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VALIDATION OF THE CTHQ IN THE SERBIAN CULTURAL CONTEXT

Summary: Although critical thinking is widely recognized as a central goal of contemporary education, questions remain regarding how it is conceptualized and measured. Existing literature highlights divergent perspectives, with some researchers emphasizing personality traits, while others focus on dispositions or cognitive abilities. Bloom's taxonomy, introduced in the 1950s, has provided educators with a widely adopted framework for evaluating learning outcomes, designing assessments, and guiding instruction. However, despite its widespread use, the taxonomy has not been empirically tested as a direct basis for measuring critical thinking. In response to this gap, Kobylarek et al. (2022) developed the Critical Thinking Questionnaire (CTHQ), designed to assess critical thinking through the six cognitive levels of Bloom's taxonomy. This study addresses that gap by evaluating the validity and reliability of the Serbian version of the CTHQ. A total of 200 participants were recruited. Our exploratory factor analysis revealed a four-factor solution including Information Synthesis, Inference, Argument Evaluation, and Disposition for Critical Thinking. This suggests that the factor structure may be sensitive to cultural and educational context. Despite this divergence, the extracted factors demonstrated strong internal consistency and conceptual clarity, supporting the instrument's utility for assessing critical thinking in the Serbian cultural context.

Keywords: CTHQ, Critical Thinking, Bloom's taxonomy

Introduction

In 2015, the UN adopted 17 goals for sustainable development (SDG) which were defined in order to point towards a different, sustainable future on Earth (UNESCO, 2017). They cover topics such as poverty, world hunger, equitable education, healthcare, renewable energy, industry and climate change. The total of 193 member states accepted to address these topics and take part in reaching, at least partially, these goals by 2030. One of the key competencies for achieving all SDG's is critical thinking. This competency transcends age and is applicable to all contexts and situations alongside problem-solving, self-awareness, collaboration, strategy, etc. The UN defined it as "the ability to question norms, practices and opinions; to reflect on own one's values, perceptions and actions; and to take a position in the sustainability discourse" (UNESCO, 2017, p. 10). However, not all authors agree on the way in which we describe this complex term.

There have been different approaches to defining it from various fields. Lai (2011) describes three of them: the philosophical, psychological and educational way of understanding critical thinking. When talking about critical thinking, philosophers tend to describe an ideal person's characteristics (Bailin & Siegel, 2003; Lai, 2011). This approach denies that critical thought can be merely an isolated skill, on the contrary, it is a human trait. A critical thinker is a person who lives a life led by skepticism,

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good judgement, self-reflection and open-mindedness. The psychological viewpoint focuses on behavior or thought processes, so, they answer the question of what actions do humans go through when engaging in critical thinking. That is why certain cognitive processes are usually at the core of critical thinking definitions by psychologists (Lai, 2011; Sternberg, 1986). The last, educational approach uses praxis to explain critical thinking. As it is something to be achieved and thought in the classroom, it is often defined as a skill. The educational frameworks for critical thinking have not yet been tested as much as philosophical and psychological theories (Lai, 2011). The common ground between these approaches is that critical thinking involves: 1) abilities such as analyzing arguments, making inferences using inductive or deductive reasoning, evaluating information and problem solving; 2) dispositions including open-mindedness, flexibility in thinking and the desire to be well-informed; 3) background knowledge (Lai, 2011).

The answer to why critical thinking became part of most school curricula and recently the sustainable development goals, we find in the philosophy of John Dewey. In the early 20th century, he emphasized the necessity of developing the capacity for critical reflection and reasoning as a key to equal participation in democratic processes. Dewey's theory, especially in his book from 1916, *Democracy and Education* addresses the issue of democracy and the role of education in fostering active citizenship. The ability to think critically is not the ultimate goal of education, but rather a necessary precondition for genuine democracy. In other words, for the average citizen to be able to participate in political life, they must be capable of understanding and reflecting on all the information that reaches them (Dewey, 1930). There are other reasons to foster critical thinking in the school system. Bailin and Siegel (2003) indicate that by doing so, we show respect to our students because we treat them as "independent centers of consciousness" (2003, p. 189). Secondly, we prepare them for adulthood because through critical thought they gain independence and initiative, and lastly, we facilitate the means by which they can master core academic subjects (Bailin & Siegel, 2003).

