

DEVELOPMENT AND VALIDATION OF THE JAPANESE SCALE OF MINDFULNESS SKILLS BASED ON DBT STRATEGIES

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ABSTRACT

The present study reports findings regarding the validity and reliability of the newly developed the Japanese Scale of Mindfulness Skills (JSMS) with Japanese female university students (N =513). The scale was designed to measure four skills in DBT strategies: the mindfulness what skills (observing, describing, and participating) and wise mind. Exploratory and confirmatory factor analyses supported a four-factor solution, corresponding to four categories of the scale. Good internal consistency was demonstrated, and the relationships with other psychological variables: psychological symptoms (anxiety, obsessive-compulsive, depression, and interpersonal sensitivity), rumination-reflection, and self-efficacy were largely as expected. Potential theoretical and applied uses of the JSMS and the limitations of the study are discussed.

Keywords: Mindfulness, DBT what skills, Wise mind, Japanese scale, Psychological symptoms.

INTRODUCTION

The discipline of mindfulness originated from Eastern meditation traditions has been integrated into psychotherapies. These psychotherapies are Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn, 1982) and Mindfulness-Based Cognitive Therapy (MBCT; Teasdale, Segal, & Williams, 2003). Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999) and Dialectical Behavior Therapy (DBT; Linehan, 1993) include mindfulness techniques as a key component of the treatment programs. The development of a reliable and valid measure of mindfulness is important to advance the scientific study on the efficacy of mindfulness-based treatments (Dimidjian & Linehan, 2003; Roemer & Orsillo, 2003). There were several measures of mindfulness: The Freiburg Mindfulness Inventory (FMI; Buchheld, Grossman, & Walach, 2001), The Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003), the Kentucky Inventory of Mindfulness Skills (KIMS; Baer et al., 2004), the Cognitive and Affective Mindfulness Scale (CAMS; Feldman et al., 2007), the Southampton Mindfulness Questionnaire (SMQ; Chadwick et al., 2008) and the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2008).

LITERATURE REVIEW

The FMI assesses nonjudgmental, present-moment observations, and openness to negative experience and addresses mindfulness as a general construct. The MAAS has a single-factor structure focusing on the general tendency to be attentive and aware of present-moment experience in daily life. The CAMS composed of four processes needed to reach a mindful state: attention, awareness, present-focus, and acceptance/nonjudgment, but these processes are not measured separately as subscales. The SMQ measures mindful awareness of distressing thoughts and images and composes of mindful observation, letting go, non-

aversion, and nonjudgment which are captured by a single scale. These measures assess a general tendency to be mindful in daily life and have shown promising psychometric characteristics. The KIMS measures four distinct components of mindfulness: observing, describing, acting with awareness, and accepting without judgment and offers the opportunity to assess various components of mindfulness skills and practice found in DBT (Linehan, 1993). The FFMQ is also based on multidimensional concepts of mindfulness and contains five factors: observing, describing, acting with awareness, non-judging of experience, and non-reactivity to inner experience. It is a questionnaire resulting from the combined pool of items from five independent mindfulness measures which are the FMI, the MAAS, the KIMS, the CAMS and the SMQ.

DBT was developed for treating the parasuicidal behavior of individuals diagnosed with borderline personality disorder (BPD). DBT is based on the biopsychosocial theory which emphasizes an interaction between an individual's biological emotional vulnerability and an environment which systematically invalidates their inner experiences and overt behaviors. This combination can develop marked instabilities in interpersonal relationships, self-identity, and affects. BPD is characterized by dysregulating emotions and reacting impulsively. DBT treatment programs comprehensively address these problems and integrate cognitive-behavioral strategies with aspects of mindfulness. Mindfulness is taught as a skill in its own right and also supports the other skills taught in groups as well as the strategies used in the individual sessions.

