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Validity and Reliability of Turkish Version of Skills Confidence Inventory

Becerilere Güven Mesleki İlgi Envanteri: Türkçe Formu Geçerlik ve Güvenirlik Çalışmaları

Ahmet Salih Şimşek, Ezel Tavşancıl

Authors Information

Ahmet Salih Şimşek
Assistant Professor, Kırşehir Ahi Evran University, Kırşehir, Turkey
asalihsimsek@gmail.com

Ezen Tavşancıl
Professor, Ankara University, Ankara, Turkey
etavsancil@gmail.com

ABSTRACT

The Vocational Interest Inventory is one of the most commonly used instruments in career counselling in the past and present. The aim of this study is to adapt the Skills Confidence Inventory (SCI) and obtain validity and reliability evidence for its Turkish version. The SCI Turkish version is called BGMIE (Becerilere Güven Mesleki Ilgi Envanteri) and is a list of vocational interests consisting of 164 items measuring 17 different areas of vocational interests. In the study, data were collected from 32 university students for the linguistic equivalence test, from 765 high school students for the pretest, and from 1449 high school students for the final test. The validity of the BGMIE was examined using the bilingual group, linguistic equivalence, and CFA (Confirmatory Factor Analysis) scores. The results of the CFA analyses indicate a perfect fit for nine factors (Creative Production, Cultural Sensitivity, Data Management, Helping, Leadership, Office Services, Public Speaking, Science, Teamwork), a good fit for seven factors (Mechanics, Organisational Management, Project Management, Sales, Teaching, Use of Technology, Writing), and an acceptable fit for one factor (Mathematics).

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ÖZET

Mesleki İlgi Envanteri, geçmişte ve günümüzde kariyer danışmanlığında en sık kullanılan araçlardan biridir. Bu çalışmanın amacı, Strong ilgi envaneterinin güncel bir versiyonu olan Skill Confidence Inventory (SCI) için Türkçe versiyonunun geçerlik ve güvenirlik kanıtlarını elde etmektir. Türkçe versiyonu BGMIE (Becerilere Güven Mesleki Ilgi Envanteri) olarak isimlendirilen envanter 17 farklı mesleki ilgi alanını ölçen 164 maddeden oluşmaktadır. Araştırmada, dilsel eşdeğerlik için 32 üniversite öğrencisi, ön test için 765 lise öğrencisi ve son test için 1449 lise öğrencisinden veri toplanmıştır. BGMIE'nin yapı geçerliği faktör analizi teknikleri kullanılarak incelenmiştir. Doğrulayıcı faktör analizi bulguları, dokuz faktörün (Yaratıcı Üretim, Kültürel Duyarlılık, Veri Yönetimi, Yardım, Liderlik, Büro Hizmetleri, Topluluk Önünde Konuşma, Bilim, Takım Çalışması) mükemmel uyum, yedi faktörün (Mekanik, Örgütsel Yönetim, Proje Yönetimi, Satış, Öğretim, Teknoloji Kullanımı, Yazma) iyi uyum ve tek faktör (Matematik) için kabul edilebilir uyumun olduğunu göstermiştir. Ortaöğretim öğrencileri için BGMIE'nin geçerliğinin ve güvenirliğinin yüksek olduğu değerlendirilmiştir.

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INTRODUCTION

The choice of a profession is one of the most important decisions that a person makes in his or her life. According to Parson (1909), job satisfaction and productivity rise for individuals who choose a profession that corresponds to their professional interests. Therefore, one of the success factors in business is that people turn to a profession that matches their characteristics. In this stage, career counselling activities, which are carried out from the time the individual's professional interests emerge, are very important. Career counseling refers to the counseling services provided to individuals in the process of choosing a career and selecting an occupation from that career (Özoğlu, 2007). The principal aim of these counselling services is to assist individuals in identifying their interests, skills, personality, etc. and guide them to the professions appropriate to those characteristics.

Parson (1909) suggests that choosing the right profession is based on three fundamental/basic factors:

1. being aware of one's own abilities, skills, interests, desires, resources, and limitations
2. knowing the requirements of the occupation to be chosen, the conditions for success, the advantages and disadvantages, the prices to be paid, and the opportunities.
3. to argue properly in relation to/with regard the phenomena of these two factors/both these factors.

Career guidance/occupational guidance, pioneered/launched by Parsons, was initially confined to introducing the professions to individuals. (Brown et al., 2002). One of the major reasons for this is that measurement instruments/tools of the 20. century were linked/tied to their early development. However, it is known that occupational choice is not independent of the individual's characteristics. Consequently, the characteristics of the individual must be taken into account. Kuzgun (2000) stated that career choice is a process and that factors that influence one's preferences should be considered in the career development process.

