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Preliminary psychometric evaluation of a self-reported cognitive functioning questionnaire in high school students

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Abstract

Introduction. Cognitive functioning is a critical determinant of academic achievement, particularly during adolescence—a period defined by the maturation of executive functions and attentional control.

Material and method. The present study conducts a preliminary psychometric evaluation of a self-report cognitive functioning questionnaire designed for high school students, aimed at optimizing the instrument prior to large-scale implementation. Adopting an exploratory, cross-sectional design, the research sampled $N = 49$ students from grades 9 through 12. The instrument comprised 25 items measured on a 5-point Likert scale, assessing domains including attention, working memory, concentration, and task organization. Data analysis involved descriptive statistics, distributional analysis, and internal consistency testing via Cronbach's alpha (α).

Results. Results demonstrate excellent internal consistency for the scale (α = .91) and adequate item-total correlations for the majority of the items. However, specific items were identified for linguistic refinement. The findings validate the instrument's utility for the primary study following minor adjustments and highlight its relevance for both educational research and clinical practice.

Key words: *cognitive functioning, executive functions, psychometric evaluation, adolescence, self-report questionnaire, internal consistency, preliminary validation*

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Introduction

Cognitive functioning represents a complex set of mental processes involved in information processing, such as attention, working memory, concentration, organization, and executive control of behavior. In the educational context, these processes play an essential role in academic performance, influencing students' ability to follow instructions, solve academic tasks, and organize their learning activities effectively. Specialized literature highlights that working memory and attentional mechanisms are significant predictors of academic success and academic adjustment (Baddeley, 2007; Gathercole & Alloway, 2008).

During adolescence, the development of executive functions and cognitive control is in an active process of maturation, being influenced by both neurobiological factors and educational and socio-emotional variables (Posner & Rothbart, 2007). From this perspective, the early identification of cognitive functioning difficulties may contribute to preventing a decline in academic performance and to implementing appropriate educational interventions.

Self-report assessment instruments offer the advantage of providing direct access to students' subjective perceptions of their own difficulties, complementing traditional methods of psychological evaluation (Broadbent et al., 1982).

Although there are established instruments for assessing cognitive functioning or executive deficits, many of them are developed for clinical populations or for other age groups, and are therefore less adapted to the high school educational context. Consequently, the development of a questionnaire adapted for high school students, formulated in accessible language and relevant to their school experience (or age level), represents a necessary endeavor from both a theoretical and applied perspective.

Considering the complex and partially subjective nature of measuring cognitive functioning through self-report instruments, it is essential that such a tool be preliminarily tested before being used on a larger sample. Through pilot testing, it can be evaluated how clear and easy to understand the items are, given that students may perceive questions related to attention, memory, or concentration differently. Identifying ambiguous or difficult-to-understand items provides the opportunity to reformulate them in order to ensure coherence and accuracy of responses (Folstein et al., 1975; Nasreddine et al., 2005).

At the same time, the pilot stage facilitates the evaluation of the questionnaire's structure and flow. The order of items may influence responses and the general perception of the instrument, and analyzing thematic continuity and internal logic contributes to optimizing the final form.

Pilot testing also allows for estimating the time required to complete the questionnaire and the level of cognitive effort involved, aspects that are relevant for efficient application in the school environment (American Educational Research Association, 2014).

Another important objective is testing the reliability and internal consistency of the scale. Statistical analysis of the relationship between items that measure the same cognitive dimensions (attention, working memory, concentration), for example through the Cronbach's Alpha coefficient, provides essential information regarding the internal coherence of the instrument (Gathercole & Alloway, 2008).

This stage allows the identification of redundant or poorly performing items and contributes to optimizing the scoring and interpretation of results. In addition, pilot testing helps identify potential practical and technical difficulties related to the formulation of instructions, the method of administration, or data management, ensuring uniformity of procedures in the main study.

It also provides the opportunity to verify the educational relevance and usefulness of the questionnaire, insofar as the items adequately capture the cognitive difficulties reported by students and may serve as support for teachers and school counselors in identifying specific educational needs (Anderson, 2005; Baddeley, 2007; Nasreddine et al., 2005).

Overall, pilot testing represents an essential methodological step for increasing the internal and external validity of the research, reducing measurement errors, and strengthening the scientific foundation of the instrument (Jensen, 1998). In this context, the present study aims to conduct a preliminary psychometric evaluation of a self-report cognitive functioning questionnaire intended for high school students.

