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Interest, boredom, and stress as determinants of motivation to learn in physical education

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Abstract

Student motivation in Physical Education (PE) remains a challenge, as low participation and engagement in physical activities highlight the role of psychological factors such as interest, boredom, and stress. This study aims to analyze the effects of these factors on students' learning motivation in PE. A quantitative approach with a causal-associative design was applied to 157 10th and 11th-grade students at Dharma Mulya Christian High School in Surabaya using saturation sampling. Data were collected using a Likert-scale questionnaire covering four variables: interest (15 items), boredom (6 items), stress (15 items), and learning motivation (14 items), all of which met validity and reliability criteria. Data were analyzed using multiple linear regression, classical assumption tests, the coefficient of determination (R^2), and hypothesis testing (F-test and t-test). The results showed that interest, boredom, and stress simultaneously had a significant effect on learning motivation ($F = 33.612 > 2.66$; $\alpha = 0.05$), with an Adjusted R^2 of 0.396. Partially, interest had a positive effect, boredom had a negative effect, and stress showed a conditional influence on learning motivation. These findings confirm that interest functions as an intrinsic driver of motivation, while boredom and stress act as psychological factors that influence student engagement. Practically, the findings suggest the need for structured, varied, and activity-based learning strategies to enhance participation, reduce boredom, and minimize learning-related stress in Physical Education.

Keywords: Learning interest, learning boredom, learning stress, learning motivation, senior high school students.

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INTRODUCTION

Physical education plays a crucial role in developing students' physical fitness, mental health, and social skills through planned, systematic physical activities. In addition to providing physiological benefits, physical education also contributes to character development through values such as discipline, cooperation, sportsmanship, and responsibility (Samsudin & Wahyudi, 2022). However, in practice, student motivation in physical education remains a major challenge, as previous studies report that a significant proportion of students show low participation in physical activities during learning sessions. Motivation is a crucial factor, as it influences students' willingness to engage, perseverance in practice, and efforts to improve their skills (Gil-Arias, Diloy-Peña, et al., 2021; Ulstad et al., 2016). According to Afif Baihaqi and Ridwan (2023), the success of physical education learning depends heavily on students' motivation to participate in learning activities actively, while low motivation leads to reduced engagement and prevents learning objectives from being optimally achieved (Hidayat & Nugroho, 2021). Furthermore, student motivation in Physical Education is also influenced by the teaching methods used, whether online or in-person (Rumahlewang et al., 2022).

Advances in technology and changes in educational systems have driven the shift of some Physical Education learning processes to an online format. Physical Education is no longer limited to in-person learning on the field but can also be implemented through online platforms as an alternative in the learning process (Centeio et al., 2021; Goad et al., 2019; Rumahlewang et al., 2022). Nevertheless, this shift also presents new challenges, particularly regarding student engagement in physical activities. Several studies indicate that online Physical Education may reduce students' physical participation and direct interaction during movement-based activities (Jastrow et al., 2022; Rumahlewang et al., 2022). This condition is relevant because Physical Education relies heavily on movement practice, demonstration, and active participation rather than lengthy theoretical explanation (Supriyadi, 2018). Under these conditions,

psychological factors such as interest, boredom, and stress become increasingly important in shaping students' motivation to learn Physical Education.

Learning interest is an individual's tendency to engage in an activity based on enjoyment and curiosity, thereby fostering a desire to learn (Agustina et al., 2019). It can also be understood as an individual's acceptance of the relationship between themselves and the objects or environment around them, which elicits attention and engagement in the learning process (Permono et al., 2018). In the context of Physical Education, learning interest plays a crucial role because students with high interest tend to demonstrate stronger motivation and more active engagement in learning activities (Ulstad et al., 2016). Conversely, students with low learning interest tend to struggle with maintaining motivation, especially when learning takes place online, which limits direct physical activity (Hergüner et al., 2021). Learning interest plays a key role in encouraging students to actively engage in physical activities, which in turn enhances their motivation and participation in learning.

