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Original Article

Standardization and Study of Some Psychometric Properties of the Washington University Sentence Completion Test (Long-form) among the Iranian Students

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Abstract

Background and Objective: The Washington University Sentence Completion Test (WUSCT) is one of the tools used to assess personality. Personality assessment helps to make decisions, diagnose, and choose the right treatments. Therefore, this study aimed to investigate the standardization of some psychometric properties of the WUSCT among Iranian students.

Materials and Methods The statistical population of this descriptive survey study included 287 medical students who were studying in Tehran, Iran, in the academic year 2015. Internal consistency, test-retest reliability, and inter-rater agreement were used to assess the reliability; moreover, the convergent validity was utilized to evaluate the construct validity of the WUSCT. The obtained data were analyzed in SPSS software (version 21).

Results: The results of the present study indicated that the acceptable internal consistency of the WUSCT (P<0.001). Furthermore, the test re-test reliability of the WUSCT was determined at 0.86 (P<0.001). The correlation between the total scores of the two examiners was obtained at 0.88 (P <0.001). Moreover, the results of the convergent validity indicated the strongest correlation between ego development and ego strength (P<0.001).

Conclusions: The results of the present study indicated that the WUSCT had the appropriate and acceptable validity and reliability in Iranian society. Accordingly, this test can be an appropriate tool for measuring personality.

Keywords: Reliability, Validity, Washington university sentence completion test

Background

Assessment is the most important activity of clinical psychologists after psychotherapy. Even historically, the most important activity of psychologists was assessment in the 1940s. Clinical psychologists spend 15% to 23% of their time doing the assessment, especially personality assessment [1, 2]. The most important benefits of assessment for clinical psychologists include assistance in terms of making decisions about problem-solving, research, and diagnosis, as well as the selection of appropriate treatments for patients [2-4]. Personality assessment helps to identify personality traits [1]. Studies have shown that personality tests are used to diagnose psychopathology, predict treatment discontinuation, and select treatment. These issues illustrate the importance of assessment in clinical psychology [5-8]. One of the tests used to assess personality is the Washington University Sentence Completion Test

(WUSCT). This test is based on Jane Loevinger's theory of ego development [5]. In this test, the ego developments are classified into eight stages, namely impulsive, self-protective, conformist, self-aware, conscientious, individualist, autonomous, and integrated. Loevinger identifies the stages of ego development based on impulse control, interpersonal relationships, and mental occupations. In Loevinger's theory, ego as the dominant characteristic of the personality enables the individual to understand the interpersonal and communication experiences [5]. Ego development may be stopped, which may be due to biological constraints and the level of psychopathology in childhood [7-9]. The higher stages represent a mature ego that is able to adapt, resolve interpersonal conflicts, and solve problems; moreover, it has empathy, emotion regulation, and integrated identity [6]. Low ego development is

associated with impulsivity, duplicity, ambivalence in relationships, and emotion dysregulation [7]. Many studies have examined ego development which has been used in predicting psychopathology, substance abuse, personality traits, coping with stress, attachment styles, parenting style, and gender differences [10-12].

Many studies have confirmed the validity and reliability of the WUSCT [7-10]. In the studies conducted by Loevinger, the internal consistency of this scale was obtained at 0.91 (Cronbach's alpha), and test-retest reliability ranged between 0.80 and 0.90 [11]. Other studies have reported the split-half reliability of 0.90 and 0.91 [12]. One study reported the inter-rater reliability of WUSCT for the overall score of ego development between 67% and 89%. The construct and differential validities of the Sentence Completion Test were confirmed in other studies [11]. Furthermore, some other studies have confirmed the reliability of this questionnaire in clinical groups [13].

With this background in mind, it is essential to have valid and reliable tools for personality assessment, and the most common way for clinical psychologists to know evidence-based, reliable, and validated tests for personality assessment is to conduct normative research and identify the psychometric properties of the tests [1, 2]. The WUSCT has high reliability and validity and has been studied in many countries. However, little research has been conducted in this regard in Iran.

Objectives
Therefore, this study aimed to investigate the standardization of some psychometric properties of the WUSCT (Long-form) among Iranian students.

Materials and Methods
This descriptive survey study investigated the reliability and validity of one of the psychometric tools. The statistical population of the present study included the students of Tehran Universities of Medical Sciences, Tehran, Iran, who were studying basic and medical sciences in 2015. The samples were selected using the available sampling method (n=287), and the subjects participated in the study voluntarily. The inclusion criteria were willingness to participate in the study, being a student, and lack of acute psychiatric illness. On the other hand, the students who were unwilling to participate in the research, as well as those who had acute psychiatric illnesses based on the self-report and handed incomplete questionnaires were excluded from the study. The validity and reliability of the WUSCT also included the determination

of internal consistency, test-retest reliability, agreement between examiners, and convergent validity. The data were collected using the WUSCT and Cattell's 16 Personality Factors (16PF) Questionnaire. Subsequently, the obtained data were analyzed in SPSS software (version 21).