In conclusion, this stage aims to strengthen the validity and reliability of the instrument, ensuring a solid scientific basis for its subsequent use in research and educational practice.

Aim

The pilot testing of the questionnaire aimed to conduct a preliminary evaluation of the instrument in order to ensure the clarity, relevance, and reliability of the items before administering it to the main sample. This stage facilitated the identification of potential methodological issues and the adjustment of the scale, in order to obtain valid and consistent measurements of the investigated constructs.

Materials and method

Methodology

The adopted design was exploratory, descriptive, and cross-sectional, using a convenience (non-probabilistic) sample, with the aim of evaluating the clarity and relevance of the items, examining the distribution of responses, and verifying the internal consistency of the scale.

Data analysis included descriptive statistics, item–total correlation analysis, testing the normality of distributions (Shapiro–Wilk test), and the evaluation of internal reliability using the Cronbach's α coefficient. The obtained results allowed the identification of problematic items and provided the basis for the necessary adjustments before administering the questionnaire to the main sample.

Participants

A total of 49 high school students participated in the study (N = 49), from grades 9–12 at Emanuel Baptist Theological High School in Oradea. Participants were selected from a pre-university educational institution for the purpose of preliminary testing of the instrument.

The inclusion criterion was enrollment in the high school cycle and agreement to participate. Participation was voluntary. For minor students, informed consent was obtained from parents or legal guardians. All participants were informed about the anonymous and confidential nature of the collected data.

Instrument

The instrument used was a self-report cognitive functioning questionnaire, developed to assess students' perceptions of their own cognitive difficulties in the school context. The questionnaire includes 25 items investigating dimensions such as attention, working memory, concentration capacity, organization of activities, and task persistence. Responses are formulated on a 5-point Likert scale, where: 1 = never; 2 = rarely; 3 = sometimes; 4 = often; 5 = very often.

The total score is obtained by summing the responses to the 25 items, with possible values ranging from 25 to 125 points. A higher score indicates a higher frequency of perceived cognitive difficulties. The average completion time was approximately 10 minutes.

Procedure

The questionnaire was administered in an organized setting within the school environment. Participants received standardized instructions regarding the completion of the instrument, emphasizing the importance of honest responses and the anonymous nature of the data. No personal identifying data were recorded. Data were collected in a single stage, after which the responses were coded and entered into an electronic database for statistical analysis.

Statistical Analysis

Data analysis was performed using a specialized statistical software program (SPSS), and the following analyses were conducted:

a) Descriptive analyses: mean, median, standard deviation, variance, minimum and maximum values, and distribution range.

b) Normality testing: The Shapiro–Wilk test was used to examine the normality of score distributions.

c) Item distribution analysis: Response frequencies were analyzed for each item in order to identify potential ceiling or floor effects.

d) Internal consistency analysis: The reliability of the scale was evaluated using the Cronbach's α coefficient. Additionally, the following were calculated: corrected item–total correlations and the α coefficient value if each item were deleted.

e) Evaluation of problematic items: The following criteria were used as general guidelines: item–total correlation < .30, very low variance, and strongly skewed distributions.

Ethical Considerations

The study respected the ethical principles of research in the socio-human sciences. Participation was voluntary and based on informed consent. Data were collected anonymously and used exclusively for scientific purposes. Students had the possibility to withdraw from the study at any time without any consequences.

Results

The pilot study allowed the evaluation of the clarity and relevance of the items in the self-report cognitive functioning questionnaire. Following the analysis of the preliminary responses, the following observations were made:

1.Most students considered the questions clear and easy to understand.

2.The average completion time of the questionnaire was appropriate for the target group, approximately 10 minutes.

3.Several ambiguous items were identified and were subsequently adjusted.

The consistency of the preliminary responses indicated that the instrument is reliable and appropriate for assessing self-reported cognitive functioning. The results of the pilot study confirmed that the questionnaire can be used in the main study, with minor adjustments for clarity and precision. This stage was essential for improving the validity and reliability of the instrument.

Thus, the analysis conducted on the 25 items administered to a sample of 49 participants allowed the identification of three items that did not meet the established psychometric criteria. These included items with low variance, items with low corrected item–total correlation (< .20), and items with extreme means (< 1.5 or > 4.5).

Descriptive statistics for each item are presented in Table 1, which includes indicators such as mean, median, standard deviation, and variance. The distribution of responses for each category of the Likert scale (Never – Very often) is presented in Table 2, providing a detailed overview of the frequency of responses for each item.

