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Development and psychometric properties of the Academic Mindfulness Scale for university students

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Abstract

Academic environments require specialized measurement instruments for mindfulness assessment. This study developed and validated the Academic Mindfulness Scale (AMS) to address the gap in context-specific mindfulness measures for university students in Saudi Arabia. Using a quantitative approach with 553 undergraduates (311 males, 242 females, aged 18-26), we developed the AMS through literature review, expert consultation, and pilot testing. Factor analyses revealed a four-factor structure explaining 57.098% of variance: Academic attention in the classroom (33.072%), Academic acceptance without judgment (9.994%), Performing academic tasks with full awareness (7.639%), and Academic presence in the present moment (6.394%). Confirmatory factor analysis supported this structure ($\chi^2 = 689.248$, CFI = .871, RMSEA = .076). The 20-item scale demonstrated excellent reliability ($\alpha = .889$, $\omega = .911$) with satisfactory subscale reliability ($\alpha = .775–.818$) and item-total correlations ranging from .42 to .64 ($p < .01$). The AMS provides a valid, reliable tool for assessing academic mindfulness among university students, offering educators and researchers a targeted instrument to evaluate mindfulness interventions, identify students needing support, and enhance academic engagement. This scale moves beyond adaptations of general mindfulness measures to provide a nuanced understanding of mindfulness specifically in educational contexts.

Keywords: Academic mindfulness, psychometric properties, reliability, validity, scale development among university students.

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1. Introduction

In recent decades, mindfulness has emerged as a significant construct in educational research and practice, offering promising avenues for enhancing student learning experiences, academic performance, and overall well-being [1, 2]. Defined broadly as "paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally" Kabat-Zinn [3], mindfulness has garnered substantial interest within higher education contexts. As institutions increasingly recognize the value of holistic approaches to student development, mindfulness practices have been integrated into various aspects of university life—from dedicated courses and workshops to embedded components within existing curricula [4, 5].

Mindfulness practices have demonstrated significant value in higher education by enhancing student engagement and improving academic performance [6-8]. Research indicates that mindfulness interventions foster self-regulation, problem-solving, and resilience, which directly contribute to academic success [9-11]. Additionally, these practices support students' mental health by reducing stress and anxiety while improving focus and information retention [12, 13]. The transformative nature of mindfulness in education extends beyond academic achievement to reshape students' overall educational experience, Ergas and Hadar [14] highlighting the need for valid assessment tools tailored to university settings.

Despite growing interest, the current research field lacks sufficient assessment tools to measure academic mindfulness among university students [15]. While numerous instruments exist for measuring general mindfulness (e.g., the Five Facet Mindfulness Questionnaire (FFMQ), Baer et al. [16], and the Mindful Attention Awareness Scale (MAAS), Brown and Ryan [17] these tools often lack specificity for academic contexts. Academic settings present unique mindfulness opportunities through students' engagement with complex concepts, collaborative learning, and adaptive responses to evaluations and feedback [2, 18].

The conceptualization of mindfulness in higher education draws from established mindfulness frameworks and educational psychology. Traditional mindfulness models, rooted in Buddhist contemplative practices and later secularized by pioneers such as Kabat-Zinn [19], emphasize present-moment awareness, non-judgment, and intentional attention. These elements have been incorporated into psychological models such as Bishop et al. [20] two-component model (self-regulation of attention and orientation to experience) and Baer et al. [16] five-facet model (observing, describing, acting with awareness, non-judging, and non-reactivity).

Educational psychology further enriches the understanding of mindfulness in academic settings. Self-regulated learning theory [18, 21]. Emphasizes metacognitive awareness and strategic adaptation, aligning closely with mindfulness principles. Similarly, academic engagement frameworks, Fredricks et al. [22] describe cognitive, emotional, and behavioral domains that mindfulness can effectively support. These theories collectively provide a foundation for interpreting academic mindfulness as a distinct educational construct.

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Recent research has explored specific mindfulness applications and benefits for college students. Studies indicate that mindfulness enhances attention and focus Morrison et al. [23] strengthens critical thinking Noone et al. [24] reduces test anxiety Bamber and Schneider [25] and improves stress management [26]. Mindfulness also promotes deeper learning approaches, encouraging active engagement with academic material rather than superficial processing [27, 28]. These findings underscore the importance of mindfulness skills in higher education and the need for accurate assessment tools to identify skill gaps and guide remediation strategies [29].