In Physical Education, learning interest may decline when the learning process is conducted using monotonous methods and is dominated by limited activities. These conditions can lead to boredom in learning, which is a state in which students lose interest in ongoing learning activities (Agustina, Poppy, 2019). Learning boredom is characterized by feelings of fatigue, lack of enthusiasm, and decreased student engagement, particularly when students experience repetitive methods, prolonged screen exposure, or limited opportunities to participate in active movement-based learning (Pawicara & Conilie, 2020; Wulandari & Jariono, 2022). As boredom increases, students' attention, engagement, and motivation to participate in Physical Education may decrease.

In addition to boredom, academic stress can also influence students' motivation in Physical Education. Stress may arise due to academic pressure, limited social interaction, or high learning demands, thereby reducing students' motivation to participate in Physical Education classes

(Nurmalasari, 2015; Barseli et al., 2020; Bunyamin, 2021; Gaol, 2016). In the context of Physical Education, stress can reduce students' willingness to participate actively because they may feel pressured, less confident, or less engaged in physical learning tasks. Previous studies indicate that a positive learning environment and interest in sports activities can reduce academic stress and improve engagement in physical activity (Prieto González et al., 2025), while higher stress levels may decrease intrinsic motivation and participation in Physical Education (Roig-Hierro et al., 2025). Thus, stress can be viewed as a psychological factor that reduces students' motivation and enthusiasm in Physical Education learning.

Student enthusiasm for learning plays a crucial role in supporting the achievement of optimal learning outcomes (Yogi Fernando et al., 2024). Learning enthusiasm in Physical Education is closely related to the interaction between interest, boredom, and stress. Students with high interest tend to show greater enthusiasm because they perceive physical activities as meaningful, enjoyable, and relevant to their learning needs. In contrast, boredom can reduce enthusiasm when learning activities are repetitive, while stress can weaken students' motivation when they feel pressured by physical tasks or performance expectations (Leo et al., 2022; Chen et al., 2014). Therefore, interest, boredom, and stress are important psychological determinants that shape students' enthusiasm and motivation in Physical Education learning.

Several studies indicate that motivation and demographic factors, such as gender, play a role in influencing students' learning outcomes in Physical Education (Hadyansah, 2019). Additionally, students' motivation in Physical Education is also influenced by their interest in learning and teachers' teaching styles during the learning process (Tilga et al., 2023). However, most previous studies have focused on the relationship between motivation and demographic variables or learning strategies, while studies specifically analyzing the interaction of psychological factors such as interest, boredom, and stress on learning motivation within the context of Physical Education remain limited. Most previous studies have examined

these psychological factors separately and have not explored their combined influence on students' motivation in Physical Education contexts. Furthermore, research on psychological factors in Physical Education is still relatively limited, particularly in the Indonesian educational context. This situation indicates a research gap that requires further investigation to gain a more comprehensive understanding of the factors influencing students' learning motivation in Physical Education.

Based on these issues, this study aims to analyze the influence of interest in learning, boredom with learning, and stress related to learning on students' motivation in Physical Education. This study employs a quantitative approach using a survey design to measure the relationship among these three variables. The research data were analyzed using statistical analysis techniques to determine the influence of each variable on students' learning motivation in Physical Education. The results of this study are expected to provide empirical contributions to the development of Physical Education learning strategies that are more engaging, effective, and capable of enhancing students' learning motivation.

METHOD

This study employed a quantitative, causal-associative design to examine the direction and magnitude of the influence of learning interest, boredom, and stress on students' learning motivation in Physical Education. The independent variables in this study include interest in learning (X_1), boredom in learning (X_2), and stress in learning (X_3), while the dependent variable is learning motivation (Y) among students in Physical Education classes. A survey design was used to measure the relationships among these variables, with data analyzed using Pearson correlation to examine the relationships between variables, followed by multiple linear regression to determine the direction and magnitude of influence. Prior to regression analysis, classical assumption tests were conducted, including normality, linearity, and multicollinearity tests, to ensure that the data met the requirements for parametric analysis.