DBT mindfulness skills are psychological and behavioral translations of Eastern meditation practices. Linehan (1993) presented the mindfulness what skills (observing, describing, and participating) and how skills (nonjudgmentally, one-mindfully, effectively) to apply them. The KIMS (Baer et al., 2004) is the measure of three mindfulness what skills and mindfulness how skills. The subscale of "Observing" measures the ability to pay attention and cultivate openness, awareness, and observation of what is noticeable in the present moment. "Describing" is the ability to find the adequate words to depict what is observed and experienced. "Acting with Awareness" corresponds to "participating" of the mindfulness what skills and "one-mindfully" of the mindfulness how skills. The subscale measures the ability to engage in the activity with undivided attention and to focus with awareness on one thing at a time. "Accepting without Judgment" addresses the ability to accept what is observed in a nonjudgmental way and to allow reality to be as it is without trying to ignore or change it. From a spiritual perspective, DBT includes the supplementary mindfulness skills. "Wise mind" is one of them and is integrated into the practice of mindfulness what and how skills. "Wise mind" is the integration of "emotion mind" and "reasonable mind" and adds intuitive wisdom to current emotional state and logical analysis.

The purpose of the present study was to develop the Japanese mindfulness scale which included the mindfulness what skills ("observing", "describing", and "participating") and "wise mind", and to examine the validity and the reliability of the scale. The second purpose of this study was to use the developed Japanese Scale of Mindfulness Skills to examine the relationship between the mindfulness skills and psychological variables expected to be related to mindfulness. The previous studies reported that mindfulness was negatively related to psychological symptoms (Baer et al., 2004; Buchheld et al., 2001) and rumination (Cardaciotto et al., 2008). Mindfulness was reported to be positively related to psychological well-being such as self-esteem and to facilitate self-regulation and psychological health (Brown & Ryan, 2003). In this study, the correlations between the Japanese Scale of

Mindfulness Skills and psychological symptoms, rumination-reflection, and self-efficacy were analyzed.

Although mindfulness has a multifaceted construct (Roemer and Orsillo, 2003), the multidimensional trait measures of mindfulness are the KIMS (Baer et al., 2004) and FFMQ (Baer et al., 2006). In order to assess various effects of the mindfulness-based treatments such as DBT, the KIMS and FFMQ are very useful. However, the KIMS and FFMQ were suggested to include subscales that are redundant with one another (Cardaciotto et al., 2008). For example, “Describing” of the KIMS is said to be conducted in the context of “Accepting without Judgment”. “Describing” is one of the mindfulness what skills, and “nonjudgmentally” is one of the mindfulness how skills in DBT (Linehan, 1993). The mindfulness how skills are ways to apply what skills. It is useful to develop a new scale to measure each facet of what skills reliably and separately. Since each facet of mindfulness skills may correlate differently with various psychological variables, such as self-efficacy, rumination-reflection, and psychological symptoms, the Japanese Scale of Mindfulness Skills may provide more understanding of mindfulness by clarifying these differential relationships and may also be useful to clarify strengths and weaknesses in the individual’s mindfulness skills.

METHODOLOGY

Participants

Sample 1 consisted of 308 female undergraduate students and, sample 2 consisted of 205 female undergraduate students. They were enrolled in introductory psychology classes in a women’s university. The mean ages of sample 1 and sample 2 were 18.57 ($SD = .69$) and 19.05 ($SD = .86$) years, respectively.

Procedure

Participants completed a packet of random-ordered questionnaires in a classroom setting. The questionnaires of both sample 1 and sample 2 included the items of the Japanese Scale of Mindfulness Skills, the Japanese version of the General Self-Efficacy Scale-12 (JGSES-12; Nakano, Shimohira, & Suzuki, 2007), the Japanese version of the Rumination-Reflection Questionnaire (JRRQ; Takano & Tanno, 2008), and the Japanese version of the Hopkins Symptom Checklist (JHSCL; Nakano & Kitamura, 2001).

Measures

Japanese version of the General Self-Efficacy Scale-12 (JGSES-12)

The JGSES-12 (Nakano, Shimohira, & Suzuki, 2007) is a twelve-item scale and is scored on a 5-point Likert-type scale from 1 (strongly uncharacteristic of me) to 5 (strongly characteristic of me). The scale assesses the belief of a person in his or her ability to execute certain behaviors. The Japanese version of the scale had satisfactory internal consistency (Cronbach’s alpha for the scale of .78). Evidence of construct validity has also been found with respect to other psychological variables ($r = .43$ with another self-efficacy measure; $r = -.60$ with depressive mood). Confirmatory factor analyses which examined the dimensionality of the scale as well as the factor structure also proved the construct validity of the JGSES-12 (AGFI = .90, CFI = .94, RMSEA = .06).