Existing mindfulness assessments, such as the MAAS Brown and Ryan [17], Kentucky Inventory of Mindfulness Skills (KIMS) Baer et al. [30], and FFMQ Baer et al. [16], demonstrate adequate psychometric properties in general populations but exhibit limitations in academic contexts. They often lack content validity for academic settings, omit domain-specific dimensions (e.g., mindful engagement with coursework), and may include irrelevant items, compromising measurement precision [31].

Recent developments in domain-specific mindfulness measures—such as interpersonal mindfulness Pratscher et al. [32] workplace mindfulness Zheng et al. [33] and embodied mindfulness Khoury et al. [34]—highlight the need for an academic-focused instrument. While two studies have attempted to develop academic mindfulness scales [35, 36]. Their reliance on general mindfulness constructs and limited cultural applicability (e.g., Iranian and Egyptian contexts) leaves gaps in assessment validity.

In Saudi Arabia, existing mindfulness research has focused on general rather than academic mindfulness [37]. Given the scarcity of culturally adapted academic mindfulness scales, this study aims to develop and validate the Academic Mindfulness Scale (AMS), a psychometrically robust instrument tailored to university students. This tool will enhance understanding of mindfulness in higher education, support intervention evaluations, and advance research in academic mindfulness.

2. Method

2.1. Research Design

This study employed a quantitative research methodology to develop and validate the AMS, a psychometrically sound instrument designed specifically to measure mindfulness within academic contexts. The research was conducted during the 2023-2024 academic year at universities in Saudi Arabia. The study aimed to establish the psychometric properties of the scale while examining patterns of academic mindfulness among undergraduate students.

2.2. Participants

The sample consisted of 553 undergraduate students (311 males, 242 females), representing diverse academic backgrounds. Male participants comprised 56.2% of the sample, while female participants represented 43.8%. Participants ranged in age from 18 to 26 years (M = 20.29, SD = 1.78), with male students (M = 21.22, SD = 1.61) being significantly older than female students (M = 19.11, SD = 1.18).

Participants were recruited from various colleges and departments, including the College of Science, College of Education, College of Arts, College of Engineering, College of Business Administration, and the Applied College in Saudi Arabia. This diverse representation allowed for the examination of academic mindfulness patterns across different academic disciplines and learning contexts.

2.3. Instrument Development

The development of the AMS followed a systematic process involving a comprehensive literature review, expert consultation, and pilot testing. Initial item generation drew upon existing mindfulness instruments while focusing specifically on the academic context. The research team reviewed established measures, including the FFMQ Baer et al. [16] MAAS Brown and Ryan [17] and other context-specific mindfulness measures to inform item development.

The initial item pool consisted of 21 items designed to assess various dimensions of academic mindfulness among university students. Unlike previous attempts at measuring academic mindfulness that simply adapted items from general mindfulness scales, our items were specifically developed to address mindfulness related to academic activities, tasks, and interactions within higher education settings.

2.4. Data Collection Procedures

Data collection procedures were standardized to ensure the reliability and validity of responses. The research team administered the scale under controlled conditions, providing clear instructions and ensuring participant confidentiality. Participants responded to items on a 5-point Likert scale ranging from 1 (Never) to 5 (Always), allowing for nuanced measurement of academic mindfulness patterns and attitudes.

A demographic questionnaire accompanying the scale gathered information about participants' age, gender, academic specialization, and other relevant characteristics. These variables were coded systematically to facilitate a comprehensive analysis of potential relationships with academic mindfulness patterns.

