

Development of the Japanese version of the Bored for Sports Scale (BOSS-J): Which is the best way to measure degree or frequency?

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Abstract:

Boredom has been the focus of much attention in the field of sports science in recent years, in Western Europe. Boredom in sports is “A psychological state in which one recognizes the need for exercise and training but is unable to sustain attention and interest, and behavior becomes inertial and formal.” In Japan, although studies focusing on boredom have begun to progress, no studies have been conducted focusing on boredom in sports, and no scales to evaluate them have been found. Furthermore, it is said that an international comparison with other countries is useful to grasp the current situation and issues surrounding sports in Japan in more detail (Tadano, 1988). The purpose of this study was to create a Japanese version of the Bored for Sports Scale (BOSS), a sports boredom scale, to measure boredom in sports among athletes playing competitive sports and compare its reliability and validity with the BOSS degree answer version and BOSS frequency answer version. The participants were 294 Japanese collegiate athletes. The scale was translated into Japanese using the back translation method, and its reliability and validity were examined. Exploratory factor analysis (EFA) was conducted to analyze scale items, and 1 factor 11 items were extracted. In addition, reliability and factorial validity were confirmed by Cronbach's alpha and confirmatory factor analyses (CFA). Criterion-related validity was indicated by significant correlations for two of the three relevant measures. After comparing the results of these analyses, BOSS frequency answer version was adopted, confirming the reliability of the reproducibility. In conclusion, BOSS degree answer version was created as a Japanese version of the BOSS (BOSS-J).

Key Words: scale development; boredom; Japanese athlete; collegiate sports; training; sports psychology

Introduction

Boredom is “the aversive experience of wanting to engage in a satisfying activity but being unable to do so (Eastwood et al., 2012).” In other words, we experience boredom when we feel that we are not making the best use of our time and resources. Although boredom is an emotion that we all feel, it has been neglected (Elpidorou, 2022) and has only recently begun to be empirically studied, even in Western Europe. Particularly, with increased spare time owing to the COVID-19 pandemic, several studies have focused on boredom. For example, people who are easily bored experience lower well-being and life satisfaction (Peng et al., 2020). Boredom has also been found to be associated with social networking and internet dependence (Donati et al., 2022). Additionally, boredom has been identified as being associated with violent behavior (Pfattheicher et al., 2021) and participation in maladaptive learning behaviors (Audrin & Hascoët, 2021).

Boredom can be categorized as “situational/overall” and “episodic/chronic” (Mael and Jex, 2015). Situational boredom is limited to a particular situation and does not involve other aspects of life. Whereas, overall boredom spans all aspects of life, either temporarily or chronically (Kawada et al., 2022). Furthermore, Loukidou et al. (2009) reported that episodic boredom is characterized by temporary, short-term emotional reactions to specific situations or tasks and chronic boredom by general, chronic mental states. Episodic boredom is less of a problem and may sometimes motivate behavior to escape boredom. Whereas, chronic boredom is associated with negative aspects, such as problematic behavior (Haager et al., 2018; Lepera, 2011). Therefore, to develop boredom research in Japan in future, accumulating studies focusing on chronic boredom is necessary. Uehara (2024) has created a Japanese version of the Boredom Proneness Scale (BPS) (Farmer and Sundberg, 1986), which measures the ease of daily boredom and is universally used in boredom research overseas. This scale measures both overall and chronic boredom. Morinaga et al. (2025) developed a Japanese version of the Short Boredom Proneness Scale (SBPS). Kawada et al. (2022) developed a Japanese version of the Dutch Boredom Scale (Reijseger et al., 2013), a measure of boredom at work that assesses situational and chronic boredom (Kawada et al., 2024). Thus, boredom is receiving increasing attention in Japan.

Recently, in Western Europe, boredom has gained significant attention in the field of sports science. By nature, sports are considered leisure activities. Some people engage in sports to escape boredom, while others are bored by sports (Wolff et al., 2024). For example, elementary school students who are forced to exercise in a physical education class or those who do not have the habit of exercising but are advised by their doctors to run

once a week for their health may experience boredom. The reason for their boredom is that they feel that the task at hand is of low value or meaningless (Wolff et al., 2024). In other words, boredom in sports is “a psychological state in which one recognizes the need for exercise and training but is unable to sustain attention and interest, and behavior becomes inertial and formal.”