While there have been authors from Bosnian-Croatian-Serbian (BCS) speaking countries that have constructed questionnaires about teaching for critical thinking (Buchberger, 2022; Staničić, 2020; Sušanj, 2017), few have dealt with the topic of self-evaluation (Galić, 2021) and none related to Bloom's theory were found upon writing this paper. Having a clear instrument on critical thinking could enable clearer evaluation of the teaching process. Not only could it benefit teachers to track students' educational progress, but also serve students as a self-reflective and feedback giving tool. Furthermore, it could help collect data in studies evaluating the effectiveness of programs or interventions aimed at fostering critical thinking. A validation of this instrument could inform not only university-level interventions but also broader educational policy in Serbia and comparable contexts.

Overview of The Critical Thinking Questionnaire (CThQ)

The Critical Thinking Questionnaire (CThQ) was developed in Poland, by a group of authors led by Kobylarek (Kobylarek, Błaszczczyński, Ślósarz, & Madej, 2022). The aim of the questionnaire is to measure critical thinking skills in adolescents and adults. The basis of the questionnaire is Bloom's Taxonomy, a well-known theory about educational objectives stemming from 1956 (Bloom et al., 1956). The taxonomy, formed in the shape of a pyramid with common nouns describing learning goals, was made in order to help teachers engage students in higher modes of thinking. Because creation and evaluation become one of the highest ranking study purposes, an enormous shift in educational perspective can be acknowledged. This taxonomy shifted the focus from teachers to students (Munzenmaier & Rubin, 2013). The original taxonomy identified three domains: cognitive, affective and psychomotor (Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956). Each of the domains consist of 6 categories or classes, ranging from simpler to more complex behaviors and levels of awareness. Over the years, the cognitive domain has gained the most attention, as it emphasizes

intellectual outcomes which have been in the center of most curricula. The categories in this domain are as follows:

1. Knowledge – retrieving information, e.g. key terms and concepts;
2. Comprehension – information processing, explaining and paraphrasing;
3. Application – problem solving, interpreting information and applying learned skills;
4. Analysis – recognizing relationships between parts of information, comparing and contrasting;
5. Synthesis – creating new products or information by combining previously learned material;
6. Evaluation – judging and evaluating different situations, concepts and information, forming an opinion (Bloom et al., 1956; Munzenmaier & Rubin, 2013; Taimur & Sattar, 2019).

Until the creation of Bloom's taxonomy, it was believed that most practitioners focused mostly on the first class, the retrieving of information and memorising facts (Munzenmaier & Rubin, 2013). This taxonomy influenced professionals to think about higher-order thinking and developing critical thinking questions in the classroom. Even though it is still widely utilized among professionals, criticisms influenced a revision of the taxonomy in 2001 (Krathwohl, 2002). The new version kept the 6 categories with slight changes in word formation: nouns were reiterated to verbs in order to show the active nature of the learning process. As well as this, another dimension was added, which characterizes the depth and width of each category. Four different types of knowledge are recognized: factual, conceptual, procedural and metacognitive knowledge. The revised version consists of the following categories: 1. Remember, 2. Understand, 3. Apply, 4. Analyze, 5. Evaluate, 6. Create (Krathwohl, 2002). By intersecting cognitive processes with the knowledge dimension, a table is formed, in which any educational objective could be classified.

Congruent with the revised categories, the CThQ presents 6 subscales across 25 items:

1. Remembering (e.g. „After reading it, I am able to repeat important threads from the text“)
2. Understanding (e.g. „I can understand texts from various fields“)
3. Applying (e.g. „I try to use the information I have learned in everyday life“)
4. Analyzing (e.g. „I can extract the most relevant parts of a text“)
5. Evaluating (e.g. „When I am interested in some information, I try to check if it is true“)
6. Creating (e.g. „I like combining information from different texts“) (Kobylarek et al., 2022).

The questionnaire uses a 5-point Likert scale and later on groups the answers across low (25-58), medium (59-92) and high levels (93-125) of critical thinking skills. With a Cronbach's α of 0.87, the instrument shows high reliability. CThQ also shows positive correlations between the individual scales and with the overall score, proving homogeneity of scales (Kobylarek et al., 2022).

Study Goals

The primary aim of this study was to assess the validity and reliability of the Serbian version of the Critical Thinking Questionnaire (CThQ), originally developed by Kobylarek et al. (2022). This involved evaluating the instrument's internal consistency, exploring its factor structure, and determining its overall psychometric adequacy for use in the Serbian higher education context. Specifically, the study aimed to examine the internal consistency of the Serbian-translated CThQ using Cronbach's Alpha. As well as this, this research set out to examine the underlying factor structure through exploratory factor analysis and compare it with the original six-factor model proposed by Kobylarek et al. (2022), as well as to assess the relationships between the factors. Finally, the study sought to identify items that may require revision or removal, based on factor loadings, uniqueness values, and overall fit with the extracted factors.