Vocational interest inventories are one of the most commonly used tools in career counselling (Harrington & Long, 2013). Judge et al. (2001) stated that an individual's job performance is related to his/her skills and whether or not he/she continues to work depends on whether or not he/she enjoys the job. Following the theory of vocational development developed by Parsons (1909), developments in vocational guidance moved into the application phase with the development of the Student Vocational Self Analysis (SVSA) instrument by Davis (1914) to measure the vocational interests of high school students. The first standardised interest inventory was developed by CIT (Carnegie Institute of Technology) in 1920. Following these developments, many vocational interest inventories have been developed to date (Harrington & Long, 2013).

Interest inventories are objective measurement tools that provide information about individuals' vocational interests. Vocational interest inventories may become outdated due to the emergence of new occupations, changes in existing occupations, or the disappearance of existing occupations. This has prompted the updating of existing instruments or the development of new vocational interest inventories. Vocational interest inventories widely used in international literature and research are listed in Table 1.

Table 1. Vocational interest inventories widely used in the international literature

Developer	Year	Measurement Instrument	Number of Items	Source
Strong	1934	Strong Interest Inventory	291	(Strong, 1934)
Thurstone	1947	Thurstone Vocational Interest Schedule	80	(Harrington & Long, 2013)
Lee ve Thorpe	1946	The Occupational Interest Inventory	240	(Bridge & Morson, 1953)
Kuder	1948	Kuder Prefence Record – Form C	504	(Walsh & Osipow, 1986)
Holland	1965	Vocational Preference Inventory	305	(Harrington & Long, 2013)
Campbell	1974	Strong-Campbell Interest Inventory	325	(Brown et al. 2002)
Jackson	1977	Jackson Vocational Interest Survey	289	(Walsh & Osipow, 1986)
Holland	1979	Self-Directed Search	72	(Campbell & Borgen, 1999)
Kuzgun	1988	Kendini Değerlendirme Envanteri	230	(Kuzgun, 2000)
Betz, Borgen ve Harmon	1996	Skills Confidence Inventory	186	(Betz, Borgen, Kaplan & Harmon, 1998)

As can be seen in Table 1, vocational interest inventories generally contain many items. Kuzgun (2000) noted that vocational interests become consistent over time, so the results of interest inventories should be followed up through repeated applications. From this perspective, vocational interest inventories should be both useful and have high validity and reliability. For this reason, there is a need for useful measurement instruments that examine a broad domain with few items rather than vocational interest inventories with many items. It is very important for the validity of the results that the vocational interest inventories used in the career counselling process are up-to-date. The most commonly used instruments in Turkish literature in the past and present are the "Kuder Interests Preference Inventory" adapted into Turkish by Özoğlu (1977) and the "Self-Assessment Inventory" developed by Kuzgun (1988). If these instruments, which were created considering the occupational fields of the time they were developed, are not updated, the effectiveness of individuals in determining their vocational interests decreases. In assessing validity, it is very important to update the content of existing measurement instruments or develop/adapt new measurement instruments. The inventories of vocational interests developed or adapted in Turkish in the last 10 years are listed in Table 2.

Table 2. Developed/adapted vocational interest inventories in Turkish version (2010-2020).

Theory	Study	Sample	Number of Factors	Number of Items	Source
Holland	Development	Adults	6	60	(Yılmaz, 2011)
Original*	Development	Secondary and higher education students	14	156	(Deniz, 2013)
Original*	Development	Secondary education students	11	71	(Otrar & Canel, 2015)
Holland	Development	Students of higher education	6	55	(Perkmen & Tezci, 2015)
Jackson	Adaptation	Students of higher education	34	578	(Kaya, 2017)
Holland	Development	Secondary education students	6	30	(Atli & Keldal, 2017)
Holland	Development	Students of the 2nd level of primary education	6	36	(Demir, 2020)

*Measurement of the vocationals chosen by the researchers

Examining Table 2, it was found that there was one adaptation study, while the number of developed interest inventories was six. Most of the developed studies were based on Holland's typology theory. The development of structurally similar scales limited the variety of vocational interest instruments in the literature. For career counselling studies, it is important to introduce instruments with different structural characteristics into the literature and enrich the instruments that can be used to measure career interests. Yeşilyaprak (2012) states that new measurement instruments should be introduced into Turkish literature so that they can be used in career counselling.