As previously mentioned, the possibility of boredom in various sporting situations has been noted, and competitive sports are no exception. In competitive sports, one must undergo training for over countless hours, enduring fatigue and pain to improve performance. While continuously and effectively training toward goals, we face many challenges (McCormick et al., 2019), one of which is boredom (Wolff et al., 2021). Training in competitive sports often comprise certain elements that are different from the athletes’ original sport (e.g., soccer players run to improve endurance), and involves continuing monotonous repetitive practice compared to the original sport. Wolff et al. (2024) point out that this can lead to boredom. Velasco and Jorda (2020) investigated boredom in athletes using two approaches, qualitative and quantitative, and found that athletes were frequently bored, with 34.8% reporting repetitive practice as the main trigger for boredom.

Boredom in sports may have various negative effects. Boredom during an activity is associated with a greater demand for self-control to continue the activity; thus, jeopardizing its continuation (Wolff and Martarelli, 2020). Boredom activities have also been reported to cause fatigue (Bieleke et al., 2021), malaise (Milyavskaya et al., 2019), and frustration (Westgate and Wilson, 2018). Furthermore, the boredom experienced by athletes during training is exacerbated if the training content is not perceived as valuable for goal attainment. In other words, it can be inferred that if activities that can lead to boredom, such as monotonous repetitive exercises that are not perceived as necessary for goal attainment, are not addressed, they may affect not only the implementation and continuation of sports, but also mental health.

Weich et al. (2022) indicated that boredom can be experienced not only during training but also during ultra-endurance competitions, such as 24-hour endurance ultramarathons. In their study, although boredom during competition was reported less frequently than fatigue and pain, only boredom was associated with critical situations during competition (Weich et al., 2022). They suggested that this was due to a lack of effective preparation for boredom, although several previous studies have helped address phenomena, such as fatigue and pain. Additionally, bored athletes have been found to make more failed decisions in sports, which is associated with increased passive attitudes that could affect their performance (Wolff et al., 2022).

Thus, in Western Europe, boredom has been examined among athletes participating in competitive sports. Wolff et al. (2021) developed the Bored of Sports Scale (BOSS) for athletes who have competed and developed the study of boredom in sport using quantitative surveys. Martarelli et al. (2023) used the BOSS to determine whether athletes find value in their training and found that athletes who find value in training are less likely to feel bored. Studies on citizen runners and cyclists have shown that boredom is associated with lower satisfaction and a tendency to train less frequently (Bieleke et al., 2024). As described above, boredom in sports has been identified as potentially negatively influencing athletes.

Conversely, In Japan, although studies focusing on boredom have begun to progress, no studies have been conducted focusing on boredom specifically in sports, and no scales exist to evaluate it. In Japan, if the situation of boredom continues to be ignored, the number of people participating in sports will decrease, which could have a negative impact on people’s health. Furthermore, an international comparison with other countries is useful to grasp the current situation and issues surrounding sports in Japan in more detail (Tadano, 1988). Wolff et al. (2022), who created the BOSS, cited the need to verify whether it can be applied in other cultures as a future issue. Therefore, developing a standard scale for international comparisons is necessary.

Therefore, this study’s purpose was to create a Japanese version of the BOSS to measure boredom among athletes playing competitive sports. As previously discussed, chronic boredom is considered a problem and the original version of the BOSS was designed to measure the degree of boredom. Therefore, in this study, we created a scale comprising an instructional text asking about the frequency of boredom and a choice to answer the frequency (BOSS frequency answer version). Subsequently, we compared its reliability and validity with the original version of the BOSS, which answers the degree of boredom (BOSS degree answer version).

Material & methods

Participants and survey procedure

The study population comprised 465 Japanese collegiate athletes. To accurately capture athletes’ boredom in this study, we restricted the study population to collegiate athletes. Additionally, as Wolff et al. (2021) indicated that verifying whether the results can be applied to other age groups is necessary, we decided that there would be no problem targeting collegiate athletes.

