3	4	5
58	Puedo identificar la idea principal y los conceptos principales de un texto.	1	2	3	4	5
59	Entiendo las razones detrás del comportamiento de mis compañeros/as	1	2	3	4	5
60	Soy capaz de regular mis emociones.	1	2	3	4	5
61	Puedo hacer trabajos en grupo con compañeros/as con quienes no me relaciono bien	1	2	3	4	5

Appendix A.2.1. Organization of Items by Executive Function

Factores	Ítems
Gestión de elementos para resolver tareas	1, 9, 10
Monitorización consciente de las responsabilidades	2, 12, 14, 27, 50
Regulación consciente del comportamiento	4, 18, 29, 31, 33, 35
Regulación deliberada de las emociones	47, 52, 60
Toma de decisiones	7, 20, 40
Sistema atencional supervisor	16, 22, 25, 41, 51
Verificación del comportamiento para aprender	38, 43, 45, 55
Memoria de trabajo en la universidad	3, 13, 19, 24, 30, 37, 44, 54
Flexibilidad cognitiva del universitario	5, 15, 21, 26, 32, 39
Aprendizaje metacognitivo	23, 42, 34, 49, 58
Planificación del estudio	8, 11, 17, 28, 36, 46
Cognición Social del universitario	53, 56, 57, 59, 61

Appendix A.3. Executive Function Scale for University Students: UEF-2 Portuguese version.

Escala de Funções Executivas para Estudantes Universitários: UEF-2

Instruções

A seguir, você encontrará algumas afirmações sobre estratégias que pode utilizar na universidade.
Por favor, leia cada afirmação e indique em que grau você concorda.
Escolha sua resposta circulando um dos números (1 a 5) após cada afirmação.

1	2	3	4	5
Discordo totalmente	Discordo moderadamente	Nem discordo nem concordo	Concordo moderadamente	Concordo totalmente