Japanese version of the Rumination-Reflection Questionnaire (JRRQ)

The RRQ (Trapnell & Campbell, 1999) is a 24-item self-report inventory and has two subscales: Rumination assesses neurotic self-consciousness which represents a difficulty regulating emotion and includes judgmental or evaluative attitudes toward one’s thoughts and

experiences. Reflection assesses intellectual, open, and inquisitive self-consciousness. The RRQ demonstrated excellent internal consistency for both scales, and good convergent and discriminant validity (Trapnell & Campbell, 1999). The JRRQ (Takano & Tanno, 2007) also is a 24-item scale and is scored on a 5-point Likert-type scale (1 =strongly disagree and 5 = strongly agree). The JRRQ had satisfactory internal consistency (Cronbach's alpha for the scale of .90). Evidence of concurrent validity has also been found with respect to other psychological variables such as neuroticism ($r = .73$ with Rumination; $r = .13$ with Reflection) and openness to experience ($r = -.06$ with Rumination; $r = .52$ with Reflection) of the NEO-FFI.

The Japanese version of the Hopkins Symptom Checklist (JHSCL)

The HSCL (Derogatis et al., 1974) is widely regarded as a reliable and valid measure of neurotic symptoms. The items of the HSCL demonstrated sensitivity to low levels of symptoms in normal populations. It is scored on five underlying symptom dimensions: somatization, anxiety, obsessive-compulsive, depression, and interpersonal sensitivity. A series of studies have shown the substantial evidences of the constructs validity and reliability. The JHSCL consists of five symptom dimensions and showed satisfactory reliability and validity (Nakano and Kitamura, 2001). Anxiety, obsessive-compulsive, depression, and interpersonal sensitivity out of the five symptom dimensions were used.

The Japanese Scale of Mindfulness Skills (JSMS)

The items were explicitly designed to measure the DBT mindfulness what skills: "observing", "describing", and "participating" and "wise mind" which is integrated into the practice of the DBT mindfulness what and how skills. Items were rated on a 4-point Likert-type scale ranging from 1 (poor) to 4 (very good). The definitions of the item categorization, shown in Table 1, were described in the introduction section.

Statistical analyses

The analysis was divided into four parts. First, the explanatory factor analysis was conducted on the items of the Japanese scale of mindfulness skills with the participants in sample 1. Secondly, the confirmatory factor analysis was conducted on the data of the sample 2 to investigate whether the factor structure would be maintained in another sample. Cronbach's α coefficients were also calculated to determine the internal consistency reliability. Thirdly, Pearson correlations were calculated among the factors of mindfulness skills and various psychological variables, such as self-efficacy, rumination-reflection, and psychological symptoms with all participants. Fourthly, multiple regression analyses were conducted to test the relationships between four symptom dimensions (anxiety, obsessive-compulsive, depression, and interpersonal sensitivity) and the four mindfulness skills. A p -value of < 0.05 was considered to be statistically significant for all statistical analyses.

RESULTS

Exploratory factor analysis

An exploratory factor analysis of the JSMS was conducted. The correlation matrix of the JSMS items of 308 participants was subjected to principal-axis factor analysis followed by oblique rotation. The number of factors retained for final solution was determined by setting the eigenvalue criterion at 1.0. This analysis identified four factors accounting for 53.89 % of the variance and this solution was interpretable, with six items loading on Factor 1 (eigenvalue = 4.10, variance explained = 21.59%), six items loading on Factor 2 (eigenvalue = 2.83, variance explained = 14.91%), four items loading on Factor 3 (eigenvalue = 1.72, variance explained = 9.07%) and three items loading on Factor 4 (eigenvalue = 1.58, variance

explained = 8.32 %). The oblique-rotated factor loadings for the four-factor solutions are shown in Table 1. Results (see Table 1) indicated that the JSMS can be a measurement interpreted as mindfulness and supported categorization of the JSMS items as four subscales of “participating” (6 items), “wise mind” (6 items), “observing” (4 items), and “describing” (3 items).