2.5. Statistical Analysis

Statistical analyses were conducted using SPSS and AMOS software packages to establish the psychometric properties of the AMS. The analysis process involved multiple sequential steps to ensure comprehensive validation of the instrument. First, descriptive statistics were calculated for all items to examine their distribution properties, including means, standard deviations, skewness, and kurtosis values. Next, the sample was randomly split to perform exploratory factor analysis (EFA) on one subsample using principal axis factoring with oblimin rotation to identify the underlying factor structure, followed by confirmatory factor analysis (CFA) on the second subsample to validate the identified structure. The internal consistency reliability of the overall scale and its subscales was assessed using Cronbach's alpha coefficients, with values above .70 considered acceptable. Convergent and discriminant validity were established through correlations with theoretically related constructs, including general mindfulness measures and academic performance indicators. Additionally, measurement invariance testing was conducted to ensure the scale functioned similarly across gender groups. Finally, bivariate correlations and regression analyses were performed to examine relationships between demographic variables, academic characteristics, and scores on the AMS, with statistical significance set at $p < .05$ for all analyses.

3. Results

The psychometric analysis of the Academic Mindfulness Scale (AMS) yielded robust findings that support its validity and reliability for university students in the Saudi environment. The analysis process included several statistical procedures to establish the scale's psychometric properties, including exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and various reliability assessments.

Initial analysis of sampling adequacy yielded promising results. The Kaiser-Meyer-Olkin (KMO) measure produced a value of 0.884, indicating excellent sampling adequacy for factor analysis. Bartlett's Test of Sphericity was significant ($\chi^2 = 4185.014$, $df = 190$, $p < 0.001$), confirming the correlation matrix's suitability for factor analysis. These preliminary findings supported proceeding with the factor analysis.

The exploratory factor analysis, conducted using principal component analysis with Varimax rotation, revealed a four-factor structure that collectively explained 57.098% of the total variance. The variance explanation was distributed across the factors as follows: Factor 1 (33.072%), Factor 2 (9.994%), Factor 3 (7.639%), and Factor 4 (6.394%). This structure emerged as the most interpretable solution, with items demonstrating clear and meaningful loadings on their respective factors, as shown in Table 1.

Table 1.
Factor Loading Analysis of 27-Item AMS.

Items	Factor1	Factor 2	Factor 3	Factor 4	M	SD	Item total correlation
13.	.718				3.82	.88	0.60**
14.	.692				3.78	.89	0.59**
15.	.686				3.91	.87	0.57**
11.	.653				3.70	.95	0.56**
12.	.545				4.06	.91	0.55**
19.		.816			3.89	.93	0.58**
17.		.742			4.06	.84	0.57**
18.		.715			3.85	.96	0.53**
16.		.683			4.16	.94	0.42**
20.		.632			3.64	1.06	0.50**
7.			.812		4.04	.80	0.58**
8.			.766		4.02	.84	0.57**
9.			.636		3.73	.99	0.58**
6.			.597		3.79	.93	0.64**
10.			.513		3.76	1.07	0.64**
3.				.762	3.51	1.08	0.56**
2.				.745	3.19	1.13	0.49**
4.				.678	3.79	1.01	0.56**
5.				.551	3.75	.94	0.61**
1.				.538	3.45	1.02	0.59**

As presented in Table 1, factor loadings for the final 20-item scale showed strong psychometric properties. The first factor, "Academic attention in the classroom," comprised five items with loadings ranging from .545 to .718. The second factor, "Academic acceptance without judgment," included five items with loadings from .632 to .816. The third factor, "Performing academic tasks with full awareness," contained five items with loadings between .513 and .812. The fourth factor, "Academic presence in the present moment," encompassed five items with loadings from .538 to .762.

The confirmatory factor analysis provided support for the four-factor structure. The model chi-square test was significant ($\chi^2 = 689.248$, df = 164, $p < .001$). The model demonstrated acceptable fit to the data across multiple indices: CFI = .871, TLI = .850, NFI = .838, IFI = .871, RMSEA = .076 (90% CI [.070, .082]), and SRMR = .055. These values indicate that the four-factor model provides an adequate representation of the scale's underlying structure for the target population (See Figure 1).