Considering the need for current measurement tools in determining professional interests, adaptation and development studies are very important. Reviewing the literature, it was found that 23 instruments (9 adaptation studies, 14 development studies) were included in the Turkish literature between 1956 and 2020. However, it was found that the most commonly used instrument in the literature is the Self-Assessment Inventory developed by Kuzgun (1988). It was considered that it would be very useful to introduce new occupational interest inventories into the literature that could be a current alternative to the scale that was developed considering the occupations of 30 years ago. The purpose of this study is to obtain a new measurement instrument that can be used in career counselling. For this purpose, the Skills Confidence Inventory, the current version of the Strong interest inventory, was adapted into Turkish. The widespread use of the Strong interest inventory in the international literature and the fact that it has not yet been adapted to the Turkish literature played a role in the selection of this inventory.

METHOD

This research is an applied research because it is a measurement instrument adaptation study. Applied research is the research that is conducted to evaluate the information obtained for the actual solution of the problem (Karasar, 2009).

Study Participants

In the research, data were collected from 32 university students for the linguistic equivalence study, from 765 high school students for the pretest, and from 1449 high school students for the final test. The university students were selected from among students in the Department of English Education at a state university. The high school students were selected from the 10th, 11th, and 12th grade students studying in public secondary schools in Sivas province in 2015-2016. Progressive random sampling method was used as the sampling method. In the first phase, 10 educational institutions were randomly selected from 29 secondary educational institutions. In the second phase, the students of the schools who voluntarily participated in the study were included in the study. The distribution of the study groups, consisting of high school students, by school type and gender is shown in Table 3.

Table 3. Distribution of study group by type of school and gender.

Study Group	School Type	Male		Female		Total
		f	*Row %*	f	*Row %*	f
Pretest 1	Anatolian High School	222	*%55*	182	*%45*	404
Pretest 2	Anatolian High School	162	*%45*	199	*%55*	361
Final Test	Anatolian High School	486	*%56*	381	*%44*	867
	Science High School	85	*%46*	101	*%54*	186
	Vocational High School	120	*%64*	68	*%36*	188
	İmam-Hatip	105	*%50*	103	*%50*	208
Total		1180	*%53*	1034	*%47*	2214

The study group has a balanced distribution by gender (53% male). For the final test, the study group consists of 60% students from Anatolian High School, 14% students from Imam Hatip High School, 13% students from Science High School, and 13% students from Vocational High School, each by school type.

Ethical Statement

By letter from the Ministry of National Education dated 26/02/2015 and number 81576613/605/2144292, the necessary ethical approval and application permission for this research were obtained.

Data and Collection

In the study, SCI (Skill Confidence Inventory), Betz et al. (2003) and the Turkish version of SCI, BGMIE (Confidence in Skills Vocational Interest Inventory) were used as data collection tools. Official permission was obtained before data collection process. It took approximately 30 minutes to complete the form. Responses were collected in the classroom and under supervision.

SCI: Skills Confidence Inventory (Original Version). The Skills Confidence Inventory is an vocational interest inventory consisting of 164 items measuring 17 different vocational interests. The vocational interests measured by the SCI were briefly defined by researchers as follows (Betz et al., 2003);

- Science (Sc): Conducting scientific research and understanding popular science.
- Public speaking (PS): Speaking and presenting information to an audience.
- Cultural sensitivity (CS): Interacting with and understanding people from different cultural backgrounds.
- Leadership (LE): Confidence in your ability to motivate others by being persuasive, confident, and inspiring.
- Mathematics (Ma): Application of mathematics in daily life and success in a mathematics-related course.
- Mechanics (Me): Use common tools and equipment to perform repairs and simple installations of electrical, plumbing, office and home furniture.
- Office Services (OS): Performing clerical tasks such as organizing organizational calendars and preparing reports on business operations for others.
- Organizational Management (OM): The ability to manage people, policies, and workflows in an organization.
- Teaching (Te): Teaching a new subject area and training others.
- Project Management (PM): Leading a project involving activities such as planning, coordinating, and monitoring processes.
- Sales (Sa): Convince others to buy services or products.
- Teamwork (TW): Working effectively and cooperatively with others in a team or work group.
- Use of Technology (UT): The ability to install hardware and software applications and use personal computers to accomplish specific goals.

- Data Management (DM): Analyze and effectively present numerical information for decision making.
- Creative Production (CS): Innovation and creativity in business, technology, science, or the arts.
- Helping (HE): Helping others in activities such as empathy, personal support, counseling.
- Writing (Wr): Proofreading and writing in fields such as journalism and writing.

