

Reliability and Validity of the Turkish Version of Work Readiness Scale for Graduate Nurses Among Senior Nursing Students

Mezun Hemşireler İçin Çalışmaya Hazırlık Ölçeği Türkçe Formu'nun Hemşirelik Son Sınıf Öğrencilerinde Geçerlik ve Güvenirliği

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ABSTRACT

Objective: This study aimed to test the validity and reliability of the work readiness scale for graduate nurses among senior-class Turkish nursing students.

Methods: This is a study of methodological design. A method of translation—back translation, pilot testing, and exploring content validity through a review of 10 raters—was used to create the Turkish version of the work readiness scale. The work readiness scale for graduate nurses was applied to 1008 senior nursing students enrolled in 15 universities in Turkey. Demo version of SPSS 28 and Lisrel 9.2 for Windows was used for statistical analysis. Reliability was evaluated with Cronbach's alpha, and the scale's factor construct was explored with confirmatory factor analysis.

Results: The content validity index of the scale was found to be 0.97. Confirmatory factor analysis revealed that the general fit coefficients related to a 4-factor model were acceptable. The convergent and discriminant validity results obtained from factor loadings were largely supported. The Cronbach alpha reliability coefficient of the scale was found to be 0.93.

Conclusion: The Turkish version of the work readiness scale for graduate nurses was found to be valid and reliable and can be used in the Turkish population to assess work readiness.

Keywords: Nursing, validity and reliability, work

ÖZ

Amaç: Bu araştırma, Mezun Hemşirelerin İşe Hazırlık Ölçeği'nin son sınıf Türk hemşirelik öğrencilerinde geçerlik ve güvenirliliğini test etmek amacıyla planlanmıştır.

Yöntemler: Çalışmada metodolojik tasarım kullanılmıştır. Mezun Hemşirelerin İşe Hazırlık Ölçeği'nin Türkçe versiyonunu oluşturmak için çeviri - geri çeviri, pilot test ve sonrasında 10 uzmanın incelemeyle içerik geçerliliği yöntemi kullanılmıştır. Ölçek, Türkiye'de ki 15 üniversitede kayıtlı 1008 hemşirelik son sınıf öğrencisine uygulanmıştır. İstatistiksel analiz için SPSS 28 ve Lisrel 9.2'nin demo versiyonu kullanılmıştır. Güvenirlik Cronbach alfa ile değerlendirilmiş ve ölçeğin faktör yapısı doğrulayıcı faktör analizi doğrulanmıştır.

Bulgular: Ölçeğin kapsam geçerlilik indeksi 0,97 idi. Doğrulayıcı faktör analizi sonucunda 4 faktörlü bir modele ilişkin genel uyum katsayılarının kabul edilebilir olduğunu ortaya koydu. Faktör yüklerinden elde edilen yakınsak ve ayırt edici geçerlik sonuçları büyük ölçüde desteklenmiştir. Ölçeğin Cronbach alfa güvenirlik katsayısı 0,93 olarak bulunmuştur.

Sonuç: Mezun Hemşireler İşe Hazırlık Ölçeğinin Türkçe versiyonu geçerli ve güvenilir bulundu. Ölçeğin Türkçe versiyonu, Türk popülasyonunda işe hazır olma durumunu değerlendirmek için kullanılabilir.

Anahtar Kelimeler: Hemşirelik, geçerlilik ve güvenirlilik, iş

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INTRODUCTION

Work readiness refers to the extent to which graduates possess the abilities and competencies they need to be successful in the working environment.¹ The competencies graduates exhibit as employees or individuals shape their contributions to society. It is reported that individuals new to the profession who possess work readiness skills are more successful in their transition into working life and in fulfilling their duties as required by their jobs.²⁻⁵

In recent years, many economic, technological, and demographic changes have taken place which have in turn changed the expectations of employers and institutional administrators with regard to work readiness.⁶ To ensure long-term success, employers expect graduates to possess the skills of problem-solving, communication, teamwork, and innovation as well as related competencies.^{7,8} A large majority of the studies conducted in various countries on work readiness relate to the attributes that employers seek in job candidates and their expectations in this regard.⁹⁻¹³ Additionally, qualitative studies have been undertaken that have explored subject matter such as individuals' working experiences in the healthcare setting prior to starting as professionals, their social integration into the working environment, and the views of educators and nursing leaders regarding the concept of work readiness.^{9,14,15}