Additionally, the relationship between each item and the total score of the scale was analyzed using the corrected item–total correlation, and the results are presented in Table 3. The reliability analysis also included the estimation of the Cronbach's alpha coefficient, used to evaluate the internal consistency of the instrument.

Table 1. Descriptive Statistics

	Count	Mean		Median	Dev. standard	Var	Min	Max	Amplit
Item 1	49	2.46		2	0.93	0.87	1	5	4
Item 2	49	2.95		3	0.95	0.91	1	5	4
Item 3	49	3.02		3	0.87	0.77	1	5	4
Item 4	49	2.32		2	0.62	0.39	1	4	3
Item 5	49	2.2		2	1.27	1.63	1	5	4
Item 6	49	2.38		2	1.13	1.28	1	5	4
Item 7	49	2.65		3	0.99	0.98	1	5	4
Item 8	49	3.02		3	1.08	1.18	1	5	4
Item 9	49	2.65		3	0.99	0.98	1	5	4
Item 10	49	1.65		1	0.92	0.85	1	5	4
Item 11	49	2.53		2	0.91	0.83	1	5	4
Item 12	49	2.4		2	0.76	0.57	1	4	3
Item 13	49	2.38		2	0.9	0.82	1	5	4
Item 14	49	2.77		3	1.06	1.13	1	5	4
Item 15	49	2.59		3	1.13	1.28	1	5	4
Item 16	49	1.34		1	0.63	0.39	1	4	3
Item 17	49	1.95		2	0.76	0.58	1	3	2
Item 18	49	3.61		4	1.15	1.32	1	5	4
Item 19	49	2.24		2	0.85	0.73	1	5	4
Item 20	49	2.08		2	0.81	0.65	1	4	3
Item 21	49	2.51		2	0.86	0.75	1	5	4
Item 22	49	3.02		3	1.1	1.22	1	5	4
Item 23	49	2		2	0.88	0.79	1	5	4
Item 24	49	2.24		2	0.99	0.98	1	5	4
Item 25	49	3.12		3	1.05	1.1	1	5	4

Table 2. Response Distributions for Each Item

	1 Never	**2 Rarely**	**3 Sometimes**	**4 Often**	**5 Very often**
Item 1	4	26	14	2	3
Item 2	3	12	20	12	2
Item 3	2	10	24	11	2
Item 4	3	28	17	1	0
Item 5	17	17	7	3	5
Item 6	11	20	8	8	2
Item 7	5	18	17	7	2
Item 8	4	11	19	10	5
Item 9	5	19	14	10	1
Item 10	28	13	6	1	1
Item 11	5	21	16	6	1
Item 12	5	22	19	3	0
Item 13	6	24	15	2	2
Item 14	4	18	16	7	4
Item 15	9	15	15	7	3
Item 16	35	12	1	1	0
Item 17	15	21	13	0	0
Item 18	1	9	12	13	14
Item 19	5	33	7	2	2
Item 20	11	26	9	3	0
Item 21	3	26	13	6	1
Item 22	3	15	14	12	5
Item 23	13	27	7	0	2
Item 24	9	27	7	4	2
Item 25	3	12	13	18	3

Table 3. Item–Total Correlation Analysis

	Corrected item–total correlation	**Cronbach's alpha coefficient**	**Mean**	**Variance**
Item 1	.47	.91	2.47	0.88
Item 2	.65	.91	2.96	0.91
Item 3	.61	.91	3.02	0.77
Item 4	.29	.91	2.33	0.39
Item 5	.53	.91	2.22	1.64
Item 6	.66	.91	2.39	1.28
Item 7	.68	.91	2.65	0.98
Item 8	.65	.91	3.02	1.19
Item 9	.66	.91	2.65	0.98
Item 10	.35	.91	1.65	0.86
Item 11	.57	.91	2.53	0.84
Item 12	.67	.91	2.41	0.58

Item 13	.61	.91	2.39	0.83
Item 14	.44	.91	2.78	1.14
Item 15	.64	.91	2.59	1.29
Item 16	.26	.91	1.35	0.40
Item 17	.45	.91	1.96	0.58
Item 18	.56	.91	3.61	1.33
Item 19	.49	.91	2.24	0.73
Item 20	.36	.91	2.08	0.66
Item 21	.39	.91	2.51	0.76
Item 22	.63	.91	3.02	1.23
Item 23	.25	.91	2.00	0.79
Item 24	.54	.91	2.24	0.98
Item 25	.51	.91	3.12	1.11

The normality of the score distributions at the item level was evaluated using the Shapiro–Wilk test, applied to the 25 items of the self-report cognitive functioning questionnaire. This test is recommended for small to medium sample sizes and is considered one of the most sensitive tests for detecting deviations from a normal distribution.