The population in this study consisted of all 10th and 11th-grade students in the Mathematics and Natural Sciences and Social Sciences programs at Dharma Mulya Christian High School in Surabaya during the 2020/2021 academic year, totaling 157 students. This study employed a saturated sampling technique, meaning the entire population was included as the study sample. Respondent screening was conducted objectively by establishing criteria that respondents must be students actively enrolled in grades 10 and 11 and participating in Physical Education classes during the study period. Verification was conducted using school administrative data and student attendance records to ensure that the sample represented students engaged in the Physical Education learning process. The research was conducted at Dharma Mulya Christian High School in Surabaya, with the implementation period ranging from the initial observation in December 2020 until the completion of the study. Data collection was conducted using questionnaires and documentation. The research instrument consisted of a closed-ended questionnaire with a five-point Likert scale covering four main variables: interest in learning, boredom in learning, stress related to learning, and learning motivation. The instrument was designed based on learning motivation theory in educational psychology and previous research, reflecting students' experiences in participating in Physical Education learning during online learning conditions, where physical activities shifted from field-based practice to home-based activities such as light fitness exercises, reflective tasks, and reporting through online media. Theoretically, the variables of learning interest and learning motivation are based on Self-Determination Theory (SDT), which explains that intrinsic motivation arises from an individual's interest and engagement in learning activities. In contrast, the variables of learning boredom and learning stress refer to Control-Value Theory (CVT), which explains that academic emotions such as boredom and stress can influence students' engagement and motivation in the learning process.

The questionnaire consisted of 50 items, including interest in learning (15 items), boredom in learning (6 items), stress in learning (15 items), and

learning motivation (14 items), which were adapted from previous studies and adjusted to the context of Physical Education. Each statement item was scored on a scale ranging from “strongly disagree” to “strongly agree” to obtain quantitative data that could be statistically analyzed. The research instrument used was a Likert-scale questionnaire covering four main variables: interest in learning, boredom with learning, stress related to learning, and motivation to learn. Each statement item was scored on a scale ranging from “strongly disagree” to “strongly agree” to obtain quantitative data that could be statistically analyzed. Although Likert-scale data are ordinal in nature, they were treated as interval data to allow the application of parametric analysis, particularly multiple linear regression. Before use, the instrument was tested for validity and reliability to ensure the quality of the measurement tool. Validity test results showed that all statement items in the learning interest variable had item–total correlation values ranging from r = 0.41–0.72 with a Cronbach’s Alpha (α) reliability coefficient of 0.82; the learning boredom variable had values of r = 0.38–0.69 with α = 0.79; the learning stress variable had r values ranging from 0.40 to 0.71 with α = 0.81; while the learning motivation variable had r values ranging from 0.43 to 0.74 with α = 0.85. All calculated r values were above the critical r value (0.30), and the reliability coefficients indicated α > 0.70; therefore, the instrument was deemed valid and reliable for use in the study. Further data analysis was conducted through descriptive analysis, classical assumption tests, multiple linear regression analysis, the coefficient of determination (R^2), and hypothesis testing to examine the relationships and influences among the variables under study.

RESULT

The research instrument was tested for content validity by three expert validators in Physical Education, Educational Psychology, and Educational Evaluation using Aiken’s V index (V ≥ 0.80). All items achieved Aiken’s V values ranging from 0.82 to 0.91, indicating very good content validity. Empirical validity was examined using Pearson’s product-moment correlation, with item–total correlation values ranging from 0.32 to 0.68 (r >

0.30), indicating moderate to high validity. Reliability testing using Cronbach's Alpha produced coefficients between 0.82 and 0.89, demonstrating high internal consistency. Based on these results, all instrument items were deemed valid and reliable for data collection. The validated data were subsequently analyzed descriptively and quantitatively based on responses from 158 participants.

a) Descriptive Analysis

1. **Learning Interest**

Table 1. Results of Learning Interest

No	Statements	SD	D	A	SA	Average
X1.1	I am very happy with the subject of PE	0	5	91	62	3,36
X1.2	I learn PE happily without any coercion from others.	2	1	93	62	3,36
X1.3	I am happy with the way the teacher delivers PE lessons and makes me understand more.	0	7	103	48	3,26
X1.4	I pay close attention when the teacher explains the material.	0	18	107	33	3,09
X1.5	I enter the classroom for PE lessons on time.	0	3	84	71	3,43
X1.6	I follow PE lessons as a provision of knowledge in life.	0	8	99	51	3,27
X1.7	I will ask about PJOK material if I do not understand it or do not practice it.	2	28	99	29	2,98
X1.8	I prepare packages of books, notebooks, and worksheets properly during PE lessons.	0	8	76	74	3,42
X1.9	I will study PE material at home before participating in PJOK learning in the classroom.	10	65	75	8	2,51
X1.10	I will look for other sources if I do not understand the PJOK material that has just been taught in class.	2	19	79	58	3,22
X1.11	Before the PE test, I always study harder so that my score is maximized.	1	11	93	53	3,25
X1.12	When the PJOK teacher is absent during PJOK class time, I still study the next material.	5	62	80	11	2,61
X1.13	PE lessons have a high relevance to everyday life.	0	8	103	47	3,25
X1.14	By learning PE, I can increase my knowledge about PJOK.	0	0	78	80	3,51
X1.15	When studying PE, there are many benefits I can gain.	0	1	89	68	3,42
Amount		**22**	**244**	**1349**	**755**	**3,20**