Methodology

Questionnaire

Since this study is a validation of an already existing questionnaire, the only instruments used were the Critical Thinking Questionnaire (CThQ) developed by Kobylarek et al (2022). The questionnaire consists of 25 items, each rated on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The tool has demonstrated high reliability in previous studies, with a Cronbach's Alpha coefficient of 0.877, making it a suitable instrument for this validation study.

For the purposes of this study, the CThQ was translated into Serbian using a forward-backward translation method. The translation was conducted by the authors of this study, who have excellent knowledge of both English and Serbian, see Appendix for the translated questionnaire. The forward translation involved translating the original English version of the CThQ into Serbian. This was followed by a backward translation, where the Serbian version was translated back into English by the same authors to ensure consistency and accuracy. Any discrepancies were resolved through discussion, ensuring that the final Serbian version retained the original meaning of the items.

Participants & Procedure

A total of 200 participants were recruited for this study, with the majority being female (163 women, 37 men). The sample consisted of students at various levels of higher education, with most participants enrolled in bachelor's programs ($N = 173$), while the remainder were either in master's ($N = 14$) or doctoral studies ($N = 13$). The majority of participants were in their second year of bachelor's studies (see Table 1 for detailed demographics). Due to the relatively small number of participants in master's and doctoral programs, these groups were combined for analysis. Additionally, most participants reported having scholarships (160 with scholarships, 40 without), and the average grade across participants was 9.29, indicating a generally high academic performance. Any incomplete responses were excluded from analysis to ensure data quality.

The data were collected using an online questionnaire administered via Google Forms in May 2024. Participants were recruited via convenience sampling using social media channels. Participants were first presented with an informed consent form, where they were asked to confirm their willingness to participate in the study before proceeding, they were also assured of the anonymity, confidentiality of their responses. The questionnaire included demographic questions (e.g., gender, study program, year of study, scholarship status, and average grade) followed by the Serbian-translated version of the CThQ.

Table 1. Demographics

Variable	Level	N	%
Gender	Female	163	81.5
	Male	37	18.5
Study program	Pedagogy	67	33.5
	Psychology	10	5.0
	German studies	12	6.0
	Language, literature and culture	16	8.0
	History	4	2.0
	Sociology	4	2.0
	Social work	9	4.5
	Serbian language	11	5.5
	Romanistics	3	1.5
	English studies	47	23.5
	Journalism	2	1.0
	Russian language	5	2.5
	Communications	5	2.5

Year of study	Rusynistics	1	0.5
	Slovak language	4	2.0
	1 st	18	9.0
	2 nd	80	40.0
	3 rd	48	24.0
Level of studies	4 th	27	13.5
	Master studies	14	7.0
	Doctoral studies	13	6.5
	Bachelor studies	173	86.5
	Master studies	14	7.0
Scholarship	Doctoral studies	13	6.5
	Have scholarships	160	80.0
	Do not have scholarships	40	20.0
Average grade during studies	7.01-8.0	29	14.5
	8.01-9.0	85	42.5
	9.1-10.0	86	43.0
Total		200	100.0

Note: N – number of participants, % - percent.

Data analysis

To examine the psychometric properties of the Serbian version of the Critical Thinking Questionnaire (CThQ), several statistical analyses were conducted using the statistical JASP program JASP. Internal consistency was assessed using Cronbach's Alpha coefficient for the overall scale and for individual items, to evaluate the reliability of the instrument. To explore the underlying factor structure of the questionnaire, an exploratory factor analysis (EFA) was conducted. The extraction method used was principal axis factoring, which is appropriate for non-normally distributed data and latent constructs. Given that the factors were expected to be correlated, Promax rotation (an oblique rotation method) was applied to facilitate interpretability of the factor solution.

Results

To assess the internal consistency reliability of the Serbian version of the Critical Thinking Questionnaire (CThQ), Cronbach's α coefficient was calculated for the overall scale as well as for each individual item. For the entire questionnaire, the Cronbach's α coefficient was $\alpha = 0.853$, with a 95% confidence interval ranging from 0.828 to 0.878 (Table 2). This result demonstrates high internal consistency, confirming the reliability of the instrument when administered to the Serbian population.