In the study conducted with university students, it was found that the rate of agreement between the courses in which the students were enrolled and the classification made with the SCI was 69% (Betz et al., 2003). It was found that the Cronbach's Alpha internal consistency coefficients calculated for the 17 factors of the SCI ranged from .84 to .94 in the study group of university students and from .86 to .94 in the study group of adults. There are also several studies in the literature that examine the validity and reliability of the SCI (Betz & Rottinghaus, 2006; Betz & Wolfe, 2005; Larson et al., 2010; Robinson & Betz, 2004; Rottinghaus et al, 2003).

BGMIE: Becerilere Güven Mesleki İlgi Envanteri (The SCI Turkish Version). The SCI was translated into Turkish under the name BGMIE (Becerilere Güven Mesleki İlgi Envanteri). Sample items for the original and Turkish versions are given in the appendix (appx. 2). The BGMIE, measured interest domains, and item numbers are listed in Table 4.

Table 4. BGMIE measured ınterest areas and ıtem numbers

The SCI (Original Version)	The BGMIE (Turkish Version)	Number of Items
Creative Production (CS)	Yaratıcı Üretim (YÜ)	10
Cultural Sensivity (CS)	Kültürel Duyarlılık (KD)	10
Data Management (DM)	Veri Yönetimi (VY)	10
Helping (HE)	Yardım Etme (YE)	6
Leadership (LE)	Liderlik (Li)	10
Mathematics (Ma)	Matematik (Ma)	10
Mechanical (Me)	Mekanik (Me)	10
Office Services (OS)	Ofis Hizmetleri (OH)	10
Organizational Management (OM)	Organizasyon Yönetimi (OY)	9
Project Management (PM)	Proje Yönetimi (PY)	10
Public Speaking (PS)	Hitabet (Hi)	9
Sales (Sa)	Satış (Sa)	10
Science (Sc)	Bilim (Bi)	10
Teaching (Te)	Öğretim (Öğ)	10
Teamwork (TW)	Takım Çalışması (TÇ)	10
Using Technology (UT)	Teknoloji Kullanımı (TK)	10
Writing (Wr)	Yazma (Ya)	10

For the adaptation studies, the scale adaptation guide prepared by Hambleton & Patsula (1999) and the International Test Adaptation Guide prepared by the International Test Commission (2005) were considered. The translation process was conducted with a group of six experts, including two experts in foreign language instruction, two experts in assessment and evaluation, and two experts in psychological counseling and guidance. Three main aspects were considered in the translation process (Hambleton & Patsula, 1999);

- The accuracy of the translation and the clarity of the sentence.
- The appropriateness of the translated words to the level of the group
- Cross-cultural equivalence of the experiences expressed.

After the translation process, the first draft version was created. The items in the first draft version were arranged according to the recommendations of the experts in the field of Psychological Counseling and Guidance. The draft version was back-translated and checked for equivalence by foreign language experts by comparison with the original version. The draft version obtained after translation and back-translation was evaluated by the experts from the field of measurement and assessment regarding the suitability of the items and the response options. As a result of the studies, a preliminary version was prepared for pretesting. Evidence of validity and reliability obtained through the adaptation process can be found in the Results section.

Data Analysis

The packages mvnShapiroTest (1.0), psych (1.5.8), lavaan (0.5), ltm (1.0) from the R package program were used to analyze the research data. The statistical analyzes performed during the research are listed in Table 5.

Table 5. Statistical analysis and R package used

Purpose	Statistical Analysis	R Package
Assumption Test	Multivariate Normality	mvnShapiroTest (1.0)
Assumption Test	Parallel Anaysis	psych (1.5.8)
Validity	CFA (Confirmatory Factor Analysis)	lavaan (0.5)
Validity	Correlation	psych (1.5.8)
Validity	t-test	psych (1.5.8)
Reliability	Internal Consistency	ltm (1.0)

Because the data did not meet the multivariate normality assumption, the weigthed least square (WLS) method was used to estimate the parameters of the CFA model. It is known that the measurement accuracy of the WLS method is higher than that of the ULS, MLE, and DWLS methods when the multivariate normality assumption is violated (Forero et al., 2009; Koğar & Koğar, 2015). The alpha significance value of 0.05 was used for the hypothesis tests performed during the data analysis.

RESULTS

The results obtained for the BGMIE are presented under the subtitles linguistic equivalence, pretest, final test, and reliability.