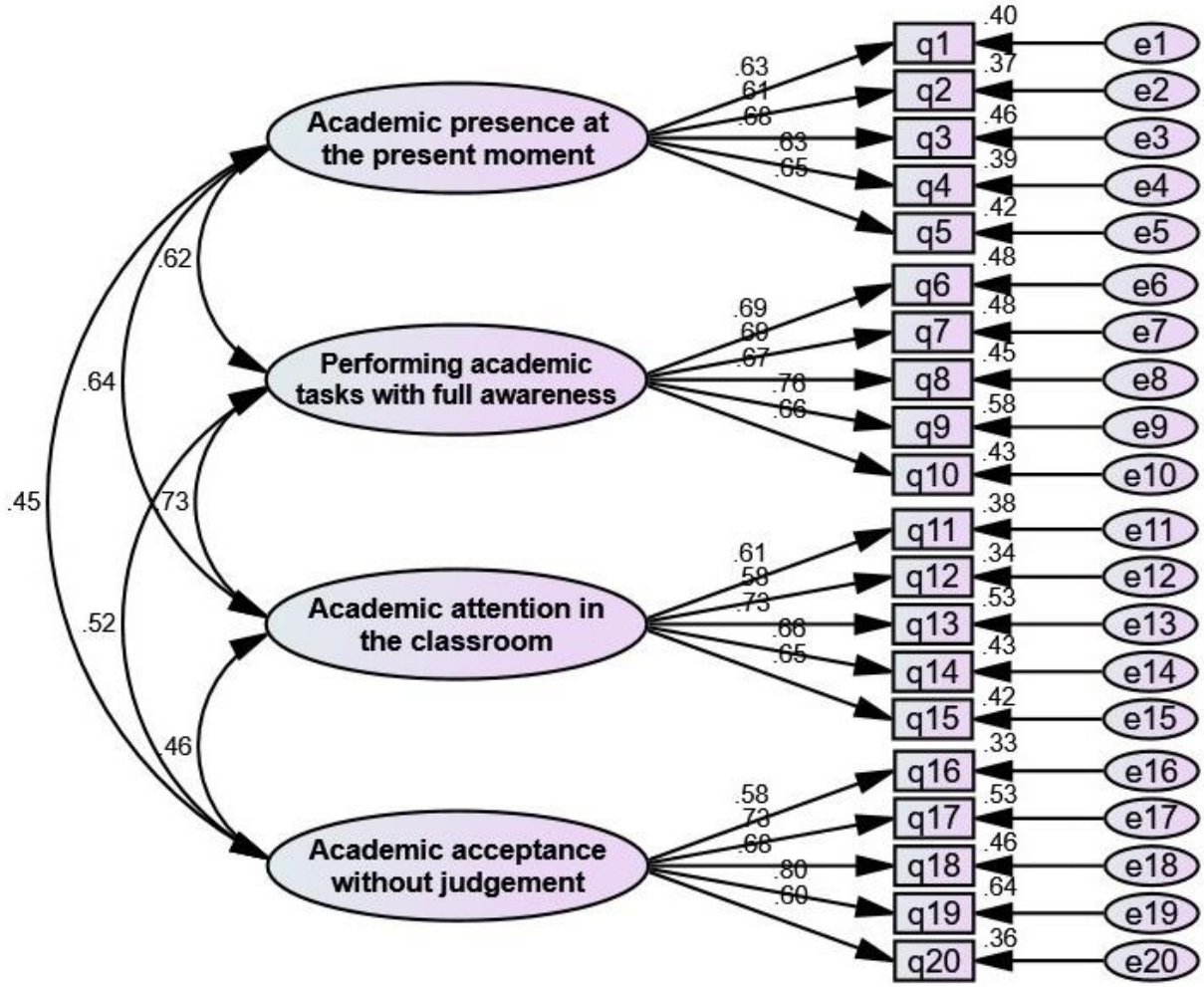

Figure 1.
Standardized CFA for the four-factor 20-Item AMS structure model.

The reliability analysis revealed strong internal consistency for both the overall scale and its individual factors. The overall scale demonstrated excellent reliability with McDonald's ω = .911 and Cronbach's α = .889. Individual factors showed satisfactory reliability coefficients: Factor 1 (ω = .773, α = .775), Factor 2 (ω = .825, α = .818), Factor 3 (ω = .782, α = .779), and Factor 4 (ω = .810, α = .801). The split-half reliability analysis yielded a Spearman-Brown coefficient of .783 and a Guttman Split-Half coefficient of .781, providing additional evidence of the scale's reliability.