In a study, the researchers evaluated the concept of "work readiness" in terms of the work attributes of university graduates and their functional competencies and development at the workplace from the perspective of employment.¹⁶ In another study, the scope of work readiness and competence was examined and then the work readiness scale was developed. The subscales of the study were defined as personal work characteristics known as self-awareness and adaptability, work competence related to problem-solving skills and clinical abilities, social intelligence, concerned with communication skills, and organizational acumen related to social responsibility, and work ethic.¹⁰ After that, Walker et al¹ adapted and refined the scale for the field of nursing, and these 4 sub-dimensions were also confirmed.

The healthcare industry is one of the fields that benefit from the systematic improvement graduates are able to bring to their skills and competencies regarding work readiness. In the last 40 years, many studies have revealed that individuals suffer from a high rate of burnout in the first 18 months after being initially hired because of fatigue and the confusion caused by their workload.¹⁷⁻¹⁹ The transition from being a student to becoming a professional is defined by a turbulent period of stress and anxiety.²⁰⁻²² In studies carried out on nurses newly starting out on their careers, it has been shown that in their first years of employment, 33%–61% of nurses plan to quit the profession or make a change in their workplaces.^{20,23,24} Furthermore, due to the shortage in the number of nurses per capita in Turkey, the marked increase in the quotas placed on college-graduate nurses in the last 20 years is particularly striking. The rise in quotas has given way to shortages in many schools of classrooms, laboratories, and clinical practice sites.²⁵ As a result, ensuring that newly graduated nurses make the transition and integration into their jobs with ease and start off with more job readiness requires above all the assessment of work readiness with a valid and reliable instrument.

This study was conducted to create a Turkish adaptation of the English version of the work readiness scale for graduate nurses

and to carry out psychometric analysis of the data obtained from senior nursing students.

METHODS

Design and Participants

The study is of methodological design. It was carried out between February 2016 and June 2016 in a total of 15 universities in 4 cities in Turkey (6 state and 9 foundation universities), with senior-class nursing students enrolled in an undergraduate nursing program (Figure 1). The average age of the students was 22.54 ± 1.37 and 81.6% were women, and 63.9% of the participants were studying at a state university. The number of students participating in the study from the relevant universities ranged from 16 to 150. It is generally advised that adaptation and validation studies for a scale be conducted with 10 times the sample population of the number of items in the scale. In the literature, it has been stated that reaching 10 times the number of items in the scale would be sufficient for validity and reliability analysis.²⁶ In this context, the study was completed with 1008 people. The retest was conducted with 73 individuals 4 weeks after the initial data collection.

Instrument: Work Readiness Scale for Graduate Nurses

Based on the Work Readiness Scale for Graduate Nurses (WRS-GN) developed by Caballero et al.¹⁰ Walker et al¹ worked to shorten the scale to adapt it for use with nurses, testing it for validity and reliability. The scale comprises 46 items and is made up of 4 subscales. The responses to the questions are scored on a scale of 0-10 (0=I definitely disagree and 10=I definitely agree). In the testing of the scale conducted by Walker et al¹ in 2015, the overall Cronbach alpha value was found to be 0.92; the value for the work competence(WC) subscale was 0.88, the social intelligence (SI) subscale was 0.87, the organizational acumen (OA) subscale coefficient was 0.85 and that of the personal work characteristics (PWC) subscale was 0.84. Higher values in WC, SI, and OA indicate better work readiness while lower values in PWC represent better work readiness.

Translation

In order to test the linguistic validity of the WRS-GN, the original English scale was translated into Turkish by 2 separate individuals, one a linguist and the other a faculty member. The researchers compiled the 2 Turkish versions into a single scale after their review and this Turkish questionnaire was sent to 2 separate linguists to be back-translated into English. The researchers then reviewed the 2 versions of the back translation and incorporated them into a single form.²⁶ Afterward, the back-translated version of the scale was sent to Walker for review. Walker's feedback was requested about 2 items (39 and 46) that were thought to be vague and these were revised to afford more comprehensibility. In accordance with Walker's feedback, revisions were made to item 39 ("I become overwhelmed by challenging circumstances") and item 46 ("Approaching senior people at work is a weakness for me").