Linguistic Equivalence

A bilingual group design was used to study linguistic equivalence. The linguistic equivalence studies were conducted with a study group consisting of 32 students who voluntarily participated in the research and were among the students who were continuing their undergraduate education in English teaching at Cumhuriyet University. During the implementation phase, the study group was randomly divided into two groups (A and B). In groups A and B, the Turkish and English forms were given in a different order. In the first session, group A took the Turkish form while group B took the English form. In the second session, which took place one week later, the students answered the form that they had not received in the first session. To examine the linguistic equivalence of the items in the adapted form, the correlations between the students' responses to the items in the Turkish and English forms were examined.

The Spearman correlation coefficient was used because the data were on a rank scale. The average of the correlations between the items in the Turkish and English versions is .86, but varies between .80 and .94.

The high correlation coefficients indicate that the linguistic equivalence of the items in the Turkish version is high. To examine the linguistic equivalence of the Turkish version, the significance of the difference between the means of the scores obtained in the two versions was also tested. For this purpose, the scores obtained in the Turkish and English versions were calculated. In order to examine the significance of the difference between the scores obtained in both versions, the paired t-test was performed. The results are shown in Table 6.

Table 6. The SCI Turkish and English version: paired t-test

Factors	$\underline{X}_{BGE-SCI}$	$\sigma_{BGE-SCI}$	**t**	**sd**	**p**
Creative Production (CS)	-0.41	1.74	-1.322	31	0.196
Cultural Sensivity (CS)	0.53	1.61	1.871	31	0.071
Data Management (DM)	-0.19	1.42	-0.745	31	0.462
Helping (HE)	0.47	1.44	1.846	31	0.074
Leadership (LE)	-0.06	1.41	-0.250	31	0.804
Mathematics (Ma)	-0.13	1.91	-0.370	31	0.714
Mechanical (Me)	-0.50	1.41	-2.000	31	0.054
Office Services (OS)	0.15	1.27	0.694	31	0.493
Organizational Management (OM)	0.34	1.43	1.362	31	0.183
Project Management (PM)	0.55	1.85	1.625	31	0.114
Public Speaking (PS)	-0.35	1.64	-1.187	31	0.244
Sales (Sa)	0.32	1.26	1.543	31	0.133
Science (Sc)	-0.09	1.12	-0.475	31	0.638
Teaching (Te)	0.44	1.37	1.811	31	0.080
Teamwork (TW)	0.16	1.48	0.596	31	0.556
Using Technology (UT)	-0.41	1.76	-1.308	31	0.201
Writing (Wr)	0.18	1.32	0.668	31	0.509

The small differences between the results of the Turkish and English versions were not statistically significant ($p > .05$). Accordingly, the students' responses in the Turkish and English versions are similar in successive applications. The results show that the language equivalence of the Turkish version of the inventory is high.

Pretest

The validity of the BGMIE was investigated by pretesting the preliminary version. Data were collected from 404 high school students for the pretest. A CFA analysis was conducted for the prefinal version of the BGMIE using the pretest data and the validity of the test was examined. As a result of the analysis, the expression of nine items (M001, M010, M018, M031, M085, M093, M103, M109, M134) was corrected due to low factor loadings (appx. 3). Data were collected from 361 high school students during the pretest, using the pretest version. CFA results conducted on data obtained after repeated pretest application were examined. The repeated CFA analyzes showed good fit for the BGMIE factors (excluding Creative Production, Mathematics, Science, Instruction) (appx. 4). However, the Cronbach's Alpha internal consistency coefficients calculated for Pretest 1 and Pretest 2 data are shown in Table 6.

Table 6. The Reliability Coefficients for Pretest 1 and Pretest 2

The Factors of BGMIE	Number of Items	Pretest 1 (N=404)	Pretest 2 (N=361)
Creative Production (CS)	10	.80	.86
Cultural Sensivity (CS)	10	.82	.88
Data Management (DM)	10	.89	.89
Helping (HE)	6	.89	.90
Leadership (LE)	10	.88	.87
Mathematics (Ma)	10	.91	.82
Mechanical (Me)	10	.90	.89
Office Services (OS)	10	.86	.85
Organizational Management (OM)	9	.85	.78
Project Management (PM)	10	.92	.89
Public Speaking (PS)	9	.91	.88
Sales (Sa)	10	.91	.83
Science (Sc)	10	.92	.87
Teaching (Te)	10	.86	.85
Teamwork (TW)	10	.91	.86
Using Technology (UT)	10	.93	.93
Writing (Wr)	10	.88	.90

When the validity and reliability results obtained in the pretest applications for the BGMIE were evaluated, it was decided to proceed with the final testing phase.