Item-total correlations ranged from .42 to .64 ($p < .01$), indicating that all items contributed meaningfully to the overall scale score. The mean scores across items ranged from 3.19 to 4.16, suggesting that students generally reported moderate to high levels of academic mindfulness. The standard deviations ranged from .80 to 1.13, indicating reasonable variability in responses.

These results collectively suggest that the Academic Mindfulness Scale demonstrates strong psychometric properties when applied to university students in the Saudi environment, with evidence supporting both its factorial validity and reliability. The four-factor structure provides a comprehensive framework for understanding academic mindfulness patterns among university students, while the high reliability coefficients indicate that the scale provides consistent measurements of the construct.

4. Discussion

The primary aim of this study was to develop and validate a psychometrically sound instrument for measuring academic mindfulness among university students in Saudi Arabia. The results provide strong evidence for the validity and reliability of the Academic Mindfulness Scale (AMS), a 20-item measure that captures four distinct dimensions of mindfulness within academic contexts. This discussion examines the significance of these findings, situates them within the broader literature, addresses theoretical and practical implications, acknowledges limitations, and suggests directions for future research.

4.1. Factor Structure and Conceptualization of Academic Mindfulness

The emergence of a four-factor structure for academic mindfulness represents an important contribution to our understanding of how mindfulness manifests in higher education settings. The four dimensions identified—Academic attention in the classroom, Academic acceptance without judgment, Performing academic tasks with full awareness, and

Academic presence in the present moment—suggest that academic mindfulness is indeed a multifaceted construct that extends beyond general mindfulness conceptualizations.

This factor structure differs notably from both general mindfulness measures like the FFMQ Baer et al. [16] which identifies five facets, and previous attempts to measure academic mindfulness, such as the Ahmed [36] scale that mirrored the FFMQ's dimensions. While there are conceptual parallels between some factors in the AMS and existing mindfulness frameworks—for instance, "Academic presence at the present moment" shares similarities with the present-moment awareness emphasized in Kabat-Zinn's [3] definition—the factors identified in the current study are specifically contextualized within academic activities and environments.

Unlike Naderipour et al. [35] academic mindfulness questionnaire that included self-compassion as a factor, our scale focused more directly on cognitive and attentional processes within academic contexts. This difference highlights the importance of cultural and contextual considerations in understanding how mindfulness operates in educational settings. The factor structure of the AMS aligns more closely with the theoretical intersection of mindfulness principles and educational psychology frameworks of self-regulated learning, Zimmerman [18], and academic engagement [22].

The "Academic attention in the classroom" factor captures students' ability to maintain focused attention during lectures, discussions, and other classroom activities. This dimension is particularly relevant to the higher education context, where students must navigate complex material and multiple sources of potential distraction. This factor corresponds conceptually to the self-regulation of attention component in Bishop et al. [20] two-component model of mindfulness, but with specific application to the academic environment.

The "Academic acceptance without judgment" factor reflects students' capacity to approach academic challenges, feedback, and setbacks without harsh self-criticism or excessive rumination. This dimension resonates with the orientation to experience component of Bishop et al. [20] model and the non-judging facet in the FFMQ Baer et al. [16], yet applies these concepts specifically to academic experiences such as receiving critical feedback or encountering difficult course material.

Performing academic tasks with full awareness encompasses students' ability to engage deliberately and consciously with academic work, avoiding automatic or mindless approaches to studying, writing, and problem-solving. This factor aligns with the acting with awareness facet of the FFMQ but emphasizes the specific cognitive demands of academic tasks.

Finally, "Academic presence at the present moment" reflects students' ability to maintain present-focused awareness during academic activities, rather than becoming preoccupied with past performance or future outcomes. This dimension is conceptually related to the observing facet of the FFMQ but centers specifically on the temporal aspects of academic engagement.

The emergence of these four distinct yet interrelated factors suggests that academic mindfulness represents a unique construct that warrants specific measurement approaches. The moderate correlations between factors indicate that they represent related but distinguishable aspects of academic mindfulness, supporting the multidimensional conceptualization of the construct.