Following the translation process, 10 experts from among academics in the fields of public health nursing, nursing fundamentals, internal medicine nursing, and nursing education were asked to rate the content validity of the scale. The experts rated each item for relevance and comprehensibility with content validity index (1 point: not relevant, 4 points: very relevant).²⁷ When the opinions of 10 experts were evaluated for the validity of the WRS-GN, the relevance of the scale questions to the subject was found

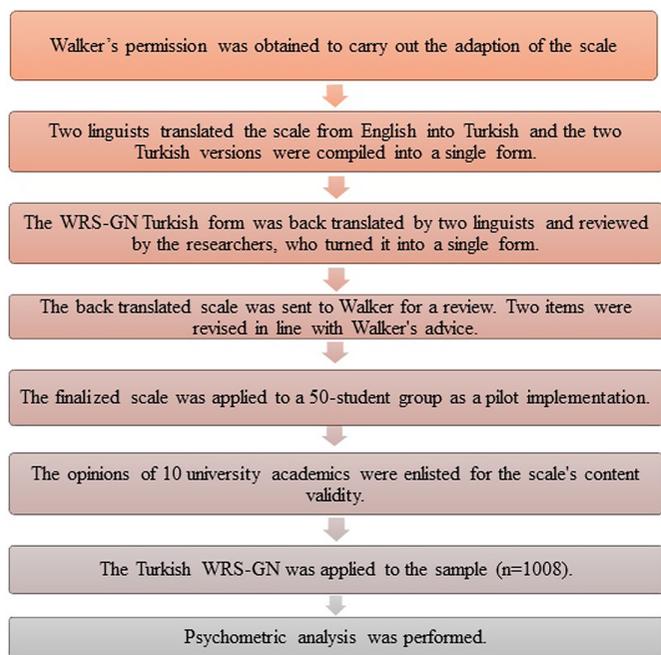


Figure 1. Work readiness scale study process.

to be 3.89 out of 4 at the item level and 97.25% at the whole scale level.

Statistical Analysis

Demo version of Social Science Statistical Package Version 28 and Lisrel 9.2 for Windows was used for statistical analysis (International Business Machines, California, USA). Descriptive statistics were employed to analyze the characteristics of the sample. The scale's content validity was assessed with the Content Validity Index recommended by Lynn (1986).

Construct validity was assessed with confirmatory factor analysis (CFA). The hypotheses were checked prior to the CFA and then a test was conducted to assess to what degree the theoretical model explained the relationships in the data set. This was followed by CFA for alternative models. Since the item scores were ranked variables with a displayed normal distribution, the diagonally weighted least square (DWLS) predictive method was applied to the asymptotic covariance matrix.

Internal consistency was assessed with item-total correlations (Pearson correlation) and Cronbach's alpha. In order to assess retest reliability, the overall score on the scale from the previous measure, the factor total scores, and the retest scores obtained 4 weeks later were examined using Pearson correlation analysis.

Ethical considerations

Permission for use of the scale was obtained from Walker. Prior to the start of the study, ethical permission was obtained from the ethics committee of the Marmara University Health Sciences Institute (December 14, 2015, Protocol No. 122), institutional permission was received from the universities at which the study would take place, and the participating students provided their written consent.

RESULTS

Of the participating students, 63.9% were enrolled in state universities (n=644), and 36.1% (n=364) in foundation universities. The students were between the ages of 19 and 33 and their mean age was 22.53 ± 1.37 years. Of the students, 81.9% were female (n=823), and 18.1% (n=182) were male.

Content Validity

When the views of the 10 experts were evaluated in terms of the content validity of the WRS-GN, it was found that the relevance of the questions on the scale to what was being measured was 3.89 on the basis of 4 at the item level and that the content validity index displayed a good content validity of 0.97.