Final Test

Data collected from 1449 high school students were used for the BGMIE final test. To investigate the construct validity of the BGMIE, the CFA model was defined, which included 17 factors and 164 items. However, the analysis could not be conducted due to a negative variance estimate in the construction of the covariance matrix. Wothke (1993) states that there can be five main reasons for negative estimation of covariance matrices (as cited by Kline, 2015, p.303).

1. the data provide very little information (small sample, fewer than two indicators per factor, etc.)

2. the model is overparameterized (too many free parameters)

3. extreme values in the sample or excessive deviations of the distribution from normality 4. few definitions of factor covariances 5. wrong measurement model.

Examining the structure of the BGMIE used in the study, we find that the main reason for the negative variance estimate is that the measurement model, consisting of 17 factors and 164 items, is overdefined. In such cases, also referred to as model complexity, CFA estimates can be obtained by simplifying the measurement model defined based on the negative variance estimate (Brown, 2015; Thompson, 2004). To this end, confirmatory factor analysis was conducted separately for each factor. First, the multivariate normality assumption was tested to determine which method should be used for the goodness of fit of the model and the parameter estimates for the factors of the BGMIE. To test the multivariate normality assumption, mvnShapiroTest (1.0) from the R packages was used for statistical evaluation and the mvnTest (1.1) package was used for analytical evaluation using the Mahalanobis distance. The results of the multivariate normality test can be found in Table 7.

Table 7. The Results of Multivariate Normality Test

The Factors of BGMIE	Shapiro-Wilk	p	The Factors of BGMIE	Shapiro-Wilk	p
Creative Production (CS)	.986	.000	Project Management (PM)	.992	.000
Cultural Sensivity (CS)	.982	.000	Public Speaking (PS)	.990	.000
Data Management (DM)	.986	.000	Sales (Sa)	.974	.000
Helping (HE)	.980	.000	Science (Sc)	.989	.000
Leadership (LE)	.987	.000	Teaching (Te)	.986	.000
Mathematics (Ma)	.989	.000	Teamwork (TW)	.985	.000
Mechanical (Me)	.977	.000	Using Technology (UT)	.989	.000
Office Services (OS)	.983	.000	Writing (Wr)	.990	.000
Organizational Management (OM)	.982	.000			

The BGMIE final test data were found not to meet the multivariate normality assumption. Due to the violation of the normality assumption, the weighted least squares (WLS) estimation method was used for the CFA. The results of the first-order CFA conducted to investigate the construct validity of the BGMIE are shown in Table 8.

Table 8. The Results of first-order CFA

The Factors of BGMIE	Index						Goodness of Fit
	Number of Items	Chi-Square	df	RMSEA	SRMR	TLI	CFI	
CP	10	115.73	35	.04	.04	.99	.99	Perfect
CS	10	133.10	35	.04	.04	.98	.99	Perfect
DM	10	93.31	35	.03	.03	.99	.99	Perfect
He	6	32.76	9	.04	.03	.99	.99	Perfect
Le	10	148.16	35	.05	.04	.99	.99	Perfect
Ma	10	602.92	35	.10	.09	.92	.94	Acceptable
Me	10	389.07	35	.08	.07	.96	.97	Good
OS	10	65.46	27	.03	.03	.99	.99	Perfect
OM	9	267.64	35	.07	.06	.95	.96	Good
PM	10	196.09	35	.06	.05	.98	.99	Good
PS	9	89.84	27	.04	.04	.99	.99	Perfect
Sa	10	201.44	35	.06	.05	.98	.98	Good
Sc	10	144.75	35	.05	.04	.99	.99	Perfect
Te	10	364.87	35	.08	.07	.96	.97	Good
TW	10	149.76	35	.05	.04	.99	.99	Perfect
UT	10	245.36	35	.06	.06	.98	.99	Good
Wr	10	227.88	35	.06	.05	.98	.98	Good

CP: Creative Production, CS: Cultural Sensivity, DM: Data Management, He: Helping, Le: Leadership, Ma: Mathematics, Me: Mechanical, OS: Office Services, OM: Organizational Management, PM: Project Management, PS: Public Speaking, Sa: Sales, Sc: Science, Te: Teaching, TW: Teamwork, UT: Using Technology, Wr: Writing

Although there are different critical values for RMSEA and SRMR values in the literature, the accepted cutoffs are .05 and below for a perfect fit, between .05 and .08 for a good fit, and between .08 and .10 for an acceptable fit (Browne & Cudeck, 1993; Maccallum et al., 1996). On the other hand, Hu & Bentler (1999) found that an RMSEA value of less than .06 and an SRMR value of less than .08 indicated good fit. The critical values for the fit indices TLI and CFI, which are widely used in the literature among the relative fit indices, range from .90 to .95 for a acceptable fit and .95 and above for a good fit (Hooper et al., 2008).