In the survey population, 294 Japanese collegiate athletes (males: 207, females: 83, no answer: 4, mean age: 19.00 ± 0.94 years) were included in the analysis (valid response rate: 63.2%), excluding those who did not respond and those who provided incomplete answers. All surveys were administered via Google Forms during university classes and club practice times. Regarding the ethical considerations of this study, at the beginning of the survey screening, the participants were explained the study’s purpose, that their identity could not be revealed through statistical processing, and the study results would be published. Only those who could provide consent were asked to respond. This study was approved by the Ethical Review Committee of Shigakukan University.

Instruments

The 11 BOSS items developed by Wolff et al. (2021) that assess boredom in sports were translated into Japanese and used in this study. The translation procedure was based on the procedure used in a previous study (Shiraishi et al., 2024). Permission was first obtained from the original author, and then the translation was performed by a translation company. The author and translation company then adjusted the translation so that it accurately reflected the meaning of the original text and was natural Japanese. The translation company was then asked to back-translate the document, and the draftsman was asked to confirm its consistency with the original version. After making minor modifications according to the draftsman's feedback, the draftsman confirmed that there were no conceptual problems. Therefore, it was determined that all the English and corresponding Japanese items were conceptually consistent, and a subsequent survey was conducted. The BOSS degree answer version required responses on a scale from "not at all applicable (1)" to "very applicable (5)." Additionally, the BOSS frequency answer version required responses on a scale of "never (0)" to "always (6)." The original author also permitted a comparison between the BOSS degree and frequency answer versions.

In developing the Japanese version of the BOSS, the following scales were measured simultaneously with reference to a previous study (Wolff et al., 2021) to examine criterion-related validity.

The first was the one-factor, eight-item Japanese version of the SBPS (Morinaga et al., 2025), which measures boredom tendency and comprises items, such as "It is hard to entertain myself." It was both reliable (internal consistency and retest reliability) and valid (construct validity). The scale is rated on a seven-point scale, ranging from "does not apply at all (1)" to "applies well (7)."

The second was the one-factor, 13-item Japanese version of the Brief Self-Control Scale (BSCS-J) (Ozaki et al., 2016), which measures individual differences in self-control and comprises items, such as "I cannot stop bad habits." It is also recognized for its reliability (internal consistency and retest reliability) and validity (construct validity). It is a five-point scale ranging from "does not apply at all (1)" to "applies very much (5)." The original version used another self-control scale (Hoyle and Davison, 2016), but since the Japanese version has not been created, the BSCS-J, which is widely used in Japan, was adopted.

The third was the If-Then Planning Scale (ITPS; Bieleke and Keller, 2020), an eight-item measure, which is a self-control strategy that specifies in advance when, where, and how to act toward a goal (Gollwitzer, 2014). It comprises items, such as "I think about when and where decisive moments for the achievement of my goals could occur." Reliability (internal consistency) and validity (convergent and discriminant validity) for this scale have been confirmed. The scale is rated on a seven-point scale, ranging from "not at all applicable (1)" to "very applicable (7)." As this scale was originally developed in English, a translation company was contracted to develop a Japanese version using the back-translation method.

Data analysis

First, Cronbach's alpha coefficient was calculated to test the internal consistency of the ITPS, a validation scale for the criterion-related validity of the Japanese version of the BOSS, and construct validity was tested using confirmatory factor analysis (CFA).

To examine the discriminability of each item of the Japanese version of the BOSS, Item-Total correlation analysis (IT correlation analysis) was conducted, and items with a correlation coefficient less than $r = 0.4$ (Tokunaga, 2002) were designated as deleted items. Additionally, to confirm the factor structure of the scale, exploratory factor analysis (EFA) using the maximum likelihood method and promax rotation was conducted, and items with factor loadings less than 0.4 (Tokunaga, 2002) were considered deleted items. Cronbach's alpha coefficient was then calculated to confirm the internal consistency of the scale. After the EFA, CFA was conducted to confirm the factor model fit of the scale. The goodness of fit index (GFI), adjusted goodness of fit index (AGFI), comparative fit index (CFI), and root mean square error of approximation (RMSEA) were used as goodness of fit indices. The Cronbach's alpha coefficient indicates that a question item is valid if it is greater than 0.7 (Cronbach, 1951). GFI, AGFI, and CFI are considered to have more explanatory power for a model to fit if they are close to 1, and a value of 0.9 or higher is generally considered a good fit criterion (Oshio, 2008). Furthermore, RMSEA is considered to be better when it is closer to 0, with 0.08 or less favoring a model fit, and 0.10 or more indicating a poor fit (Yamamoto and Onodera, 2002). To examine criterion-related validity, Pearson's correlation coefficient with the simultaneously measured scale was calculated. Correlation coefficients were calculated for the first and second surveys to examine the reliability. The significance level in this study was set at 5%. Statistical analyses were performed using IBM SPSS Statistics 28.0 and AMOS 25.0.