Table 2. *Frequentist Scale Reliability Statistics*

Coefficient	Estimate	Std. Error	95% CI	
			Lower	Upper
Coefficient α	0.853	0.013	0.828	0.878

Note: CI - Confidence Interval.

Additionally, the reliability analysis included the evaluation of individual item reliability statistics to determine if any items negatively affected the overall scale's consistency. Table 3 presents the Cronbach's α coefficient for the scale if each item were dropped. The α coefficients remained within a narrow range (from 0.842 to 0.858), showing that no single item significantly reduced the reliability of the scale. Only the removal of variable r_k9 "I am willing to share with others the new information I have learned" lead to a minimal increase, while the rest of the variables resulted in a

decrease in the tests Alpha coefficient. Notably, removing any item would not lead to a meaningful improvement in internal consistency, indicating that all items contribute positively to the questionnaire's reliability.

These findings confirm that the Serbian-translated version of the CThQ maintains a robust internal structure, aligning with the psychometric properties reported in the original study by Kobylarek et al (2022). The high Cronbach's Alpha values suggest that the instrument is a reliable measure of critical thinking skills in the Serbian academic context.

Table 3. *Frequentist Individual Item Reliability Statistics*

Item	Coefficient α (if item dropped)		
	Estimate	Lower 95% CI	Upper 95% CI
k1	0.852	0.826	0.878
k10	0.845	0.819	0.871
k11	0.848	0.822	0.875
k12	0.844	0.818	0.871
k13	0.844	0.817	0.871
k14	0.845	0.818	0.872
k15	0.853	0.828	0.878
k16	0.847	0.820	0.873
k17	0.849	0.823	0.875
k18	0.844	0.818	0.871
k2	0.849	0.823	0.875
k20	0.843	0.817	0.870
k21	0.844	0.817	0.871
k23	0.845	0.819	0.872
k24	0.842	0.815	0.870
k25	0.848	0.821	0.875
k3	0.851	0.827	0.876
k5	0.848	0.821	0.874
k6	0.850	0.825	0.876
k7	0.848	0.821	0.874
k8	0.843	0.816	0.870
r_k19	0.852	0.827	0.877
r_k22	0.850	0.824	0.876
r_k4	0.848	0.822	0.874
r_k9	0.858	0.833	0.882

Note: CI - Confidence Interval.

Prior to conducting the exploratory factor analysis (EFA), the suitability of the data for factor extraction was assessed using the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity. The overall MSA value for KMO was 0.821, indicating good sampling adequacy. Individual measures of sampling adequacy for the 25 items ranged from 0.478 to 0.900, with the majority being over 0.70. The only one item (r_k9) is under the commonly accepted threshold of 0.50 is r_k9, it has an MSA = 0.478. This suggests that this item has limited shared variance with other items.

Bartlett's test of sphericity was significant ($\chi^2(300) = 1392.93, p < .001$), indicating that correlations between items were sufficiently large for factor analysis. With these results we can proceed with the following EFA analysis. An Exploratory Factor Analysis (EFA) was performed using principal axis

factoring with Promax oblique rotation, as the underlying critical thinking constructs were expected to be correlated. Based on the eigenvalues (Table X), the scree plot (Figure X), and the interpretability and theoretical coherence of the resulting factor solution, a four-factor solution was extracted. These four factors collectively accounted for 34.2% of the total variance in the questionnaire items (Table 4).

Factor loadings for the pattern and structure matrices are presented in Table 5 and Table 6, respectively. As an oblique rotation was employed, the pattern matrix was primarily used for interpreting the unique contribution of each item to its respective factor, while the structure matrix provided insights into the bivariate correlations between items and factors. The identified factors, along with their primary loading items (loadings $\geq .40$) from the pattern matrix, were conceptually interpreted as follows:

- Factor 1 – this factor is defined by k14 (0.924), k10 (0.694), k23 (0.602), k24 (0.523), k12 (0.496), k21 (0.452), k25 (0.436), k20 (0.424), and k8 (0.410). These items primarily describe dynamic, reflective, and contextual processing of information, which altogether encompass Information Synthesis (item example: “I pay attention to the contexts, nuances and overtones of the statements”).
- Factor 2 - Items k5 (0.656), k17 (0.608), k7 (0.595), k6 (0.490), and k15 (0.405) loaded highest on this factor. This factor appears to primarily capture core comprehension skills, the ability to grasp essential meaning, and to recall and rephrase information. In this validation the most suitable name for this factor was Inference (item example: “I can extract the most relevant parts of a text”).
- Factor 3 - This factor was characterized by strong loadings from items k18 (0.725), k1 (0.634), k16 (0.541), and k2 (0.463). These items seem to represent a tendency for cautious and analytical approach to information, as well as seeking further validation for arguments. We named it Argument Evaluation (item example: “To evaluate the information, I check many sources”).
- Factor 4 - Items r_k4 (0.512), r_k22 (0.448), r_k9 (0.444), and r_k19 (0.431) significantly loaded on this factor. This factor seems to reflect barriers of critical thinking, such as self-perceived cognitive deficits, pessimism, and low epistemic motivation. Based on the factor’s characteristics, the most suitable name was Disposition for Critical Thinking (item example: “In-depth analyses of reality are a waste of life”).