When examining the RMSEA, SRMR, TLI, and CFI fit indices given in Table 8, it is found that the factors Creative Production, Cultural Sensitivity, Data Management, Helping, Leadership, Office

Services, Public Speaking, Science, Teamwork, Mechanics, Organizational Management, Project are perfectly matched. It can be seen that the Management, Sales, Instruction, Use of Technology, Writing factors have a good fit, while the Mathematics factor has an acceptable fit. For the DFA models with perfect fit, the RMSEA values vary between .03 and .05, the SRMR values vary between .03 and .04, and the TLI and CFI values vary between .98 and .99. For the DFA models with good fit, the RMSEA values range between .06 and .08, the SRMR values range between .05 and .07, while the TLI and CFI values range between .95 and .99. Of the 17 factors in the BGMIE, the goodness-of-fit values for the CFA model created for the mathematics factor only show acceptable fit.

Reliability

To investigate the reliability of the BGMIE, the Cronbach's Alpha internal consistency coefficient was calculated using the final test data. The reliability coefficients obtained for the 17 factors of the BGMIE are shown in Table 9.

Table 9. The Reliability coefficient for BGMIE

The Factors of BGMIE	Number of Items	Cronbach's Alpha
Creative Production (CS)	10	.86
Cultural Sensivity (CS)	10	.81
Data Management (DM)	10	.87
Helping (HE)	6	.81
Leadership (LE)	10	.87
Mathematics (Ma)	10	.85
Mechanical (Me)	10	.86
Office Services (OS)	10	.84
Organizational Management (OM)	9	.80
Project Management (PM)	10	.87
Public Speaking (PS)	9	.86
Sales (Sa)	10	.85
Science (Sc)	10	.87
Teaching (Te)	10	.86
Teamwork (TW)	10	.87
Using Technology (UT)	10	.91
Writing (Wr)	10	.88

Examination of Table 9 shows that the internal consistency coefficients calculated for the factors of the BGMIE range from .80 to .91. The lowest internal consistency coefficient (r=.80) was obtained for the Organization Management factor, while the highest internal consistency coefficient was obtained for the Technology Use (r=.91). The median value of the internal consistency coefficients for the 17 factors of the BGMIE was calculated to be .86.

DISCUSSION

With the development of industry and technology, it is a fact that many professions have been replaced by machines and algorithms. For this reason, the importance of career choice and vocational guidance activities is increasing. Longitudinal studies show that career interests begin to stabilize during secondary education (Low et al., 2005). Therefore, it is very important to identify individuals' interests and abilities, especially in career counseling activities at the secondary level. In this context, there is a need for measurement instruments with high validity, reliability, and usefulness that can be used in measuring interests and abilities.

As in the past, vocational interest inventories are one of the most commonly used instruments in the career counseling process today (Zickar & Min, 2019). However, there is no vocational interest inventory that remains unchanged after it has been developed.When examining the literature on the measurement of vocational interests, one can see the changes in the instruments and methods used. Both the changes in existing professions and the characteristics of the new generation have led to changes in the inventories of vocational interests.

The international literature contains many inventories of vocational interests developed for different languages and cultures. The only way to introduce a new tool into the literature of a language is not to develop that tool from scratch. Developing a vocational interest inventory from scratch is a difficult process. In contrast, adopting an already developed instrument into a new language and culture saves a lot of time and effort. Therefore, If there is an already developed instrument in the literature with high validity and reliability, it makes more sense to adapt it. In addition, adapting a vocational interest inventory also provides the basis for comparative studies between different languages and cultures.

In this study, the Turkish version of the SCI, which is a derivative of the Strong Interest Inventory and measures 17 vocational interests, was introduced into the literature. The responses of students aged 15-18 years attending secondary school in the Turkish education system were used for the adaptation. In the Turkish education system, the choice of a undergraduate major is very important for secondary school students. Although many factors are effective in the preference stage, in the studies conducted in Turkey, it is known that the most effective factor in students' career choice is interest in the profession (Atli & Gür, 2019; Şeker & Çapri, 2020). In this context, the Turkish version of SCI will help in the career counseling process to identify students' vocational interests. The obtained results show that the validity and reliability of the Turkish version of SCI are high.