The results presented in Table 4 indicate that for all 25 items the p-values are lower than the statistical significance threshold of .05, suggesting significant deviations from normal distribution. The values of the W coefficient range between 0.59 and 0.92, indicating varying degrees of asymmetry and non-normality in the distributions.

Table 4. Shapiro–Wilk Normality Test

Item	W	p_value	Interpretare
Item 1	.81	< .001	Skewed distribution
Item 2	.91	< .001	Skewed distribution
Item 3	.89	< .001	Skewed distribution
Item 4	.79	< .001	Skewed distribution
Item 5	.82	< .001	Skewed distribution
Item 6	.87	< .001	Skewed distribution
Item 7	.90	< .001	Skewed distribution
Item 8	.92	<.001	Skewed distribution
Item 9	.89	< .001	Skewed distribution
Item 10	.72	< .001	Skewed distribution
Item 11	.89	< .001	Skewed distribution
Item 12	.85	< .001	Skewed distribution
Item 13	.84	< .001	Skewed distribution
Item 14	.90	< .001	Skewed distribution
Item 15	.91	< .001	Skewed distribution
Item 16	.59	< .001	Skewed distribution
Item 17	.81	< .001	Skewed distribution
Item 18	.88	< .001	Skewed distribution
Item 19	.72	< .001	Skewed distribution
Item 20	.84	< .001	Skewed distribution
Item 21	.84	< .001	Skewed distribution

Item 22	.91	<.001	Skewed distribution
Item 23	.77	< .001	Skewed distribution
Item 24	.82	< .001	Skewed distribution
Item 25	.90	< .001	Skewed distribution

Table 5. Items with Low Variance

	Corrected item–total correlation	**Cronbach's alpha coefficient**	**Mean**	**Variance**
Item 4	.28	.91	2.32	0.39
Item 16	.26	.91	1.34	0.39
Item 23	,28	,91	2	0.79

The internal consistency analysis of the questionnaire highlighted the presence of several items with low variance**,** namely Item 4, Item 16, and Item 23 (Table 5). The low variance values indicate a limited dispersion of responses, suggesting that most participants selected similar response options for these items, which reduces their ability to discriminate between different levels of the measured construct.

The corrected item–total correlations for these items ranged between .26 and .28, values slightly below the recommended threshold of .30**,** suggesting a marginal contribution to the total scale score.

However, the Cronbach's alpha if item deleted values remained constant (.91), indicating that removing these items would not lead to a significant improvement in the internal consistency of the questionnaire. From the perspective of the obtained means, the identified items present relatively low values, suggesting a low frequency of cognitive difficulties reported for the specific content assessed by these items.

Overall, although these items show reduced variability and a marginal correlation with the total score, their impact on the overall reliability of the instrument is limited**; therefore,** reformulation is recommended**.**

Table 6. Extreme Means

	Corrected item–total correlation	**Cronbach's alpha coefficient**	**Mean**	**Variance**
Item 16	.26	.91	1.34	0.39

Table 6 highlights Item 16 as having an extreme mean, characterized by a low average score (M = 1.34) and reduced variance (0.39). This distribution indicates a floor effect, suggesting that most participants reported a very low frequency of the cognitive difficulties described by this item.

The corrected item–total correlation for Item 16 (r = .26) confirms that it aligns only partially with the rest of the scale, contributing to a lesser extent to the assessment of the overall construct. However, the Cronbach's alpha if item deleted value remains unchanged (.91), indicating that removing the item would not lead to an increase in the reliability of the instrument. As mentioned above**,** reformulation would therefore be optimal (Thorell et al., 2020).