Table 1. Items and Pattern Matrix of the Japanese Scale of Mindfulness Skills

Item	Factor Loading			
	Factor 1	Factor 2	Factor 3	Factor 4
“Participating” Cronbach’s $\alpha = .84$				
Being focused only on what is done	.87	.06	-.03	-.14
Getting wrapped up in doing things	.86	-.11	-.03	-.10
Paying attention to what is done	.72	-.16	.14	-.08
Being only focused on what I’m doing	.68	.02	.01	.19
Focusing on one thing at a time.	.58	.13	-.01	.15
Getting absorbed in what is done	.55	.11	-.03	.07
“Wise mind” Cronbach’s $\alpha = .71$				
Identifying what works and is effective	.14	.74	-.09	.13
Integrating all ways of knowing to the situation	.13	.74	-.04	-.03
Finding middle path between opposites	-.15	.70	-.03	-.16
Accepting the moment just as it is	.01	.65	-.10	-.06
Tolerating distress without impulsively doing things	-.12	.57	.15	.05
Accessing the wisdom to know what is needed	-.02	.56	.21	.05
“Observing” Cronbach’s $\alpha = .82$				
Paying attention to sounds	.03	-.07	.73	-.06
Noticing smells and aromas	.04	-.15	.73	.13
Paying attention to sensations	-.07	.13	.70	.07
Noticing visual elements	.07	.15	.67	-.16
“Describing” Cronbach’s $\alpha = .74$				
Finding words to describe feelings	-.01	-.08	.05	.80
Finding words to describe thoughts	-.07	.02	.01	.78
Describing body sensations	.07	.01	-.08	.77
Eigenvalue	4.10	2.83	1.72	1.58
% of variance accounted for	21.59%	14.91%	9.07%	8.32%

Confirmatory factor analysis and reliability analysis

The four-factor model of “participating”, “wise mind”, “observing”, and “describing” was suggested by the results with the participants of sample 1, so the model was tested with

another sample. A confirmatory factor analysis of the JSMS with 19 items was conducted on the data of the sample 2. For fit indices, the Goodness of the fit index (GFI), the Normed-Fit Index (NFI), the Comparative Fit Index (CFI), and the root mean square error of approximation (RMSEA) were examined. The values of the GFI, the NFI, and the CFI range from zero to 1.00, with a value close to 1.00 indicating a better fit (Arbuckle & Wothke, 1999). For the root mean square error of approximation values of less than 0.08 are considered an adequate fit (MacCallum, Browne, & Sugawara, 1996). The four-factor model of “participating”, “wise mind”, “observing”, and “describing” of the JSMS constituted an acceptable fit to the data (GFI = 0.94, NFI = 0.95, CFI = 0.96, and RMSEA = 0.06).

The reliability analyses of the present study on the JSMS showed that the instrument had acceptable reliability. An estimate of internal consistency (Cronbach’s alpha) revealed alpha coefficients of .89, .81, .76 and .73 for “participating”, “wise mind”, “observing”, and “describing,” respectively.

Relationship to other variables

Pearson product-moment correlations were calculated between four subscales of the JSMS and self-efficacy, rumination-reflection, and psychological symptoms. As expected, significantly negative correlations were found between four subscales of the JSMS (“participating”, “observing”, and “describing”, “wise mind”) and psychological symptoms (anxiety, obsessive-compulsive, depression, and interpersonal sensitivity) and rumination. Significantly negative correlations were also found between mindfulness skills except “describing” and reflection. Self-efficacy is significantly correlated with mindfulness skills except “observing”. Means and standard deviations of four mindfulness skills, self-efficacy, rumination-reflection, and four psychological symptoms are also shown in Table 2.

Table 2. Means, Standard Deviations, and Pearson Correlation Coefficients of Variables (N = 513)