5. Theoretical and Practical Implications

The development and validation of the AMS has several important theoretical and practical implications. From a theoretical perspective, this study advances our understanding of mindfulness as a context-specific construct that manifests differently across domains. While general mindfulness remains a valuable construct, the findings suggest that academic mindfulness represents a unique constellation of attentional, cognitive, and attitudinal processes specific to educational contexts. This aligns with emerging perspectives on domain-specific mindfulness, such as interpersonal mindfulness Pratscher et al. [32] workplace mindfulness Zheng et al. [33] and embodied mindfulness [34].

The four-factor structure of the AMS provides a framework for understanding how mindfulness operates within academic settings, potentially informing more nuanced theoretical models of student engagement, learning approaches, and academic well-being. By identifying specific dimensions of academic mindfulness, this study contributes to the growing integration of mindfulness principles with educational psychology frameworks.

From a practical standpoint, the AMS offers educators, counselors, and researchers a psychometrically sound tool for assessing academic mindfulness among university students. This assessment can serve multiple purposes, including: (1) identifying students who may benefit from mindfulness-based interventions to enhance their academic engagement; (2) evaluating the effectiveness of mindfulness programs within higher education settings; (3) conducting research on the relationships between academic mindfulness and various educational outcomes; and (4) monitoring changes in students' academic mindfulness over time.

The multidimensional nature of the scale allows for targeted interventions that address specific aspects of academic mindfulness where students may show deficiencies. For instance, students scoring low on "Academic acceptance without judgment" might benefit from interventions focusing on self-compassion and constructive approaches to feedback, while those struggling with "Academic attention in the classroom" might receive strategies for enhancing focused attention during lectures and discussions.

For Saudi Arabian universities specifically, this scale provides a culturally appropriate measure that can inform the development and implementation of mindfulness-based programs tailored to the unique educational context and student needs. As mindfulness continues to gain recognition within Saudi Arabian higher education institutions, the AMS offers a valuable tool for evidence-based practice and program evaluation.

6. Limitations and Future Directions

While this study provides strong support for the AMS as a valid and reliable measure, several limitations warrant consideration and suggest directions for future research. First, the sample, although diverse in terms of academic backgrounds, was limited to undergraduate students from Saudi Arabian universities. Future research should examine the scale's generalizability to other educational contexts, including different cultural settings, graduate programs, and vocational education environments.

Second, the cross-sectional nature of the study precludes conclusions about the stability of academic mindfulness over time. Longitudinal research is needed to examine the test-retest reliability of the AMS and to investigate how academic mindfulness may fluctuate across an academic term or throughout a student's educational journey. Such research could provide valuable insights into the developmental trajectories of academic mindfulness and the factors that influence its stability or change.

Third, while the psychometric properties of the scale are promising, further validation studies are warranted. These could include examining relationships between AMS scores and objective measures of academic performance, investigating discriminant validity with conceptually distinct constructs, and assessing predictive validity for outcomes such as academic achievement, retention, and well-being. Additionally, examining the scale's sensitivity to change following mindfulness interventions would strengthen its utility for program evaluation.

Fourth, the factor structure, while robust, explains approximately 57% of the variance in the data, suggesting that additional aspects of academic mindfulness may remain unidentified. Qualitative research exploring students' experiences of mindfulness in academic contexts could complement the quantitative approach taken in this study and potentially identify additional dimensions for future iterations of the scale.

Finally, research examining the invariance of the scale across diverse student populations (e.g., different age groups, academic disciplines, or students with varying levels of prior mindfulness experience) would enhance our understanding of how academic mindfulness may manifest differently across these groups.

7. Conclusion

The development and validation of the Academic Mindfulness Scale represents a significant contribution to both mindfulness research and educational psychology. By providing a psychometrically sound instrument specifically designed for university contexts, this study addresses an important gap in the assessment of mindfulness within higher education. The four-factor structure of the AMS offers a nuanced framework for understanding and measuring academic mindfulness, with strong evidence supporting its reliability and validity for Saudi Arabian university students.

As mindfulness continues to gain prominence in educational settings worldwide, the AMS provides researchers and practitioners with a valuable tool for advancing our understanding of how mindfulness operates within academic contexts and for developing targeted interventions to enhance student learning, engagement, and well-being. Future research building on this foundation will further refine our conceptualization of academic mindfulness and expand our knowledge of its relationships with key educational outcomes.

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