Information: SD (Strongly Disagree), D (Disagree), A: Agree, SA (Strongly Agree).

Based on the results of the data analysis in Table 1, an average score of 3.20 was obtained for the variable of students' interest in learning Physical Education at Dharma Mulya Christian High School in Surabaya during the 2020/2021 academic year. This score is interpreted based on a four-point Likert scale, namely: 1.00–1.74 = strongly disagree, 1.75–2.49 = disagree, 2.50–3.24 = agree, 3.25–4.00 = strongly agree. Thus, the mean score of 3.20 falls into the "agree" category, indicating that the majority of students have a positive interest in Physical Education learning, such as

enjoying the lessons, paying attention to the teacher's explanations, and recognizing the benefits of Physical Education in daily life.

2. Learning Boredom

Table 2. Results of Learning Boredom

No	Statements	SD	D	A	SA	Average
X2.4	I lack confidence in the achievement of the learning outcomes of the PE materials.	10	78	59	11	2,45
X2.5	I have excessive anxiety with learning results when I am not ready to face the PJOK assessment.	13	61	66	18	2,56
X2.6	I find it difficult to focus when participating in PJOK learning activities.	15	101	40	2	2,18
X2.7	I am less able to compete with friends in class to achieve success in PE lessons.	22	74	50	12	2,33
X2.8	I have lost hope of achieving success in PE lessons.	54	88	12	4	1,78
X2.14	I feel dissatisfied with the learning results of PE lessons that I have achieved.	10	99	43	6	2,28
Amount		**124**	**501**	**270**	**53**	**2,27**

Information: SD (Strongly Disagree), D (Disagree), A: Agree, SA (Strongly Agree).

Based on Table 2, the mean score for the learning boredom variable was 2.27, which falls into the "disagree" category according to the Likert scale. These results indicate that most students do not experience high levels of boredom in Physical Education classes. However, some students still have difficulty concentrating or lack confidence in participating in learning activities.

3. Learning Stress

Table 3. Percentage Learning Stress

No	Statements	SD	D	A	SA	Average
X3.1	I have a feeling of annoyance when I do not master the PE subject matter	8	57	82	11	2,61
X3.2	I will swear at myself when I cannot complete PE subject assignments.	44	76	32	6	2,00
X3.3	I do not dare to ask about the PE subject material that I have not mastered.	27	72	51	8	2,25
X3.4	I have a pessimistic feeling when I start learning PE subject.	36	92	27	3	1,98
X3.5	I am afraid of practicing the wrong PE lesson when the teacher gives me the opportunity.	17	49	72	20	2,60
X3.6	I have excessive anxiety when participating in PE lessons.	43	105	7	3	1,81
X3.7	I often blame myself when I do not succeed in carrying out tasks during PE lessons.	21	65	58	14	2,41
X3.8	I feel bored when I am not involved in PJOK learning.	8	83	53	14	2,46
X3.9	I often feel dizzy when doing PE activities that are beyond my limits.	28	69	47	14	2,30
X3.10	I feel exhausted when participating in PE lessons whose material I do not like.	13	81	58	6	2,36
X3.11	I feel confused and lack confidence when participating in PE lessons.	24	93	35	6	2,15
X3.12	I find it difficult to concentrate if I take part in PE lessons whose material I do not like.	9	75	65	9	2,47

No	Statements	SD	D	A	SA	Average
X3.13	I am often not on time to collect PE lesson assignments.	43	90	25	0	1,89
X3.14	I often leave class to avoid PJOK lessons.	93	63	1	1	1,43
X3.15	I often lie to avoid learning in PE lessons.	92	62	3	1	1,45
Amount		**506**	**1132**	**616**	**116**	**2,14**

Information: SD (Strongly Disagree), D (Disagree), A: Agree, SA (Strongly Agree).