Construct Validity

The construct validity of the WRS-GN was examined using CFA. An examination of the data set showed that the Z-score of more than 1 item was higher than 4.00 and 9 univariate outliers were observed. It was also seen that there were 3 multivariate outliers with a Mahala Nobis distance of (χ^2_{46}) greater than 81.40. The outliers were removed from the data set prior to the analyses. Thus, validity testing was performed on data obtained from 996 participants. Since the correlations between items in the data set were less than 0.80 (univariate), tolerance values approached 0, and no variable with a variance inflation factor (VIF) of greater than 5 (multivariate) was observed, and multicollinearity was not detected. A dual-axis scatter plot was randomly drawn and distribution estimates were reviewed. This review resulted in the observation of a high level of correlation and linear relationships, especially between items in the same subscale.

Table 1 displays coefficients of general good or poor fit related to the first theoretical model (related to 4 factors). This is followed by the results of the "proposed" model, to which 2 error covariances between 4 items that were similarly expressed were added. Table 1 also provides the results of 2 alternative models. The first of these alternative models is a 4-factor model; the second is a 1-dimensional model in which all of the items are defined under a single dimension.

In Table 1, the general goodness of fit related to the theoretical model is $\chi^2_{983} = 8368.51, P = .00, Comparative Fit Index (CFI) = 0.95,$

Table 1. General Coefficients of Goodness of Fit Obtained from the Work

Model	SB, χ^2	SD	P	CFI	RMSEA GA (90%)	SRMR	$\Delta\chi^2$
Readiness Scale for Graduate Nurses Confirmatory Factor Analysis							
Theoretical	8368.5	83	p<0.001	95	09(0.09-09)	0.08	
Proposed	7638.2	81	p<0.001	96	08(0.08-08)	0.08	730.29
Four unrelated factor	8324.1	87	p<0.001	96	09(0.09-09)	0.29	685.90
Single factor	18367.9	87	p<0.001	88	13(0.13-0.13)	0.11	10,043.82

SD, standard deviation.

Root Mean Square Error of Approximation (RMSEA)=0.09, and Standardized Root Mean Square Residual (SRMR)=0.08. Disregarding the fact that the result of the chi-square test is statistically important since it is influenced by sample size, it was accepted that the general goodness-of-fit coefficients for the theoretical model were at adequate levels. On the other hand, looking into the modification indices in the results of the theoretical model, it was seen that there were high correlations between the first item of the scale, which said, "I have a good foundation of knowledge in my own professional field," and the second item, which was "I am sure of what I have learned and I can easily respond to clinical questions in my field" as well as item 45 which was "I do not like the idea of change at all" and item 46, "I am hesitant/afraid to ask senior people in the workplace questions and talk to them." When a review of the statements in these items was carried out, it was seen that their meanings were close, and therefore, in the next stage of the analysis, the error correlations between these items were added. Thus, it was observed that the proposed model better explained the correlations in the data set compared to the theoretical model ($\chi^2 = 730.29, P = .00$). Although it was accepted that the proposed model better explained the correlations in the data set, in the next stage of the analysis, alternative model tests were performed. As can be seen in Table 2, the general goodness and poorness of fit coefficients in the alternative models were less than those in the proposed model. The comparison of the models showed that the factors were correlated and that the variable of readiness was multidimensional. The CFA graph for the WRS-GN is given in Figure 2.

As can be seen in the figure, the factor loadings (standard weights) of the items in the WC dimension ranged between 0.58 and 0.79. The factor loadings of the items in the SI dimension ranged between 0.64 and 0.84; those of the items in the OA ranged between 0.49 and 0.85 and those of the items in the PWC dimension ranged between 0.37 and 0.89.

It is observed in Table 2 that the reliability coefficients of the subscales are >0.70 . Also, only 1 item in the OA and PWC dimensions has a loading of <0.50 , and CR values are greater than the average variance extracted (AVE) in all the dimensions. Additionally, maximum shared variance (MSV) $>$ AVE is only the OA dimension. All of the ASV values are greater than the AVE. At the same time, outside of the PWC dimension, the mean item factor load (\sqrt{AVE}) for each factor is less than the correlation coefficients between the factors and other factors. In light of these findings, it can be said that WRS-GN convergent and discriminant validity has been attained to a great extent. Convergent and discriminant validity results obtained from factor loadings are given in Table 2.

Internal Consistency Reliability of the Work Readiness Scale for Graduate Nurses

The Cronbach alpha reliability coefficient for the WRS-GN was found to be 0.93 and 0.93 for the WC subscale, 0.91 for the SI,

0.92 for the OA, and 0.85 for the PWC subscales. The test-retest correlation of the subscales varied between 0.56 - 0.78 ($P < .001$) (Table 3).