Results

Cronbach's alpha coefficient was calculated for the ITPS to verify the internal consistency of the scale items, resulting in an $\alpha = .91$. The factorial validity of the scale was examined using CFA; the results were GFI=.96, AGFI=.90, CFI=.97, and RMSEA=.09. The reliability and validity of ITPS generally agreed with the criterion values. As these values overall met the criteria, we judged that the reliability and validity were within the minimum acceptable range and decided to use the Japanese version of the BOSS as a validation scale for criterion-related validity.

To examine the discriminative power of each item of the Japanese version of the BOSS, an IT correlation analysis was conducted on all 11 items, and it was confirmed that both the BOSS degree and

frequency answer versions satisfied the correlation coefficient of $r = 0.4$ or higher (Tokunaga, 2002) for all the question items. Therefore, all the items were selected for analysis in this study. Next, EFA (maximum likelihood method and promax rotation) was conducted on all items for which the discrimination of scale items was confirmed, using factor loadings of 0.4 or more as the criterion (Tokunaga, 2002), and a structure of 11 items per factor was confirmed in both the versions. Cronbach's alpha coefficient was calculated to examine the internal consistency of the scale, and the results showed that $\alpha = .97$ and $\alpha = .95$ for the BOSS degree and frequency answer versions, respectively (Table 1).

CFA was performed, and the results were: GFI=.95, AGFI=.91, CFI=.98 and RMSEA=.07 for the BOSS degree answer version, and GFI=.94, AGFI=.90, CFI=.98 and RMSEA=.08 for the BOSS frequency answer version (Figure 1).

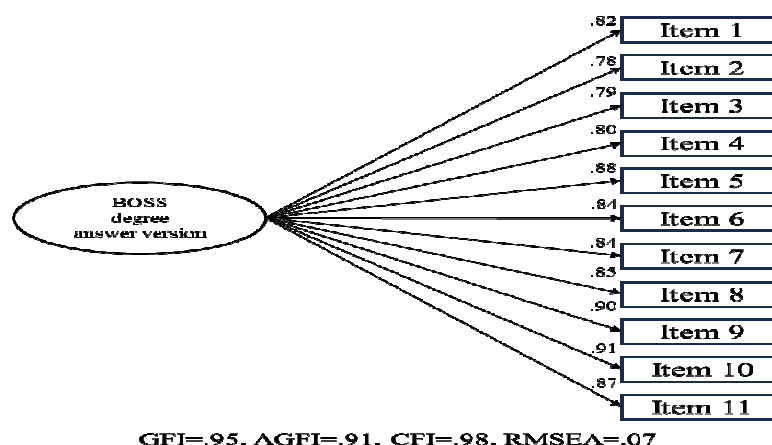
To examine the criterion-related validity, Pearson's correlation coefficients were calculated using simultaneously measured scales. According to Cohen's (1988) conventional criteria, the effect size was deemed small when close to 0.30, moderate when close to 0.40, and large when close to 0.50 or greater. The results showed that the BOSS degree and frequency answer versions were significantly and positively correlated with the Japanese version of the SBPS ($r=.61$, $p<.01$; $r=.59$, $p<.01$, respectively). Significant negative correlations were also found between the BOSS degree and frequency answer versions with the BSCS-J ($r=-.43$, $p<.01$; $r=-.32$, $p<.01$, respectively). However, no significant correlation with ITPS was identified. ($r=.03$, n.s.; $r=-.01$, n.s., respectively).

Based on the above results, the BOSS degree answer version was judged to be more reliable and valid than the BOSS frequency answer version. Thus, the BOSS degree answer version was adopted and considered the Japanese version of the BOSS (BOSS-J).

The BOSS-J was retested among 30 collegiate athlete competitors (males: 24, females: 6; mean age: 19.03 years, $SD \pm 0.18$) at three-week intervals, resulting in a correlation coefficient of $r=.69$ ($p<.01$) between the first and second tests.