変数	<i>M (SD)</i>	1	2	3	4	5	6	7	8	9	10
1. Participating	20.81 (4.57)	—									
2. Observing	12.19 (2.81)	.28**	—								
3. Describing	7.19 (2.09)	.36**	.06	—							
4. Wise mind	12.91 (3.45)	.56**	.29**	.24**	—						
5. Self-efficacy	29.22 (4.41)	.29**	-.04	.38**	.25**	—					
6. Rumination	37.90 (6.35)	-.56**	-.32**	-.29**	-.53**	-.34**	—				
7. Reflection	34.77 (5.21)	-.26**	-.35**	-.04	-.29**	-.09*	.44**	—			
8. Anxiety	14.97 (5.25)	-.48**	-.19**	-.34**	-.39**	-.35**	.42**	.17**	—		
9. Obsessive-compulsive	21.24 (5.65)	-.50**	-.15*	-.40**	-.43**	-.42**	.45**	.18**	.72**	—	
10. Depression	25.63 (7.66)	-.50**	-.10*	-.31**	-.36**	-.37**	.37**	.11*	.79**	.72**	—
11. interpersonal sensitivity	21.10 (6.43)	-.52**	-.11*	-.34**	-.41**	-.42**	.45**	.15**	.75**	.76**	.81**

**p < .001, *p < .05,

Four multiple regression analyses were conducted to test relationships between four mindfulness skills (“wise mind”, “participating”, “observing”, and “describing”) and psychological symptoms (anxiety, obsessive-compulsive, depression, and interpersonal

sensitivity). The combination of “wise mind”, “participating”, and “describing” accounted for significant variation in anxiety, R -square = .28, $F(3, 510) = 65.78$, $p < .001$. “Wise mind”, “participating”, and “describing” explained 1.7%, 23.2% and 3.1% of variance in anxiety, respectively. Anxiety is negatively related to three mindfulness skills. The combination of “wise mind”, “participating”, and “describing” also accounted for significant variation in obsessive-compulsive, R -square = .33, $F(3, 510) = 84.85$, $p < .001$. “Wise mind”, “participating”, and “describing” explained 3.2%, 25.1% and 5.1% of variance in obsessive-compulsive, respectively. Obsessive-compulsive is negatively related to three mindfulness skills. The combination of “wise mind”, “participating”, and “describing” accounted for significant variation in depression, R -square = .28, $F(3, 510) = 64.84$, $p < .001$. “Wise mind”, “participating”, and “describing” explained 1.5%, 24.9% and 1.8% of variance in depression, respectively. Depression is negatively related to three mindfulness skills. The combination of “wise mind”, “participating”, and “describing” accounted for significant variation in interpersonal-sensitivity, R -square = .32, $F(3, 510) = 78.13$, $p < .001$. “Wise mind”, “participating”, and “describing” explained 1.5%, 27.2% and 2.8% of variance in interpersonal-sensitivity, respectively. Interpersonal-sensitivity is negatively related to three mindfulness skills. The results obtained from the multiple regression analyses are presented in Table 3.

Table 3. Stepwise Regressions of Psychological Symptoms on the Mindfulness skills

Variables	Anxiety		Obsessive-compulsive		Depression		Interpersonal sensitivity	
	$R^2 = .28^{***}$		$R^2 = .33^{***}$		$R^2 = .27^{***}$		$R^2 = .21^{***}$	
	β	t	β	t	β	t	β	t
Wise mind	-.16	-3.49 ^{***}	-.20	-4.62 ^{***}	-.11	-2.35 [*]	-.15	-3.36 ^{**}
Participating	-.33	-6.85 ^{***}	-.30	-6.52 ^{***}	-.39	-8.15 ^{***}	-.38	-8.11 ^{***}
Observing	—	—	—	—	—	—	—	—
Describing	-.18	-4.48 ^{***}	-.24	-6.24 ^{***}	-.14	-3.48 ^{***}	-.17	-4.35 ^{***}

*** $p < .001$, ** $p < .01$, * $p < .05$

DISCUSSION

The purpose of this study was the development and validation of the Japanese Scale of Mindfulness Skills (JSMS) which was designed to measure four skills in DBT strategies. Four skills were the mindfulness what skills (“observing”, “describing”, and “participating”) and “wise mind”. A four-factor structure was demonstrated in the initial sample and confirmed in a second sample. The results suggested that the JSMS adequately measures the constituents, the mindfulness what skills (“observing”, “describing”, and “participating”) and “wise mind”. The reliability estimates indicated that the JSMS had acceptable levels of internal consistency. Based on these results, the nineteen-item scale of the four-factor model was employed as the JSMS (Japanese Scale of Mindfulness Skills).