In this context, Item 16 can be considered an item with reduced sensitivity for the investigated sample**;** however, its retention in the questionnaire is justified from the perspective of conceptual coverage of the evaluated dimensions and the maintenance of the structural consistency of the instrument**.**

Table 7. Questionnaire Reliability

Cronbach α	.91

For a detailed analysis of the performance of each item, descriptive statistics (mean, standard deviation, and variance), item–total correlations, and the Cronbach's α coefficient values if each item were deleted were calculated. The results are presented in Table 8**.**

Table 8. Item-by-Item Analysis

Item	Mean	Standard Deviation	Variance	Corrected item–total correlation	Cronbach's alpha if item deleted	Interpretation
Item 1	2.47	0.94	0.88	.47	.91	Acceptable, moderate correlation, low mean.
Item 2	2.96	0.96	0.91	.65	.90	Good, contributes to the internal consistency of the scale.
Item 3	3.02	0.88	0.77	.61	.90	Good, the mean is close to the midpoint and the distribution is balanced.
Item 4	2.33	0.63	0.39	.29	.91	Problematic: low variance and weak item–total correlation.
Item 5	2.22	1.28	1.64	.53	.91	Acceptable, more dispersed distribution.
Item 6	2.39	1.13	1.28	.66	.90	Good, contributes well to internal consistency.
Item 7	2.65	0.99	0.98	.68	.90	Good, high item–total correlation.
Item 8	3.02	1.09	1.19	65	.90	Good, balanced distribution.
Item 9	2.65	0.99	0.98	.66	.90	Good.
Item 10	1.65	0.93	0.86	.35	.91	Acceptable, moderate item–total correlation and low mean.
Item 11	2.53	0.92	0.84	.57	.90	Good.
Item 12	2.41	0.76	0.58	.67	.90	Good, high item–total correlation.
Item 13	2.39	0.91	0.83	.61	.90	Good.
Item 14	2.78	1.07	1.14	.44	.91	Acceptable, moderate item–total correlation.
Item 15	2.59	1.14	1.29	.64	.90	Good.
Item 16	1.35	0.63	0.40	.26	.91	Problematic: extremely low mean, low variance, and low item–total correlation.
Item 17	1.96	0.76	0.58	.45	.91	Acceptable, low mean and moderate item–total correlation.
Item 18	3.61	1.15	1.33	.56	.90	Higher mean, good contribution to internal consistency.
Item 19	2.24	0.85	0.73	.49	.91	Acceptable
Item 20	2.08	0.81	0.66	.36	.91	Acceptable, moderate item–total correlation.
Item 21	2.51	0.87	0.76	.39	.91	Acceptable, slightly lower item–total correlation.
Item 22	3.02	1.11	1.23	.63	.90	Good.
Item 23	2.00	0.89	0.79	.25	.91	Problematic: extremely low mean, low variance, and low item–total correlation.
Item 24	2.24	0.99	0.98	.54	.90	Acceptable.
Item 25	3.12	1.05	1.11	.51	.91	Good.

The item-by-item analysis indicates that most items show moderate to high item–total correlations (≥ .40), suggesting an adequate contribution to the internal consistency of the scale**.** The values of the alpha if item deleted coefficient range between 0.90 and 0.91**,** indicating the stability of the overall internal consistency**.**

Three items (4, 16, and 23) show item–total correlations below the .30 threshold and low variances, indicating a limited ability to discriminate between respondents. Additionally, Item 16 presents an extremely low mean (M = 1.35), suggesting an asymmetrical distribution of responses**.** Most items have means located in the central range of the Likert scale (approximately 2.3–3.1), indicating the absence of strong ceiling or floor effects for the investigated construct.

Discussions

The present study aimed to conduct a preliminary psychometric evaluation of a self-report cognitive functioning questionnaire designed for high school students, by examining internal consistency, response distributions, and item performance.

The results support the preliminary adequacy of the instrument, showing excellent internal consistency (Cronbach's α = 0.91). This value exceeds the recommended thresholds for instruments in the initial development and validation phase (Nunnally & Bernstein, 1994) and indicates good item homogeneity as well as conceptual coherence of the assessed construct.

The high level of internal consistency suggests that the scale items measure a common construct in a coherent manner, without indicating excessive redundancy. In psychometric literature, α values around .90 are considered indicative of a robust internal structure, suitable for both research use and preliminary educational screening.

In this sense, the obtained coefficient is comparable to values reported for established instruments assessing executive functions in adolescents, such as the BRIEF (Gioia et al., 2000), where internal consistency frequently exceeds .80. This convergence reinforces the argument for internal validity and supports that the item structure aligns with current methodological standards.