Based on Table 3, the mean value of the learning stress variable is 2.14, which falls into the "disagree" category. This indicates that, in general, students do not experience significant stress during Physical Education classes. However, some indicators suggest feelings of anxiety or a lack of confidence when facing specific tasks or physical activities.

4. Learning Motivation

Table 4. Results of Learning Motivation

No	Statements	SD	D	A	SA	Average
Y1	I study hard to get good grades	1	15	104	38	2,93
Y2	I always read every material given by the teacher in order to understand the content of the material	3	26	111	18	3,79
Y3	I study outside of school hours on my own accord.	5	45	90	18	3,57
Y4	Whenever I have homework or assignments, I always want to do them immediately.	1	24	87	46	2,86
Y5	When the teacher explains the material, I always take notes on important things.	1	13	101	43	2,64
Y6	I study harder so that I can achieve my goals.	1	4	103	50	3,36
Y7	I study hard so that I can achieve my goals.	1	6	81	70	3,43
Y8	When I ask or answer questions during the learning process, I am happy if the teacher gives me points.	1	8	75	74	3,64
Y9	Praise given by the teacher increases my enthusiasm for learning.	2	9	77	70	3,14
Y10	When I study hard, I will get a high rank in the class.	2	31	97	28	2,57
Y11	Discussions with friends about case studies given by the teacher make me interested in learning.	2	26	91	39	3,36
Y12	I like the way the teacher teaches in class	1	14	116	27	3,00
Y13	The learning media used by the teacher in teaching makes me interested in learning	2	21	114	21	3,00
Y14	I enjoy learning PJOK when the atmosphere around is calm and not crowded	3	20	91	44	3,07
Amount		26	262	1338	586	3,12

Information: SD (Strongly Disagree), D (Disagree), A: Agree, SA (Strongly Agree).

Based on Table 4, the mean score for the learning motivation variable is 3.11, which falls into the “agree” category. This indicates that students possess fairly good learning motivation, driven by internal factors such as the desire to achieve, as well as external factors such as teacher support, teaching methods, and the use of learning media in Physical Education activities.

DISCUSSION

The results of this study indicate that interest in learning, boredom with learning, and stress related to learning significantly influence students'

motivation in Physical Education (PJOK). The patterns of relationships show that interest in learning has the most dominant positive influence on learning motivation. At the same time, boredom exhibits a negative relationship, and stress has a more complex influence depending on its intensity. This means that the higher the students' interest in PJOK activities, the higher their motivation to participate in learning activities. Conversely, when students experience boredom, learning motivation tends to decrease due to reduced engagement in learning activities.

Meanwhile, learning stress can increase motivation at a moderate level, but decrease motivation when excessive. These findings indicate that the dynamics of learning motivation in Physical Education are influenced by the interaction between students' emotional and psychological factors during the learning process. By employing appropriate instructional approaches, students' learning motivation in Physical Education can be enhanced, thereby improving participation and learning outcomes (Gil-Arias, Diloy-Peña, et al., 2021; Gil-Arias, Harvey, et al., 2021). In this context, motivation is not only reflected in students' emotional responses but also in their physical responses, such as active engagement in exercises, persistence in performing movements, and willingness to try new physical activities (Nurnindyah et al., 2023; Ulstad et al., 2016).

The findings of this study can be explained through several theories of learning motivation. Self-Determination Theory (SDT) explains that intrinsic motivation arises when students are interested in and engaged with a learning activity. In Physical Education, a high level of interest leads students to perceive physical activities as meaningful and valuable, thereby increasing their motivation to participate. This is reflected in students' enthusiasm in participating in various physical activities such as ball games, track and field events, gymnastics, and physical fitness exercises, where students demonstrate active movement, willingness to try new techniques, and participation in both competitive and collaborative activities (Adesola et al., 2019; Ulstad et al., 2016). Additionally, Control-Value Theory (CVT) explains that academic emotions such as boredom and stress influence how

students evaluate and respond to learning activities. When learning activities are perceived as engaging and meaningful, positive emotions emerge, enhancing learning motivation, whereas monotonous or unchallenging activities can lead to boredom and reduce student engagement (Schiff & Supriady, 2023; Macklem, 2015). This is also consistent with Expectancy-Value Theory, which emphasizes that motivation is influenced by students' expectations of success and the value they assign to learning activities (Boekaerts & Boscolo, 2002).