Notably, the factor structure derived from the Serbian population's responses (a four-factor model) differs from the six-factor model (Analysing, Evaluating, Creating, Remembering, Understanding, Applying) reported by the original author (Kobylarek et al., 2022). This divergence suggests potential cultural or linguistic influences on how critical thinking is conceptualized and expressed within the Serbian academic context, or variations in the questionnaire's performance in a new cultural setting.

Table 4. Factor loadings promax

	Factor 1	Factor 2	Factor 3	Factor 4
k14	0.924			
k10	0.694			
k23	0.602			
k24	0.523			
k12	0.496			
k21	0.452			
k25	0.436			
k20	0.424			
k8	0.41			

k5	0.656	
k17	0.608	
k7	0.595	
k6	0.49	
k15	0.405	
k18		0.725
k1		0.634
k16		0.541
k2		0.463
r_k4		0.512
r_k22		0.448
r_k9		0.444
r_k19		0.431
k3		
k11		
k13		

To assess the internal consistency of each extracted factor, Cronbach's α was calculated for the item sets identified through exploratory factor analysis (Table 5). The results showed that Factor 1 demonstrated very good internal consistency ($\alpha = 0.819$). The remaining three factors, Factor 2 ($\alpha = 0.674$), Factor 3 ($\alpha = 0.685$), and Factor 4 ($\alpha = 0.662$), showed moderate but acceptable levels of internal consistency, suitable for exploratory research. The relatively consistent reliability values across these factors support the stability of the four-dimensional structure identified in the analysis.

Table 5. *Frequentist Scale Reliability Statistics - Coefficient α*

Variables	Estimate	Std. Error	95% CI	
			Lower	Upper
Factor 1	0.819	0.019	0.781	0.857
Factor 2	0.674	0.04	0.595	0.752
Factor 3	0.685	0.037	0.612	0.758
Factor 4	0.662	0.059	0.544	0.776

Note: CI - Confidence Interval.

Discussion

The main aim of this study was to evaluate the validity and reliability of the Serbian version of the Critical Thinking Questionnaire (CThQ), originally developed by Kobylarek et al. (2022). Using reliability testing and exploratory factor analysis, this initial validation study examined whether the translated version is a psychometrically sound instrument suitable for the Serbian academic context.

The internal consistency of the scale was found to be high, suggesting that the Serbian-translated version of the CThQ reliably measures critical thinking as a general construct. However, the factor structure that emerged from the data did not replicate the original six-factor model proposed by the authors. Instead, a four-factor solution was identified, which differed both in the number of dimensions and in the underlying conceptual grouping of items. Although the extracted factors did not align fully with the original framework based on Bloom's taxonomy, each factor displayed internal coherence and theoretical relevance. Thematic and content analysis of the items allowed for the assignment of meaningful labels to each factor based on shared conceptual features. These

four factors reflect distinct dimensions of critical thinking within the Serbian context: Factor 1 - Information Synthesis, Factor 2 – Inference, Factor 3 - Argument Evaluation, Factor 4 - Disposition for Critical Thinking.