	Itens	Respostas				
1	É fácil recolher e deixar minhas coisas organizadas quando me pedem para fazer isso.	1	2	3	4	5
2	Consigo terminar uma tarefa acadêmica quando é muito longa.	1	2	3	4	5
3	Eu consigo recordar e utilizar informações de aulas anteriores durante os estudos.	1	2	3	4	5
4	Sempre ajo pensando e refletindo sobre as consequências das minhas ações.	1	2	3	4	5
5	Eu mudo minhas estratégias de estudo quando percebo que não estão funcionando.	1	2	3	4	5
6	Regulo adequadamente minhas emoções.	1	2	3	4	5
7	Tenho capacidade de tomar decisões de forma independente.	1	2	3	4	5
8	Eu estabeleço objetivos específicos para o que quero alcançar durante meus estudos.	1	2	3	4	5
9	Minhas coisas estão no lugar certo e organizadas.	1	2	3	4	5
10	Tenho facilidade em encontrar rapidamente meus materiais ao procurá-los no meu quarto ou mesa.	1	2	3	4	5
11	Eu mantenho um calendário atualizado com todas as datas importantes, como prazos de entrega e datas de exames.	1	2	3	4	5
12	Consigo realizar as tarefas acadêmicas de forma independente e sem a ajuda dos outros.	1	2	3	4	5
13	Eu me lembro facilmente das instruções dadas durante as aulas.	1	2	3	4	5
14	Realizo com sucesso meus trabalhos na universidade.	1	2	3	4	5
15	Sou capaz de ajustar meu plano de estudo com base em mudanças no cronograma acadêmico ou em novos prazos.	1	2	3	4	5
16	Tenho boa concentração.	1	2	3	4	5
17	Eu planejo e organizo minha agenda de estudos com antecedência.	1	2	3	4	5
18	Consigo ficar quieto(a) e calmo(a) enquanto espero.	1	2	3	4	5
19	Eu consigo reter informações do início de uma aula enquanto novas informações estão sendo apresentadas.	1	2	3	4	5
20	Tenho capacidade de resolver problemas na universidade, assim como na minha vida pessoal.	1	2	3	4	5
21	Eu adapto meu método de estudo baseado no feedback dos meus professores.	1	2	3	4	5
22	Concentro-me nas minhas atividades acadêmicas, deixando de lado coisas irrelevantes.	1	2	3	4	5
23	Eu reflito sobre quais métodos de estudo funcionam melhor para mim.	1	2	3	4	5
24	Eu consigo lembrar de instruções longas.	1	2	3	4	5
25	Sou capaz de manter a atenção em uma atividade.	1	2	3	4	5
26	Ao trabalhar em grupo, ajusto minhas ideias e estratégias conforme necessário para melhor colaborar com os outros.	1	2	3	4	5
27	Posso realizar meus trabalhos sem que alguém me supervisione.	1	2	3	4	5
28	Eu reservo um tempo toda semana para revisar e atualizar meu plano de estudos.	1	2	3	4	5
29	É fácil para mim me comportar adequadamente em reuniões sociais.	1	2	3	4	5
30	Eu consigo me lembrar do que estou fazendo no meio de uma atividade.	1	2	3	4	5
31	Quando alguém me pede, posso parar facilmente de fazer algo que me distraia.	1	2	3	4	5
32	Se percebo que não estou entendendo um texto, mudo minha estratégia para compreendê-lo melhor.	1	2	3	4	5
33	Deixo os outros falarem, sem interromper.	1	2	3	4	5
34	Eu crio resumos ou mapas mentais dos conteúdos estudados para facilitar a revisão.	1	2	3	4	5
35	Posso antecipar as consequências das minhas ações.	1	2	3	4	5
36	Eu planejo minha semana, garantindo um equilíbrio entre estudos e lazer.	1	2	3	4	5
37	Eu consigo realizar trabalhos acadêmicos ou atividades que possuem várias etapas, sem perder a sequência.	1	2	3	4	5
38	Eu confiro se meus trabalhos acadêmicos estão bem-feitos e sem erros, antes de entregá-los ao professor.	1	2	3	4	5
39	Posso modificar meu comportamento para aprender com professores com os quais é difícil obter boas notas.	1	2	3	4	5
40	Posso tomar decisões sem dificuldade, mesmo nas coisas mais complicadas.	1	2	3	4	5
41	É fácil para mim me concentrar nas minhas atividades acadêmicas.	1	2	3	4	5
42	Eu verifico minha compreensão durante ou após a leitura de um texto.	1	2	3	4	5
43	Reviso a ortografia e a redação dos meus trabalhos acadêmicos antes de finalizá-los.	1	2	3	4	5
44	Ao chegar em casa, tenho em mente as tarefas universitárias.	1	2	3	4	5
45	Lembro de levar para casa as tarefas, materiais ou trabalhos da universidade.	1	2	3	4	5
46	Antes de assistir a uma nova aula, reviso e preparo seu conteúdo.	1	2	3	4	5
47	Consigo manter a calma facilmente.	1	2	3	4	5
48	Recolho minha bagunça sem que outros tenham que fazer isso por mim.	1	2	3	4	5
49	Eu utilizo estratégias, como a releitura ou o resumo, para melhorar minha compreensão de um texto.	1	2	3	4	5
50	Termino minhas tarefas acadêmicas a tempo.	1	2	3	4	5
51	Mantenho bons hábitos de estudo.	1	2	3	4	5
52	Meu humor é estável.	1	2	3	4	5
53	Posso identificar o desconforto dos meus colegas, mesmo que não me digam nada.	1	2	3	4	5
54	Organizo os conteúdos das disciplinas para aprender de forma eficiente.	1	2	3	4	5
55	No final de uma atividade universitária, verifico se alcancei o que planejei.	1	2	3	4	5
56	Consigo compreender os pontos de vista de meus colegas, mesmo que não concordem comigo.	1	2	3	4	5
57	Quando percebo que alguém se sente mal devido ao meu comportamento, sou capaz de mudá-lo.	1	2	3	4	5
58	Eu consigo identificar a ideia principal e os principais conceitos de um texto.	1	2	3	4	5
59	Compreendo as razões por trás do comportamento dos meus colegas.	1	2	3	4	5
60	Sou capaz de regular minhas emoções.	1	2	3	4	5
61	Posso realizar trabalhos em grupo com colegas com quem não me relaciono bem.	1	2	3	4	5

Appendix A.3.1. Organization of Items by Executive Function.

Fatores	Itens
Gestão de elementos para resolver tarefas	1, 9, 10
Monitoramento consciente das responsabilidades	2, 12, 14, 27, 50
Regulação consciente do comportamento	4, 18, 29, 31, 33, 35
Regulação deliberada das emoções	47, 52, 60
Tomada de decisões	7, 20, 40
Sistema atencional supervisor	16, 22, 25, 41, 51
Verificação do comportamento para aprender	38, 43, 45, 55
Memória de trabalho na universidade	3, 13, 19, 24, 30, 37, 44, 54
Flexibilidade cognitiva do universitário	5, 15, 21, 26, 32, 39
Aprendizagem metacognitiva	23, 42, 34, 49, 58
Planejamento do estudo	8, 11, 17, 28, 36, 46
Cognição social do universitário	53, 56, 57, 59, 61