Reliability and Validity Assessment
Initially, the questionnaire was prepared, and according to the standard method of "Re-translation", it was first translated into English by an English language specialist, and again translated into English by another specialist (Reverse translation). In the next step, the questionnaire was given to 10 clinical psychologists and Ph.D. candidates in clinical psychology to check the accuracy of the translation and the appropriateness of the test materials for the projective and semi-projective tests. After obtaining the approval of the experts, the questionnaire was given to the respondents at the implementation stage. Cronbach's alpha was used to investigate the internal consistency of the questionnaire. Test reliability was examined in 50 subjects two weeks apart. Due to the fact that the WUSCT score was rated by two testers, and due to the nature of the WUSCT and the role of the mental factor, the correlation between the total scores of the two testers was used to assess the inter-rater reliability. It is not appropriate to specify the validity of the WUSCT test using the classical principles proposed by Cronbach and Meehl [14]. According to Loevinger, the methods to examine the construct validity of the WUSCT include the use of tests equivalent to the theory of ego development (convergent validity), longitudinal studies to examine the sequence of stages of ego development, and various personality variables as a form of convergent validity [15]. In the present study, the first method was employed to determine construct validity. Furthermore, Cattell's 16PF Questionnaire subscale consisting of emotional stability (ego strength), emotional sensitivity, dominance, and rule consciousness was utilized to evaluate the convergent validity of the WUSCT.

Washington University Sentence Completion Test
The WUSCT is a semi-projective test introduced by Loevinger in 1970. It should be mentioned that it has been recently revised in 1996 [10]. The long-form of this test has 36 incomplete sentences, and the respondents are asked to complete any sentences that come to mind. Some items in this test include: "*When a child will not join in group activities…*" and "*When I am criticized...*". The time

Table 1. Quantitative scoring method in the Washington University Sentence Completion Test

E2: *Impulsive*	Total scores between 72-134	E6: *Conscientious*	Total scores between 181-200
E3:Self-protective	Total scores between 135-150	E7: *Individualist*	Total scores between 201-216
E4: Conformist	Total scores between 151-162	E8: *Autonomous*	Total scores between 217- 236
E5: Self-aware	Total scores between 163-180	E9: *Integrated*	Total scores between 236 and above

Table 2. Rules for scoring the Washington University Sentence Completion Test

1. Score each item based on the theory and guideline for scoring in one of the stages of ego development

2. In cases where you have difficulty determining the stages due to the complex responses of the subject, for example, you were hesitant between stages 4 or 5, choose the higher stage.

3. In cases where the answers cannot be determined based on the scoring guide, use the theory of ego development in general to score

4. For any item that the subject did not respond to or completed incompletely, score the E4.

required to complete the test is between 20 and 30 minutes. This questionnaire has separate forms for males, females, and children. The test items are coded on an eight-stage scale from E2 (Impulsive ego) to E9 (Integrated ego), and then the overall score of the ego development is calculated based on the scoring guide designed by Loevinger based on the theory of ego development. The most common way to score is to use the sum or average of the test items. In addition, the development stage of the ego that has the most frequency is another method of scoring. Table 2 shows the scoring rules for this test [10].

The reliability and validity of this test have been confirmed in some studies [9-16]. In a comprehensive review study, Gilmore and Durkin [17] examined the psychometric characteristics of the WUSCT. The results of their study indicated the suitable validity and reliability of this test. Moreover, other studies estimated the interrater reliability between 0.75 and 0.85 and confirmed the construct validity of this test [15].

The 16 Personality Factor Questionnaire

The 187-item 16PF Questionnaire was developed by Raymond B. Cattell in 1970 [18]. This questionnaire measures 16 personality factors based on Cattell's theory of personality. Various studies have confirmed the psychometric characteristics of this scale [18]. Furthermore, the psychometric properties of this questionnaire have been confirmed in Iran [19]. The Cattell's 16PF Questionnaire subscale consisting of emotional stability (ego strength), emotional sensitivity, dominance, and rule consciousness was used to evaluate the convergent validity of the WUSCT.

Result

The results of the statistical analysis of demographic characteristics data indicated that the majority (56%) of the subjects were female; however, 4% of the subjects had unknown gender due to incomplete completion of the demographic characteristics form. Moreover, 47% of the subjects were undergraduates. The mean age of the respondents was obtained at 22.40 years. Table 3 tabulates the reliability of the WUSCT based on the internal consistency method. Cronbach's alpha method was used to calculate the internal consistency of this scale (0.88), which indicated the high internal consistency of this questionnaire. The retest reliability for WUSCT with a two-week interval in 50 subjects was determined at 0.86. In addition, since the WUSCT scoring was rated by two examiners and considering the nature of the WUSCT, as well as its subjectivity factor, the correlation between the total scores of the two examiners was used to assess the reliability of the agreement between the evaluators. Accordingly, the correlation between the ego development scores of the two scorers was determined at 0.88.