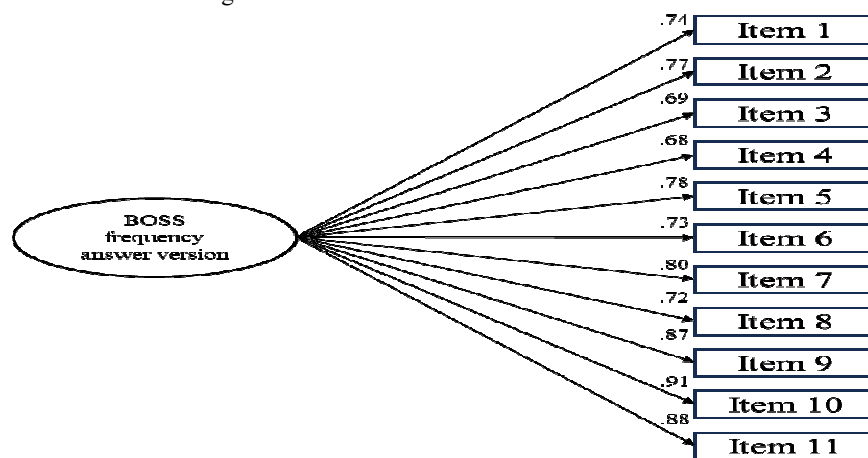
Table. 1 Scores of mean, standard deviation, factor loadings and alpha coefficient

No.	Items	Mean	SD	Factor1	α
BOSS degree answer version					0.97
1	The training session bores me to death.	1.78	1.02	0.67	
2	Exercising bores me.	1.55	0.81	0.67	
3	Exercising is dull and monotonous.	1.55	0.81	0.68	
4	While doing this boring training session, I spend my time thinking of how time stands still.	1.82	1.03	0.66	
5	The training session is so boring that I find myself daydreaming.	1.85	1.02	0.78	
6	I find my mind wandering while I exercise.	1.86	1.05	0.72	
7	Because I'm bored, I have no desire to exercise.	1.66	0.88	0.74	
8	I would rather put off this boring training session till tomorrow.	1.77	0.99	0.70	
9	Because I'm bored, I get tired while exercising.	1.76	0.96	0.81	
10	The training session bores me so much that I feel depleted.	1.74	0.97	0.81	
11	While exercising I seem to drift off because it's so boring.	1.78	1.01	0.78	
BOSS frequency answer version					0.95
1	The training session bores me to death.	1.50	1.51	0.56	
2	Exercising bores me.	0.72	1.11	0.62	
3	Exercising is dull and monotonous.	0.56	0.98	0.51	
4	While doing this boring training session, I spend my time thinking of how time stands still.	1.39	1.45	0.48	
5	The training session is so boring that I find myself daydreaming.	1.36	1.46	0.63	
6	I find my mind wandering while I exercise.	1.37	1.38	0.55	
7	Because I'm bored, I have no desire to exercise.	0.78	1.19	0.66	
8	I would rather put off this boring training session till tomorrow.	1.20	1.49	0.51	
9	Because I'm bored, I get tired while exercising.	1.07	1.38	0.74	
10	The training session bores me so much that I feel depleted.	0.99	1.33	0.82	
11	While exercising I seem to drift off because it's so boring.	1.00	1.34	0.75	



GFI=.95, AGFI=.91, CFI=.98, RMSEA=.07

Fig. 1 Result of CFA for BOSS degree answer version



GFI=.94, AGFI=.90, CFI=.98, RMSEA=.08

Fig. 2 Result of CFA for BOSS frequency answer version

Discussion

This study's purpose was to create a Japanese version of the BOSS, a sports boredom scale, to measure boredom in sports among Japanese collegiate athletes, and to compare its reliability and validity with the BOSS degree and frequency answer versions.