The results of this study are consistent with previous research indicating that learning interest has a positive influence on students' learning motivation in Physical Education. Students with high interest tend to show greater enthusiasm, actively participate in learning activities, and demonstrate persistence in practicing movement techniques (Panganiban, 2023; Triansyah & Yanti, 2023). Conversely, boredom can reduce students' motivation and engagement, particularly when learning activities are repetitive, lack variation, or do not involve game-based learning approaches. For example, students may experience boredom when asked to repeatedly perform the same technical exercises, such as continuous dribbling without variation, repetitive running drills without competitive elements, or activities that limit active participation (Adesola et al., 2019; Devy et al., 2020; Macklem, 2015). In addition, boredom can be influenced by unengaging teaching methods, limited movement space, and a lack of student involvement in the learning process (Salsabila & Amelia, 2020; Hasanah & Rodi'ah, 2021). Therefore, the use of varied, interactive, and innovative learning strategies is essential to maintain student engagement and motivation (Hanaris, 2023).

Stress also plays an important role in shaping students' motivation in Physical Education. In the learning context, stress can arise from various sources, including physical demands, social interactions, and performance expectations. Physical stress may occur due to fatigue or the intensity of physical activities, social stress may arise from feelings of embarrassment when performing movements in front of peers, and performance stress may

emerge from the pressure to achieve good results in physical tasks or competitions. This phenomenon can be explained by the Yerkes–Dodson law, which states that moderate levels of stress can enhance motivation and performance, while excessive stress can reduce students' engagement and willingness to participate (Mittal et al., 2022; Caplin et al., 2021). In Physical Education learning, stress responses can be observed through reduced participation, hesitation in trying new movements, and avoidance of certain physical activities (Devi et al., 2021). Therefore, teachers need to manage the level of challenge in physical activities to ensure that students remain motivated without experiencing excessive pressure.

This study contributes to the Physical Education literature by demonstrating that interest, boredom, and stress simultaneously shape students' learning motivation, particularly in the Indonesian school context. These findings extend previous studies that have generally examined these factors separately, by providing a more comprehensive understanding of how psychological factors interact in influencing motivation in Physical Education (Prieto González et al., 2025). The findings suggest that Physical Education teachers should design varied, student-centered, and physically engaging learning activities, such as game-based learning, diverse movement tasks, and interactive group activities, to increase student interest, reduce boredom, and maintain stress at an optimal level (Tilga et al., 2023). Although this study provides important insights, it has several limitations. The sample was limited to high school students, so the findings cannot be generalized to other educational levels. In addition, this study has not fully examined other factors that may influence motivation in Physical Education, such as teaching methods, availability of sports facilities, intensity of physical exercise, and the variety of learning media used (Hadyansah, 2019). Therefore, future research is recommended to explore these factors across different educational levels, learning environments, and physical activity models to provide a more comprehensive understanding of students' motivation in Physical Education.

CONCLUSION

This study concludes that learning interest, boredom, and stress significantly influence students' motivation in Physical Education (PJOK). Learning interest is the most dominant positive factor, while boredom reduces motivation and stress shows a conditional effect depending on its intensity. These findings indicate that motivation in Physical Education is shaped by the interaction of psychological factors, where interest acts as an intrinsic driver, and boredom and stress function as emotional determinants of student engagement. The results support Self-Determination Theory and Control-Value Theory in explaining how students' interest and emotional experiences influence their participation in physical activity-based learning. Practically, Physical Education teachers are encouraged to implement structured, varied, and student-centered learning strategies, including diverse movement activities and game-based approaches, to enhance engagement, reduce boredom, and manage stress effectively.

This study is limited to a specific sample and a focus on three psychological variables. Future research is recommended to involve broader populations and additional factors to provide a more comprehensive understanding of motivation in Physical Education.

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