The correlation of each subscale with the total WUSCT score at $P<0.001$ was significant, and its range was between 0.46 and 0.81 (Table 4).

The Cattell's 16PF Questionnaire subscale consisting of emotional stability (ego strength), emotional sensitivity, dominance, and rule consciousness was utilized to evaluate the convergent validity of the WUSCT. The results showed a significant (the strongest) correlation between ego development and ego strength ($P>0.001$) (Table 5).

Table 3. Internal consistency, retest reliability, interrater reliability

Variables	Cronbach's alpha	Retest reliability	Interrater reliability
The total score of the WUSCT	0.884	0.863	0.822

All correlations are significant at the P<0.001 level

Table 4. Items' correlation with a total score

	Items	Item correlation with a total score
1	When a child will not join in group activities …	0.81
2	Raising a family…	0.76
3	When I am criticized…	0.55
4	A man's job…	0.46
5	Being with other people…	0.65
6	The thing I like about myself is…	0.55
7	My mother and I…	0.76
8	What gets me into trouble is…	0.81
9	Education…	0.78
10	When people are helpless…	0.68
11	Women are lucky because…	0.78
12	A good father…	0.61
13	A girl has a right to…	0.67
14	When they talked about sex, I…	0.80
15	A wife should…	0.73
16	I feel sorry…	0.61
17	A man feels good when…	0.71
18	Rules are…	0.78
19	Crime and delinquency could be halted if…	0.75
20	Men are lucky because…	0.72
21	I just can't stand people who…	0.62
22	At times, she worried about…	0.63
23	I am …	0.58
24	A man feels good when…	0.61
25	My main problem is…	0.57
26	A husband has the right to…	0.50
27	The worst thing about being a woman…	0.58
28	A good mother…	0.63
29	When I am with a man…	0.67
30	Sometimes, she wished that…	0.80
31	My father…	0.77
32	If I can't get what I want…	0.71
33	Usually, she felt that sex…	0.69
34	For a woman a career is…	0.80
35	My conscience bothers me if…	0.77
36	A woman should always…	0.72

Table 5. Correlation coefficient between the Cattell's 16 Personality Factors subscales and the WUSCT

Cattell's 16 Personality Factors Subscales	WUSCT
Ego strength	0.892
Emotional sensitivity	0.864
Dominance	0.872
Rule consciousness	0.734

All correlations are significant at the $P<0.001$ level

Discussion

This study aimed to investigate the standardization of some psychometric properties of the WUSCT (Long-form) among Iranian students. This semi-projective questionnaire is based on Loevinger's theory of ego development [10]. The results of the present study indicated that the WUSCT had appropriate and acceptable reliability. This finding is consistent with the results of previous studies. In a study, Loevinger [11] reported reliability of 0.91 using Cronbach's alpha. Similarly, Noam et al. [20] obtained a Cronbach's alpha of 0.89 in their meta-analysis. The test-retest reliability in the present study was estimated at 0.86, and the reliability coefficient between the evaluators was determined at 0.80, which was in line with that obtained by the most previously conducted studies [11-16]. Redmore and Waldman [21], as well as Hausser

[22], reported test-retest coefficients of 0.88 and 0.89, respectively.

This finding is plausible given that Loevinger provided the integrated scoring guide for this questionnaire [14]. One of the most important criticisms of projective and semi-projective tests is mentalization-based scores and interpretations. Loevinger et al. have presented a guide to scoring the ego development that reduces interpretations and presentation of mind-based scores [14].

The results of convergent validity indicated the strongest correlation between ego development and ego strength. Loevinger argues that the construct validity of imaging tests is not possible based on the classical principles proposed by Cronbach and Meehl; however, those personality variables and tools that are consistent with ego development theory can be used to examine the validity of the WUSCT [14, 15]. Sutton and Swenson [23] found a significant correlation of the WUSCT with the unstructured interview and the Thematic Apperception Test. In one study [24], the correlation between the WUSCT and the California Personality inventory was examined, and there was a remarkable correlation between the two tests.

In another study, Lorr and Manning [25] confirmed the validity of the constructs of the WUSCT. They compared the characteristics of each stage of ego development with 17 bipolar structures that included interpersonal styles. The individualized stage of ego development was associated with independence and autonomy, tolerance of ambiguity, and psychological complexity. In line with these findings, according to Cattell's theory of personality, individuals who achieve high scores on the emotional stability scale (ego strength) have greater interpersonal relationships and conflict resolution, as well as autonomy [5]. The short form of this test has been standardized in Iran, and several studies confirmed the validity and reliability of this test [26].

Conclusions

Therefore, the results of the present study support the psychometric properties of the WUSCT in Iranian society. One of the most important limitations of the present study was the inclusion of students and non-clinical groups, which makes the generalization of findings difficult. Therefore, it is suggested that future studies use non-student samples and clinical groups.

Conflicts of Interest
There is no conflict of interest to be declared.

Authors' contributions
All authors contributed to this study, and they all read and approved the final manuscript.

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