First, we developed the Japanese version of the BOSS by recruiting Japanese athletes. The results of the IT correlation analysis indicated the discriminatory power of the scale items for all the question items in both the answer versions of the BOSS. The results of the EFA indicated that both the answer versions of the scale comprise a one-factor, 11-items structure. It has the same structure as the original BOSS (Wolff et al., 2021). Furthermore, the Cronbach's alpha coefficients for both the answer versions indicated adequate values. Thus, the internal consistency of the scales was confirmed. The CFA results indicate that the goodness of fit index satisfied the evaluation criteria proposed by Oshio (2008). Finally, Pearson's correlation coefficient with the simultaneously measured scale was calculated, and both the answer versions of the BOSS showed low to high correlations with the Japanese versions of the SBPS and BSCS-J. However, unlike in the original study (Wolff et al., 2021), no correlation with ITPS was found. In this study, a Japanese version of the ITPS was tentatively created, and the reliability and validity of the scale were verified to a minimally acceptable extent. Additionally, boredom in sports has been reported to be closely related to goal-directed behavior (e.g., ITPS). However, this was not observed in this study, which could be because the result may be specific to the Japanese population. In future, a Japanese version of the ITPS should be developed and additional validation, including international comparisons, should be conducted.

Based on the above results, the BOSS degree and frequency answer versions were compared. The results showed that the BOSS degree answer version had a better fit with the model and a stronger correlation with the association scale than the BOSS frequency answer version. Therefore, the BOSS degree answer version was adopted and reproducibility was investigated and found to be reproducible. Based on the above results, the BOSS degree answer version was designated as BOSS-J. Although it was not possible to create a scale for

measuring chronic boredom, there has been no research focusing on boredom in sports in Japan to date. Therefore, the creation of the BOSS-J is expected to lead to further research on this topic.

However, this study has certain limitations and future challenges. First, it was more appropriate to measure the degree than the frequency of the BOSS-J items. In previous researches, chronic boredom was a serious issue, but the degree answer version was more appropriate for BOSS-J items. Future research should comprehensively examine boredom in sports using qualitative methods and revisit items with modifications.

The second limitation is regarding variability in the target population. Although this study was limited to collegiate athletes, many factors need to be considered, such as discipline, competition level, and years of experience. These factors would need to be included and analyzed to improve the accuracy of the scale. Third, collegiate athletes are generally considered to be highly motivated toward sports; therefore, the proportion of boredom may be small. In future, different categories (junior and senior high school students or lifelong sports) should be considered.

Conclusion

This study aimed to create a scale to evaluate boredom in sports among Japanese university athletes. Based on the BOSS, we created a reliable and valid Japanese version of the scale (BOSS-J). The study results provide a new perspective on boredom in sports among Japanese collegiate athletes. Moreover, the degree or frequency was more appropriate for the BOSS-J items, and, as in the original study, the degree answer version was found to be more appropriate. The study results suggest that this is a valuable finding, as boredom in sports can be measured in Japan using BOSS-J. Sports clubs offering exercises for health and fitness training may cause individuals to become bored by providing exercise routine that remain unchanged. Consequently, individuals may lose their exercise habits, which may have a negative impact on their health and sports club business. By using BOSS-J, created in this study, to regularly measure boredom levels, we can contribute to the continuation of people's exercise habits. Although these results are intriguing, using them as a basis for clarifying the relationship between boredom and various factors, such as performance and mental health is necessary. We look forward to future researches using the BOSS-J to study boredom in sports in Japan.

Conflicts of interest

There are no conflicts of interest to declare.

Appendix: Japanese version of the scale

No.	Items
1	トレーニングは死ぬほど退屈だ。 The training session bores me to death.
2	運動は退屈だ。 Exercising bores me.
3	運動はつまらなくて単調だ。 Exercising is dull and monotonous.
4	退屈なトレーニングをしている間、時間が止まっているように感じながら過ごしている。 While doing this boring training session, I spend my time thinking of how time stands still.
5	トレーニングはとても退屈で、気づけば別のことを考えている。 The training session is so boring that I find myself daydreaming.
6	運動中に気が散ってしまう。 I find my mind wandering while I exercise.
7	退屈なので、運動する気が起きない。 Because I'm bored, I have no desire to exercise.
8	退屈なトレーニングは、できれば明日まで延ばしたい。 I would rather put off this boring training session till tomorrow.
9	退屈なので、運動中に疲れてしまう。 Because I'm bored, I get tired while exercising.
10	トレーニングはあまりにも退屈で、気力がなくなる。 The training session bores me so much that I feel depleted.
11	運動中、退屈すぎてぼんやりしてしまう。 While exercising I seem to drift off because it's so boring.

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