The first factor, Information Synthesis, partially concurs with one of the original subscale Analyzing (Kobylarek et al., 2022). The original includes items k4, k12, k17, k24 while our validation consists of k8, k10, k12, k14, k20, k21, k23, k24, k25. In spite of that, our research found that this subscale thematically does cover some parts of the analyzing level of cognitive reasoning proposed by Bloom's taxonomy. According to this theory, analysis represents the ability to examine ideas or information by dividing them into smaller parts, often by comparing and contrasting elements, identifying differences, selecting key details, and separating components to see how they relate to one another (Munzenmaier & Rubin, 2013). These item differences likely reflect the interconnected nature of higher-order cognitive skills. Although Bloom's taxonomy traditionally presents skills like analysis, synthesis, and evaluation as distinct and hierarchical, research suggests that these processes are often mutually dependent rather than strictly sequential (Ennis, 1993). In practice, engaging in analysis may involve elements of synthesis, and vice versa. Therefore, it is reasonable that the composition of this subscale may differ across instruments, as items reflecting these overlapping cognitive processes may shift depending on the theoretical interpretation or context of use. There are multiple instruments of critical thinking that also include this concept and variations of it: California Critical Thinking Skills Test (Facione, 1990); Watson–Glaser Critical Thinking Appraisal tool (Watson & Glaser, 2008, as cited in Liu, Frankel, & Roohr, 2014) and Cornell Critical Thinking Test The Critical Thinking Co., 2014, as cited in Liu et al., 2014).

The items included in the second factor, labeled Inference, were: k5, k17, k7, k6, k15. While some of these were originally grouped under the Remembering dimension, a closer look at item phrasing, particularly in the Serbian translation, suggests a stronger alignment with inference. For example, the item "After reading it, I am able to repeat important threads from the text" emphasizes understanding and identifying *important threads*, rather than merely recalling information. Inference is widely regarded as a core component of critical thinking, Hitchcock (2024, p. 75) referred to it as "the ability to draw conclusions from given information, and to recognize with what degree of certainty one's own or others' conclusions follow". Instruments that also include a form of this subscale are: The California critical thinking skills test (Facione, 1990); Cornell critical thinking test (The Critical Thinking Co., 2014, as cited in Liu et al., 2014); ETS Proficiency profile critical thinking (ETS, 2010, as cited in Liu et al., 2014); Watson-Glaser critical thinking appraisal tool (Watson & Glaser, 2008, as cited in Liu et al., 2014).

The original instrument's subscale Evaluating consists of items k1, k11, k16, k18 which partially overlaps with our validation's items of our factor Argument Evaluation (k1, k2, k16, k18). Evaluating, in the context of critical thinking, means making informed judgments about the quality, value, or effectiveness of something (Munzenmaier & Rubin, 2013). It involves assessing, giving reasons for your opinion, offering critique, and deciding whether something is valid or worthwhile. This includes activities like justifying a decision, supporting a claim with evidence, or judging how well something meets certain standards. The item k11 did not load on any factor in our analysis. This is likely because its content, in the Serbian translation, does not conceptually align with any specific subscale. Unlike other items, k11 may tap into a broader or differently framed aspect of critical thinking. Despite this, its strong correlation and Cronbach alfa with the overall scale suggests it still reflects the general construct and supports the scale's internal consistency. Additional instruments that mention this concept are: The California critical thinking skills test (Facione, 1990); Collegiate assessment of academic proficiency critical thinking (CAAP Program Management, 2012, as cited in Liu et al., 2014); Collegiate learning assessment+ (Zahner, 2013, as cited in Liu et al., 2014); Cornell critical thinking test (The Critical Thinking Co., 2014, as cited in Liu et al., 2014); Watson-Glaser critical thinking appraisal tool (Watson & Glaser, 2008, as cited in Liu et al., 2014).

The subscale Disposition for Critical Thinking reflects a dimension of disengagement from critical thinking processes, consisting of items k4, k22, k9, and k19. Unlike the previous subscales, which focus on specific cognitive skills, this factor captures a broader attitude characterized by intellectual passivity, skepticism toward analytical effort, and a sense of futility regarding learning and creativity. Moon (2008) explains multiple activities and dispositions for critical thinking, one of them being the “habit of engagement with the world” (2008, p. 33). This means that a person is not passive, but actively immersed in the world around them, reminisces and asks questions about what they see and experience. Facione (1990) names them “affective dispositions of critical thinking”, which can be divided into general and specific approaches to life. The former consists of: intellectual curiosity, the willingness to stay informed, active seeking of chances to critically think. The latter includes clearly defining issues, being thorough and precise, staying focused on the issue, etc. (Facione, 1990). An instrument that includes this concept is The California critical thinking disposition inventory by Facione, Facione, & Sanchez (1994, as cited in (Liu et al., 2014)). It comprises of 75 items divided across seven subscales, including truth-seeking and open-mindedness. Our validation found a reversed factor in comparison to previous positive definitions of critical thinking dispositions. The emergence of this subscale in our validation may suggest that resistance to engaging in critical thought may be a meaningful and measurable construct, particularly in educational and developmental contexts.