Relationships between the JSMS subscales and other psychological variables were largely as expected. The JSMS “observing” subscale was negatively related to rumination and reflection, and psychological symptoms (anxiety, obsessive-compulsive, depression, and interpersonal sensitivity). The negative correlations between the JSMS “describing” subscale and rumination and psychological symptoms were significant. The positive correlation

between the JSMS “describing” subscale and self-efficacy was significant. The negative correlations between the JSMS “participating” subscale and rumination and reflection and psychological symptoms were significant, and the positive correlation between the JSMS “participating” subscale and self-efficacy was significant. The JSMS “wise mind” subscale was negatively related to rumination, reflection, and psychological symptoms, and was positively related to self-efficacy.

The general pattern of correlations between the JSMS subscales and psychological symptoms were consistent with the theoretical expectations. The results of the multiple regression analysis further indicated that the combination of “wise mind”, “participating”, and “describing” negatively contributed to psychological symptoms, and showed symptoms preventing effect. “Observing” did not account for significant variation in any psychological symptoms. The “Observing” subscale of the KIMS was reported to be unrelated to the severity of psychological symptoms (Nicastro et al., 2010). “Observing” is intentionally attending to internal or external stimuli and addresses direct experience, without cognitive evaluation of what is observed (Linehan, 2015). Although “observing” is one of the mindfulness what skills, the ability to observe might be distinct from the ability to describe and participate.

DBT mindfulness skills (Linehan, 1993) consist of what skills (“observing”, “describing”, and “participating”) and how skills (“nonjudgmentally”, “one-mindfully”, “effectively”). The KIMS (Baer et al., 2004) is the measure of three mindfulness what skills and mindfulness how skills. What skills have to do with what one observes, describes, and participates. How skills are about how to observe, describe, and participate. DBT includes the supplementary mindfulness skills besides what skills and how skills. Wise mind is one of them and is integrated into the practice of mindfulness what and how skills. The subscales measured in the KIMS are most similar to the mindfulness skills as it is taught in DBT. However the KIMS subscales are redundant with one another (Baer et al., 2004; Cardaciotto et al., 2008). The KIMS “Describing” subscale is said to be conducted in the context of the “Accepting without Judgment” subscales. “Nonjudgmentally” is one of the mindfulness how skills in DBT (Linehan, 1993). DBT mindfulness has a multifaceted construct. A tool which assesses various effects of each DBT mindfulness skill seems to be needed. The JSMS was developed to measure each facet of what skills reliably and separately. The results of this study suggest that the JSMS might be useful for clinicians in the applications and for individuals in the practice of DBT mindfulness skills.

The results of this study must be viewed in light of several limitations on the generalizability of the results. The analyses were conducted only on female college students, even though DBT is a cognitive-behavioral treatment including mindfulness skills training developed especially for BPD. BPD is more frequently diagnosed in women (Johnson et al., 2003). The homogeneity of the participants of the present study limits generalizability. Further studies with more diverse samples should be conducted to analyze the psychometric properties of the JSMS in clinical samples and in training groups of DBT mindfulness skills. Despite these limitations, the results of this research provided support for the use of the mindfulness skills measure examined herein, for the practice of DBT skills training.

CONCLUSIONS

A marked increase in interest in mindfulness had an impact on the development of psychotherapies. One of them is DBT (Linehan, 1993; Linehan, 2015). The development of a

reliable and valid measure of DBT mindfulness skills seems important to advance the scientific study on the efficacy of the skills. This study examined the validity and reliability of the newly developed the Japanese Scale of Mindfulness Skills (JSMS). The scale was designed to measure four skills in DBT strategies: the mindfulness what skills (“observing”, “describing”, and “participating”) and “wise mind”. Exploratory and confirmatory factor analyses supported a four-factor solution, corresponding to the four subscales of the JSMS. Good internal consistency was demonstrated, and correlations to other psychological variables: psychological symptoms (anxiety, obsessive-compulsive, depression, and interpersonal sensitivity), rumination-reflection, and self-efficacy were largely as expected. Results provide preliminary support for the use of the JSMS to measure four DBT what skills and “wise mind” independently, as well as to examine their differential effects in psychological symptoms. Although several limitations of this research should be noted, the JSMS might facilitate the scientific investigation on the effects of DBT mindfulness skills independently.

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