Most items showed moderate to high item–total correlations, suggesting that each contributes significantly to the total score and that the scale assesses a relatively unitary dimension of self-reported cognitive functioning. This finding aligns with contemporary theoretical models that conceptualize executive functions as an integrated system of interrelated processes, including working memory (Baddeley, 2007), inhibitory control, and cognitive flexibility (Miyake et al., 2000). However, the literature emphasizes the unitary yet multifactorial nature of executive functions, which justifies exploring the factorial structure of the instrument through exploratory and confirmatory analyses on larger samples. Such analyses could reveal potential subscales corresponding to specific components (e.g., behavioral organization, self-regulation, working memory).

The non-symmetrical distributions observed for some items should be interpreted within the context of the investigated sample. In pilot studies with non-clinical populations, responses often cluster at the lower end of the scale when assessing low-prevalence problem behaviors. Relatively low means for certain items may reflect that participants come from a typical school population without pronounced executive difficulties. At the same time, self-report evaluation in adolescence is influenced by factors such as metacognitive development, self-monitoring capacity, and social desirability (Toplak et al., 2013). Thus, responses may reflect not only the frequency of behaviors but also how students perceive and interpret their own difficulties.

Literature also highlights frequent discrepancies between self-report measures and objective performance on standardized neurocognitive tasks (Barkley & Fischer, 2011). This difference does not necessarily indicate invalidity of self-report; rather, it captures the functional and contextual dimension of behavior in daily life, which differs from performance under controlled laboratory conditions. Therefore, the results support the utility of the instrument as an ecological measure of perceived cognitive functioning, while emphasizing the need to integrate it into a multimodal approach in future research.

The detailed item performance analysis identified three items with suboptimal psychometric functioning, characterized by low item–total correlations and low variance. According to methodological recommendations for scale development (Clark & Watson, 1995), items that are too general, ambiguous, or insufficiently contextualized can reduce the discriminative capacity of the instrument. Some items showed a potential floor effect, suggesting either low prevalence of the behavior in a non-clinical population or the influence of social desirability. In other cases, insufficient differentiation in wording may limit response variability. Reformulating items with more precise behavioral anchoring and semantic clarity aligns with international test development standards (American Educational Research Association, 2014).

Importantly, removing problematic items does not significantly increase overall internal consistency, supporting the structural stability of the scale. This indicates that necessary adjustments are primarily semantic

and optimizing, rather than structural. In other words, the instrument does not require conceptual restructuring, only refinement at the level of item wording.

From an applied perspective, literature emphasizes the role of executive functions in academic performance and school adaptation (Best et al., 2011). Difficulties in organization, planning, and maintaining attention are associated with lower academic outcomes and an increased risk of persistent school difficulties. In this context, the proposed instrument shows potential as a preliminary screening tool in educational settings, facilitating the identification of students who may benefit from personalized interventions or psychoeducational counseling.

However, the study has certain limitations. The small sample size limits statistical power and generalizability. The absence of robust factorial analyses prevents structural validation of the instrument, and the exclusive use of self-report may introduce biases related to social desirability or introspective ability. Moreover, the lack of analysis regarding variables such as gender, educational profile, or academic performance restricts nuanced interpretation of the data.

Future research directions should include sample expansion, factorial validation, convergent and divergent validity assessment through correlations with established instruments and objective academic performance indicators, as well as temporal stability evaluation via test–retest procedures.

Overall, the results support the preliminary adequacy of the questionnaire and its relevance for assessing self-reported cognitive functioning in high school students. With minor adjustments to specific items and further validation on larger samples, the instrument has the potential to become a useful tool for both research and educational practice, contributing to the development of systematic approaches for early identification and support of cognitive difficulties in school settings.

Conclusion

The pilot testing of the self-report cognitive functioning questionnaire was conducted on a sample of 49 high school students, aged 15–18 years, from grades 9–12, with the aim of evaluating the clarity, relevance, and internal consistency of the items, as well as the feasibility of the instrument before its administration in the main study. This preliminary stage is essential in psychometric instrument development, contributing to the optimization of item structure and the strengthening of internal validity.

Reliability analysis revealed a Cronbach's $\alpha = 0.91$, indicating excellent internal consistency and good item homogeneity. Most items showed balanced response distributions and significant contributions to the total score, suggesting that the instrument coherently measures the construct of self-reported cognitive functioning. These results provide strong preliminary evidence regarding the internal adequacy of the scale for use in educational contexts.