An examination of the students' WRS-GN subscale mean scores showed mean scores of 6.68 ± 1.47 for WC, 7.35 ± 1.56 for SI, 7.91 ± 1.31 for OA, and 4.76 ± 1.85 for PWC (Table 3). Item total correlations were between 0.77 and 0.49 for the WC subscale, 0.76 and 0.59 for the SI subscale, 0.74 and 0.47 for the OA subscale, and 0.68 and 0.49 for the PWC ($P < .001$) (Table 3).

DISCUSSION

Content Validity

Content validity as a whole indicates to what degree a scale and each item contained in it serve the purpose of the scale. A content validity index of >0.78 is considered an acceptable value.²⁸ In our study, the content validity index of the Turkish version of the WRS-GN, calculated after the raters provided their feedback, was found to be 0.97, a good level of content validity.

Confirmatory factor analysis was used in this study to evaluate construct validity. In the examination of the 4 different models, it was seen that the general goodness-of-fit coefficients of the proposed model were better than those of the others. The fit indices of the proposed model were $\chi^2_{983} = 7638.22, P = .00, CFI = 0.96; RMSEA = 0.08$, and $SRMR = 0.08$. Hair et al³¹ states that if the number of items is ≥ 30 and the number of people is ≥ 250 , the value of χ^2 will be statistically significant. Besides, when CFI is greater than 0.90, RMSEA is less than 0.07, and SRMR is less than 0.08 that it is considered to have significantly adequate general goodness of fit coefficients

χ^2 Accordingly, as can be understood from the formula, the chi-square test is influenced by sample size ($\chi^2 = (N-1) \cdot (S - \epsilon_k)$). In the literature, it has been reported that an RMSEA value of <0.10 and a CFI value of >0.95 indicate a good fit.²⁹ Consequently, making an assessment irrespective of the fact that the chi-square test should be statistically significant, it can be said that the 4-factor model of the WRS-GN displays an acceptable model fit.

The review of the item factor loadings showed that these were 0.58 in the WC, 0.64 in the SI, 0.49 in the OA, and 0.37 in the PWC dimensions. It is suggested that item factor loadings should be at least 0.30 and over in the scale development and adaptation process.³⁰ Indeed, Walker et al.¹ who adapted the scale to nurses, reported item factor loadings of 0.73-0.37 for the WC subscale, 0.94-0.46 for the SI subscale, 0.74-0.31 for the OA subscale, and 0.80-0.47 for the PWC subscale.

When the loadings of items in the same factor are sufficiently high, that is, when the factors can be explained by their own indicators, this is said to mean convergent validity; if items have a low correlation with factors other than their own or they are without correlation, that is, if the factor cannot be explained by items

Table 2. Work Readiness Scale for Graduate Nurses Convergent and Discriminant Validity Coefficients

Sub-Scale	CR	AVE	MSV	ASV	PWC	WC	SI	OA
Personal work competence (PWC)	0.86	0.45	0.16	0.35	0.67			
Work competence (WC)	0.94	0.55	0.48	0.42	-0.35	0.74		
Social intelligence (SI)	0.93	0.62	0.58	0.46	-0.40	0.81	0.79	
Organizational acumen (OA)	0.95	0.54	0.58	0.37	-0.25	0.69	0.76	0.73

AVE, average variance extracted; CR, composite reliability; MSV, maximum shared squared variance; ASV, average shared squared variance