Two items from the original instrument: k3 (“I am willing to share the newly gained information”) and k13 (“I can see the structure of the text, and I could change it”), did not load onto any of the four extracted factors, despite both items demonstrating good internal consistency. In the original scale, these items were associated with the domains of Applying and Creating, respectively. However, as we previously mentioned, these dimensions do not align with the factor structure in our study. It is possible that these items represent more behavioral or productive aspects of critical thinking, such as communication or generative skills, which were not central to the constructs measured by our factors. Their exclusion may also reflect contextual or cultural differences in how such skills are expressed or valued.

Conclusion

This study contributes to the use of the Critical Thinking Questionnaire (CThQ) in Bosnian-Croatian-Serbian (BCS) speaking contexts by providing the first validation of the instrument in this linguistic and cultural setting. While the original version of the CThQ proposed a six-factor model, our analysis yielded a four-factor solution—Information Synthesis, Inference, Argument Evaluation, and Disposition for Critical Thinking—indicating that the factor structure may be context-sensitive. These findings suggest that the conceptualization of self-reported critical thinking may differ across cultural and educational environments. Despite the divergence from the original structure, the identified factors demonstrate good internal consistency and conceptual clarity, supporting the instrument’s relevance for assessing key dimensions of critical thinking among Serbian speaking participants. This study thus offers a foundation for further cross-cultural validation and use of the CThQ in educational research and practice.

Several limitations of this study should be acknowledged. First, the research was conducted using a convenience sample, which limits the generalizability of the findings. The sample consisted predominantly of women, reflecting the demographic structure of the Faculty of Philosophy³, where the study was conducted. This gender imbalance may influence the results and restrict the applicability of the findings to more diverse populations. Additionally, although the Critical Thinking Questionnaire (CThQ) was originally developed for adults in general, our validation was carried out on a university student population, which may not fully represent the broader adult demographic

³ The percentage of enrolled women in this Faculty in the academic year 2023/24 was 81% (Statistički zavod Srbije, 2024)

for which the instrument was intended. Furthermore, the study was limited to a single faculty, potentially constraining the variability of experiences and perspectives on critical thinking. Future research should aim to replicate the findings with more diverse, balanced, and representative samples across various disciplines and educational levels.

As well as this, future studies could conduct cross-cultural comparisons of the questionnaire, exploring if the observed four-factor structure reflects broader cultural or educational differences in the understanding or expression of critical thinking.

To assess the stability of self-reported critical thinking over time, longitudinal research could track changes in CThQ scores in relation to educational interventions or different stages of academic development. Future work could also examine how CThQ scores relate to external measures, such as performance-based assessments of critical thinking or academic achievement, to establish concurrent or predictive validity. Finally, the Serbian CThQ could potentially be used as a pre-post measure to evaluate the effectiveness of educational programs or pedagogical strategies aimed at improving critical thinking.

Data availability

Data will be made available on request.

Disclosure statements

No potential conflict of interest was reported by the authors.

An AI-based tool was used during the preparation of this paper for stylistic editing and language enhancement of the English text, without affecting the content or scientific conclusions.

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Appendix

Table 6. Kaiser-Meyer-Olkin Test

	MSA
Overall MSA	0.821
k1	0.699
k2	0.764
k3	0.793
k5	0.86
k6	0.782
k7	0.799
k8	0.883
k10	0.835
k11	0.784
k12	0.854
k13	0.824
k14	0.829
k15	0.82
k16	0.808
k17	0.809
k18	0.834
k20	0.882
k21	0.854
k23	0.866

k24	0.9
k25	0.887
r_k4	0.786
r_k9	0.478
r_k19	0.705
r_k22	0.718

Note: MSA - Measure of Sampling Adequacy.

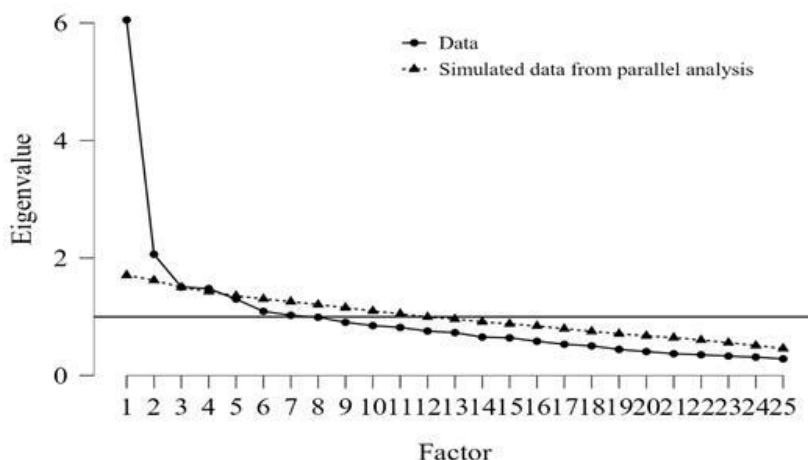
Table 7. Bartlett's test

χ^2	Df	p
1392.929	300	< .001

Note: χ^2 - chi-square, df – Degrees of freedom, p – Statistical significance.