Three items showed suboptimal psychometric performance (low variance and low item–total correlations), highlighting the need for reformulation to enhance semantic clarity and the discriminative capacity between respondents. Importantly, removing these items would not significantly improve overall consistency, supporting the structural stability of the instrument and indicating that only fine-tuning adjustments—rather than conceptual restructuring—are required.

The asymmetrical distributions identified through the Shapiro–Wilk test are common in pilot studies with small samples and non-clinical populations. This suggests caution in selecting subsequent statistical analyses and, where appropriate, the use of non-parametric tests in the main study.

From an educational perspective, the pilot study results have practical implications. Cognitive functioning—including organization, task management, attention maintenance, and self-regulation—is an important predictor of academic performance and school adaptation. The proposed instrument can serve as an effective educational screening tool, facilitating the early identification of students who may face difficulties in these areas.

Its use in schools can support:

1.Identification of students' perceived cognitive profiles, providing teachers and school counselors with relevant information to adapt teaching strategies.

2.Planning of personalized educational interventions, aimed at developing skills in organization, planning, and self-regulation.

3.Enhancement of students' metacognitive awareness, through reflection on their own cognitive difficulties and strengths.

4.Evidence-based pedagogical decision-making, contributing to a data-informed educational practice.

Although the results are promising, they must be interpreted in light of the study's limitations, particularly the small sample size and the exclusive use of self-report measures. Future validation steps should include larger

and more diverse samples, exploratory and confirmatory factorial analyses, assessment of convergent validity, and evaluation of temporal stability through test–retest procedures.

Overall, the study provides strong preliminary evidence for the internal adequacy of the questionnaire and supports its potential use in educational settings. With minor item refinements and further validation, the instrument can become a valuable tool for assessing self-reported cognitive functioning and supporting early educational interventions in high.

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APPENDIX 1

Self-Report Cognitive Functioning Questionnaire for High School Students (Pre-Pilot Version)

Complete each statement by selecting a response that reflects how often you experience the situations described. You can respond using the following scale: 1 – Never | 2 – Rarely | 3 – Sometimes | 4 – Often | 5 – Very Often

1. I forget where I put my things (e.g., textbooks, notebooks, phone).
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
2. I get easily distracted when I need to focus on a task.
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
3. I have difficulty concentrating when reading for school or doing homework.
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
4. I make mistakes when writing homework or working on projects.
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
5. I forget the names of classmates or friends after recently meeting them.
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
6. I have difficulty remembering phone numbers or passwords.
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
7. Sometimes I lose track of what I was doing, for example when I stop an activity and return to it later.
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
8. I find myself daydreaming during lessons or conversations with others.
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
9. Sometimes I forget to do things I had planned for that day.
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
10. I lose important things, such as keys, my phone, or my notebook.
    ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
11. I feel confused when I am in an unfamiliar place or a new situation.
    ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
12. I have difficulty following a teacher's instructions or completing a more complex exercise.
    ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
13. I forget what I wanted to say when speaking to someone or in class.
    ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
14. I feel confused or stressed when I need to solve a problem quickly, especially under a deadline.
    ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
15. I have difficulty making decisions, for example regarding time management or task organization.
    ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
16. Sometimes I forget to attend an important event, such as a meeting or extracurricular activity.
    ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
17. Sometimes I forget whether I have completed something I planned (e.g., homework, reading a chapter).
    ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

18. I have difficulty concentrating in noisy environments.
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

19. I make simple mistakes when doing routine tasks (e.g., writing, exercises).
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

20. I forget to take important items with me (e.g., school materials).
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

21. I have difficulty remembering words or ideas during discussions or when responding.
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

22. I feel confused or have difficulty understanding simple tasks when I am tired or stressed.
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

23. Sometimes I forget to bring essential school items with me (e.g., books, notebooks).
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

24. I have difficulty remembering people I have met in group activities or at events.
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

25. I lose track of time when I am focused on an activity.
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

APPENDIX 2
Self-Reported Cognitive Functioning Questionnaire – High School Students (Post-Pilot Version)

Please complete each statement by indicating how often you experience the situations described. Use the following response scale: 1 – Never | 2 – Rarely | 3 – Sometimes | 4 – Often | 5 – Very often