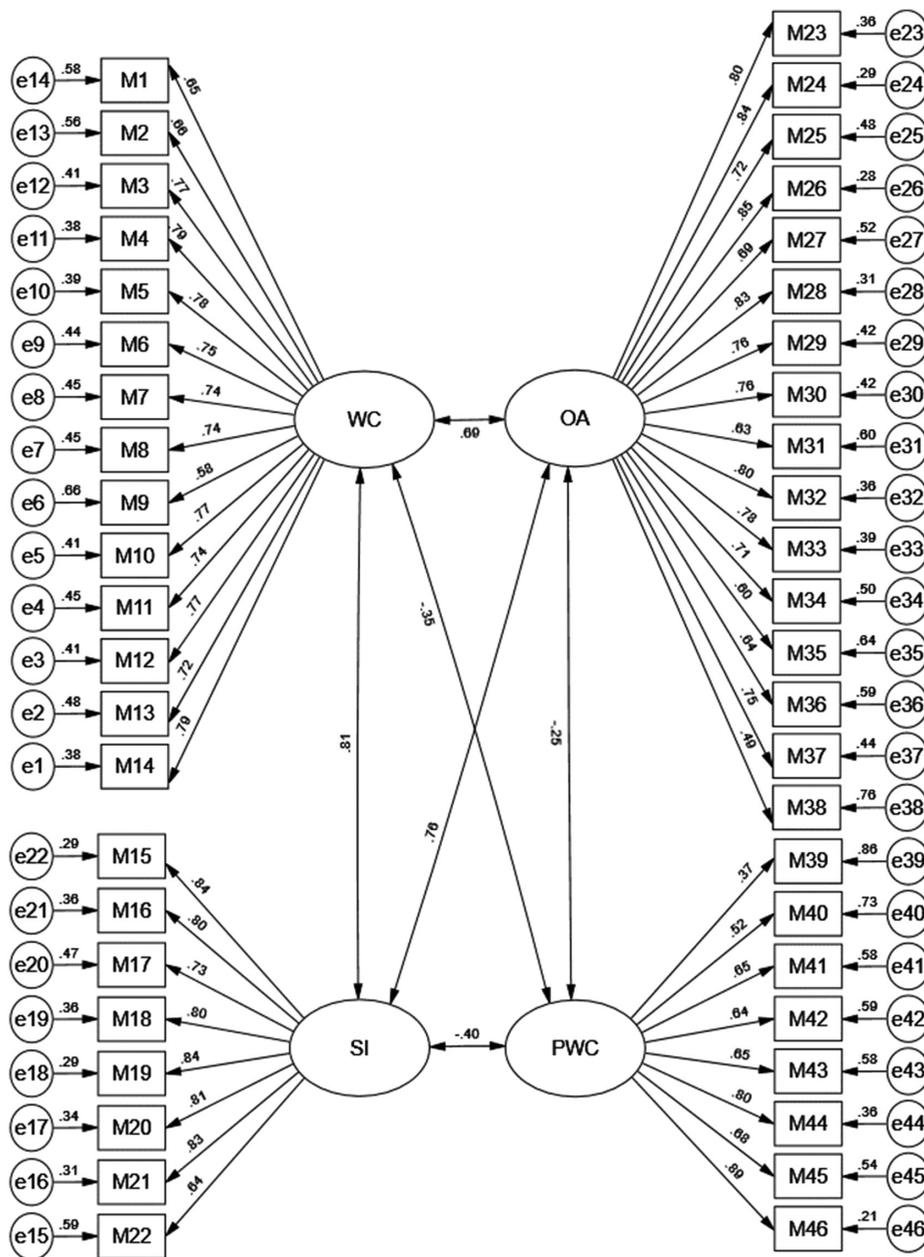


Figure 2. Work readiness scale for graduate nurses confirmatory factor analysis graph.

other than its own set, this is referred to as discriminant validity. When standard regression weights in convergent validity are $(\lambda) > 0.50$ and construct reliability coefficients are $(CR) > 0.70$, it is considered that average variance explained by a factor is $(AVE > 0.50$ and $CR > AVE)$.³¹ Discriminant validity calls for MSV and average shared variance (ASV) being less than AVE and also that \sqrt{AVE} for each factor is greater than the absolute correlations with other factors.³² The study results indicated that the Turkish version of the WRS-GN fulfilled the requirements of convergent and discriminant validity to a great extent.

Reliability

It is recommended that the internal consistency indicator Cronbach's alpha coefficient be ≥ 0.70 in instruments of measurement.^{30,33} In the study by Walker et al¹, the Cronbach alpha value of the WRS-GN was found to be 0.92, and the subscales were found to be between 0.84 and 0.88. In our study, the Turkish form's

Cronbach alpha coefficient was calculated to be 0.93; the Cronbach alpha coefficients of the subscales ranged between 0.85 and 0.93, very similar to the original scale. It can be seen that the overall scale and its subscales exhibit good reliability coefficients.