Table 8. Factor Loadings Structure matrix

	Factor 1	Factor 2	Factor 3	Factor 4
k1			0.552	
k2			0.519	
k3				
k5		0.662		
k6		0.531		
k7		0.634		
k8	0.608		0.506	
k10	0.617			
k11				
k12	0.556		0.411	
k13	0.515	0.428		
k14	0.731			
k15				
k16			0.574	
k17		0.586		
k18	0.458		0.738	
k20	0.557		0.435	
k21	0.573			0.483
k23	0.602			
k24	0.609		0.459	
k25	0.462			
r_k4				0.57
r_k9				
r_k19				0.456
r_k22				0.503

Graphic 1. Scree plot**Questionnaire in Serbian**

Ispred vas je lista od 25 izjava. Molimo vas da ocenite na skali od 1 do 5 u kojoj meri se slažete sa datom tvrdnjom (od 1 – uopšte se ne slažem, do 5 – potpuno se slažem). Nema tačnih ili pogrešnih odgovora. Ne trošite previše vremena na pojedinačne izjave i označite odgovor koji vam se prvi čini najbližim onome što mislite o sebi.

1.	Nakon što ih pročitam, proveravam važne informacije iz teksta, čak i ako se čini da su istinite.	1	2	3	4	5
2.	Volim da kombinujem informacije iz različitih tekstova.	1	2	3	4	5
3.	Voljan/na sam da delim s drugima nove informacije koje sam saznao/la.	1	2	3	4	5
4.	Dubinske analize realnosti su tračenje vremena.	1	2	3	4	5
5.	Nakon što pročitam tekst, sposoban/na sam da ponovim ključne tačke iz njega.	1	2	3	4	5
6.	Isti sadržaj može se izraziti na više različitih načina.	1	2	3	4	5
7.	Mogu da razumem tekstove iz različitih oblasti.	1	2	3	4	5
8.	Formiram svoje mišljenje na osnovu kombinovanja više različitih informacija.	1	2	3	4	5
9.	Sve na ovom svetu već postoji, pa ništa potpuno originalno i novo ne može da se kreira.	1	2	3	4	5
10.	Kada pričam, dajem mnoštvo primera.	1	2	3	4	5
11.	U diskusiji mi je jednako stalo do toga da predstavim svoje stanovište ali i da saslušam tuđu stranu.	1	2	3	4	5
12.	Volim da tragam za sličnostima između naizgled različitih fenomena.	1	2	3	4	5
13.	Mogu da uočim strukturu nekog teksta, a mogao/la bih i da je promenim.	1	2	3	4	5
14.	Kada diskutujem, trudim se da koristim praktične primere da bih potkrepio/la svoje stanovište.	1	2	3	4	5
15.	Ako postoji potreba za tim, mogu da se prisetim informacija koje sam pročitao/la samo jednom.	1	2	3	4	5
16.	Kada sam zainteresovan/a za neku informaciju, probam da proverim da li je istinita.	1	2	3	4	5
17.	Mogu izdvojiti najbitnije delove teksta.	1	2	3	4	5
18.	Kako bih /procenio/la verodostojnost informacija, proveravam mnoštvo izvora.	1	2	3	4	5
19.	Ne sećam se mnogo toga što sam učio/la u školi.	1	2	3	4	5
20.	Volim da diskutujem o novim značenjima tekstova koje sam već čitao/la.	1	2	3	4	5
21.	Volim da poredim različita mišljenja.	1	2	3	4	5

22.	Imam poteškoće da parafraziram tuđe reči.	1	2	3	4	5
23.	Trudim se da koristim informacije koje sam naučio/la u toku svakodnevnog života.	1	2	3	4	5
24.	Kada čitam tekst, istražujem odnos između informacija koje on sadrži i informacija iz tekstova koje sam čitao/la ranije.	1	2	3	4	5
25.	Obraćam pažnju na ton izjave i kontekst u kom je izrečena.	1	2	3	4	5

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