1. I forget where I put my things (e.g., textbooks, notebooks, phone).
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
2. I get easily distracted when I need to focus on an activity.
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
3. I have difficulty concentrating when reading for school or doing homework.
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
4. When doing homework or school projects, I frequently have trouble organizing my ideas or writing responses.
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
5. I forget the names of classmates or friends shortly after meeting them.
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
6. I have difficulty remembering phone numbers or passwords.
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
7. I sometimes lose track of what I was doing, for example, when I stop an activity and return to it later.
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
8. I find myself daydreaming during classes or discussions with others.
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
9. I sometimes forget to do things I planned for that day.
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
10. I lose important items, such as keys, phone, or notebook.
    ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
11. I feel confused when I am in an unfamiliar place or situation.
    ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
12. I have difficulty following a teacher's instructions or solving a complex exercise.
    ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
13. I forget what I wanted to say when speaking to someone or in class.
    ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
14. I feel confused or stressed when I need to solve a problem quickly, especially under a time limit.
    ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
15. I have difficulty making decisions, for example regarding time management or task organization.
    ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
16. I regularly and responsibly participate in school events or extracurricular activities, such as meetings with teachers, clubs, or projects.
    ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
17. I sometimes forget whether I have completed something I planned (e.g., homework, reading a chapter).
    ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
18. I have difficulty concentrating in noisy environments.
    ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

19. I make simple mistakes when doing routine tasks (e.g., writing, exercises).
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

20. I forget to take important items with me (e.g., school materials).
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

21. I have difficulty remembering words or ideas during discussions or when responding.
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

22. I feel confused or have difficulty understanding simple tasks when I am tired or stressed.
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

23. I make sure I always have all necessary school materials with me, such as books and notebooks.
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

24. I have difficulty remembering people I have met in group activities or events.
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

25. I lose track of time when I am focused on an activity.
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

APPENDIX 3
Scoring Procedure for the Pilot Questionnaire

To analyze students' responses to the self-reported cognitive functioning questionnaire, a standardized scoring procedure was applied. This procedure allows for the evaluation of each item and the calculation of a total score. It involves assigning numerical values to each response option on the Likert scale (from 1 to 5), facilitating the quantification and comparison of results across participants.

The scores were subsequently checked for internal consistency using Cronbach's alpha, and problematic items were identified based on low variances and weak correlations with the total score. The procedure was designed to allow both quantitative and qualitative analysis, enabling interpretation of the meaning of responses in the context of students' cognitive functioning (Gliem & Gliem, 2003).

This scoring methodology provides a systematic and replicable framework necessary for administering the instrument to the main sample and obtaining valid and reliable results.

Score Ranges and Categories

For interpreting the self-reported questionnaire, which measures aspects of cognitive functioning related to attention, working memory, and concentration, several key points should be considered (Folstein et al., 1975; Nasreddine et al., 2005):

Table 9. Score Ranges

Score/Range	Interpretation
95–125	Normal cognitive functioning
70–94	Mild cognitive deficits
<70	Moderate/severe cognitive deficits

Score Categories:

Interpretation of the total score can be based on the established scoring ranges, which reflect the frequency with which the student perceives encountering cognitive difficulties. Below are suggestions for interpreting the total score (American Educational Research Association, 2014):

1.Normal Cognitive Functioning (95–125 points):

The student does not experience significant difficulties in working memory, attention, or concentration. Responses suggest the student can complete academic and personal tasks without excessive distraction or forgetfulness. This is considered a normal score for a student able to meet everyday cognitive demands, though occasional moments of being "distracted" or "forgetful" are normal in daily life (Baddeley, 2007).

2.Mild Cognitive Deficits (70–94 points):

The student may experience minor difficulties managing tasks that require attention or concentration. They may be more easily distracted, forget details, or have trouble organizing information (e.g., during studies or homework) (Gathercole & Alloway, 2008). Monitoring the student's progress is recommended. Mild cognitive deficits may sometimes be related to school stress, lack of sleep, lifestyle factors, or other external influences. They may also indicate that certain organizational skills are not yet fully developed (Anderson, 2005).

3.Moderate or Severe Cognitive Deficits (<70 points):

The student may show significant difficulties in attention, working memory, or concentration. For example, they may frequently forget important tasks, feel confused when following simple instructions, or struggle with tasks requiring focused attention (Posner & Rothbart, 2007).

It is important that the student's situation be evaluated by a specialist (psychologist, school counselor, or physician). Such cognitive deficits may indicate conditions requiring intervention, such as learning disorders, attention disorders (e.g., ADHD), or severe stress and anxiety (Nasreddine et al., 2005). A student scoring below 70 points may benefit from additional learning strategies, such as individualized support, structured learning sessions, or stress management techniques.