To understand the degree to which scale items correlate with the whole of the scale, the indicator that is frequently used in the analysis of item selection is the item-total correlation coefficient. A high correlation coefficient for an item indicates that the item being measured has a high correlation with the item's theoretical construct and that the item is effectively adequate to measure the desired behavior. An item-total score correlation of 0.30 and above indicates sufficient discrimination of the characteristic being measured and a good correlation with the scale total.^{30,34} The item-total correlations of the Turkish version of the WRS-GN vary between 0.77 and 0.47 and it is seen that the scale items have a high correlation with the theoretical construct.

Table 3. Reliability and Descriptive Statistics for the Work Readiness Scale for Graduate Nurses by Subscale

Sub-Scale	Scale Items	Mean	Standard Deviation	Item Sub-Scale r	Test-Retest r	Mean \pm SD	Cronbach α
Work competence	1	6.07	2.04	0.69	0.78	6.68 \pm 1.47	0.93
	2	6.06	2.01	0.73			
	3	6.56	1.90	0.75			
	4	6.49	1.86	0.77			
	5	6.38	2.10	0.75			
	6	6.52	2.11	0.74			
	7	6.21	2.08	0.70			
	8	6.91	2.07	0.68			
	9	6.03	2.36	0.55			
	10	7.59	1.87	0.62			
	11	6.78	1.94	0.68			
	12	6.27	1.87	0.71			
	13	7.98	1.94	0.49			
	14	7.91	1.78	0.57			
Social intelligence	15	7.71	1.88	0.75	0.62	7.35 \pm 1.56	0.91
	16	8.00	1.83	0.67			
	17	7.40	2.12	0.67			
	18	7.33	2.02	0.76			
	19	7.60	1.85	0.75			
	20	7.55	1.81	0.73			
	21	7.25	1.85	0.76			
	22	6.07	2.32	0.59			
Organizational acumen	23	7.79	1.80	0.68	0.70	7.91 \pm 1.31	0.92
	24	8.07	1.74	0.70			
	25	7.24	2.26	0.60			
	26	7.68	1.72	0.74			
	27	6.73	2.10	0.55			
	28	7.84	1.78	0.72			
	29	8.07	1.71	0.70			
	30	8.16	1.69	0.71			
	31	7.63	1.97	0.59			
	32	8.61	1.57	0.73			
	33	8.87	1.53	0.69			
	34	8.45	1.66	0.68			
	35	8.11	1.86	0.58			
	36	8.13	1.71	0.63			
37	8.06	1.68	0.65				
Personal work characteristics	38	7.68	2.00	0.47	0.56	4.76 \pm 1.85	0.85
	39	6.58	2.31	0.51			
	40	5.01	2.57	0.55			
	41	4.99	2.39	0.66			
	42	5.55	2.63	0.68			
	43	5.22	2.55	0.61			
	44	4.32	2.83	0.65			
	45	3.42	2.74	0.49			
	46	3.08	2.78	0.60			
Total Cronbach α							0.93

Test–retest correlations are analyses that assess the reliability of a measurement instrument in terms of its consistency over time. Instruments are recommended to have correlation coefficients of ≥ 0.40 between test and retest scores.³⁵ In this study, the WRS-GN and its subscales had a good test–retest correlation of ≥ 0.56 . The Turkish version of the WRS-GN and its 4 subscales named SI, PWC, WC, and OA was found to be valid and reliable. The results of the CFA verified the original 4-factor construct of the WRS-GN. The WRS-GN Turkish version may be used to evaluate the work readiness status of senior class nursing students.

Limitations of the Study

The limitation of the study is that the data were collected from senior nursing students in the last education period before graduation. Therefore, the psychometric results of the study can only be generalized to this group.

Ethics Committee Approval: Ethical committee approval was received from the Ethics Committee of Marmara University Health Sciences Institute. (Date: 14.12.2015, No: 112).

Informed Consent: Written informed consent was obtained from all participants who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - AB, AE; Design -AB; Supervision - AB; Resources - AB, AE; Data Collection and/or Processing - AB; Analysis and/or Interpretation - AB, AE; Literature Search - AB, AE; Writing Manuscript - AB; Critical Review - AB, AE.

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