In this study, a new vocational interest inventory, different from the existing instruments in the literature, was introduced into the Turkish literature. When examining the Turkish vocational interest inventories that have been developed or adapted in the last 10 years, one finds that most of them are based on Holland's theory (Yılmaz, 2011; Perkmen & Tezci, 2015; Atli & Keldal, 2017; Demir, 2020). In this context, the Turkish version of SCI has increased the variety of instruments in the Turkish literature. The small number of items in the Turkish version of SCI (164 items) makes it a more useful alternative to the instruments (Kaya, 2017) in the literature.

Vocational interest inventories are useful instruments to describe a person's interests in the career counseling process. The inclusion of these tools in the literature is valuable, but not sufficient. These studies should be considered by official policy makers such as the Department of Educational Guidance of the Turkish Ministry of Education, and their use in career guidance in schools should be encouraged. Similar to the international models (Occupational Information Network | onetonline.org), a system (National Vocational Information System | mbs.meb.gov.tr) was created in 2009 to enable online use of career guidance tools in Turkey. However, upon closer examination, it is found that the instruments of the current system are not updated over time, the Vocational Interest Inventory results are not correlated with occupations, the computerized individualized test application for the measurement instruments has not been developed, and today's technologies such as big data and artificial intelligence are not used. In this context, the suggestions developed at the end of the research are as follows;

- The construct validity and reliability of the BGMIE should be investigated in sample groups consisting of secondary school students.

- In sample groups of college students, the BGMIE should be used to construct vocational interest profiles for undergraduate majors.

- In sample groups of adults working in various occupations, vocational interest profiles should be constructed using the BGMIE.

- Given the developments in the field of measurement technology, a computerized individualized test application for BGMIE should be developed and its usefulness increased.

- The predictive validity of BGMIE should be investigated with longitudinal studies.

- The measurement invariance of the factor structure of the BGMIE as a function of gender should be analyzed.

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About Authors

Ahmet Salih Şimşek is a PhD in the Department of Measurement and Evaluation in Education and Psychology. Psychometrics, scale development, computerized individualized testing, individual technology interaction, and technology-based measurement applications are the researcher's main areas of work.

Ezel Tavşancıl is a professor in the Department of Measurement and Assessment in Education and Psychology. Researcher conducts research in behavioral sciences, multivariate statistical methods, measurement and assessment in education and psychology.

Author Contribution

This study was conducted by all the authors working together and cooperatively. All of the authors substantially contributed to this work in each step of the study.

Conflict of Interest

It has been reported by the authors that there is no conflict of interest.

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Ethical Statement

By letter from the Ministry of National Education dated 26/02/2015 and number 81576613/605/2144292, the necessary ethical approval and application permission for this research were obtained.

Appendix-1. BGMIE Sample Items

SCI (Factor)	BGMIE (Factor)	SCI (Item)	BGMIE (Item)
Creative Production	Yaratıcı Üretim	Invent a new product.	Yeni bir şeyler tasarlama
Cultural Sensivity	Kültürel Duyarlılık	Work in homeless shelter.	Kimsesizler evinde (darülacezede) çalışma
Data Management	Veri Yönetimi	Develop and use a personal budget plan.	Bütçe oluşturma ve kişisel harcamalarınızı takip etme
Helping	Yardım Etme	Comfort a patient experiencing severe pain.	Şiddetli ağrıları olan bir hastayı rahatlatma
Leadership	Liderlik	Inspire others through your leadership.	Liderlik yaparak başkalarına ilham kaynağı olma
Mathematics	Matematik	Calculate the dollar savings for an item on sale.	Bir ürünün maliyetini/karını hesaplama
Mechanical	Mekanik	Build a dollhouse.	Bir evin maketini yapma
Office Services	Ofis Hizmetleri	Use a word processing program on a computer.	Metin, dilekçe, rapor v.b. işler için ofis programlarını kullanma
Organizational Management	Organizasyon Yönetimi	Start a business.	Bir işi gerçekleştirmek için insanları organize etme
Project Management	Proje Yönetimi	Maintain a schedule for jobs that must be done.	Yapılması gereken işler için bir çalışma takvimi oluşturma
Public Speaking	Hitabet	Speak to your class reunion.	Mezunlar toplantısında konuşma yapma
Sales	Hitabet	Call people on the phone to sell them a product or service.	Telefon ile insanlara bir ürün veya hizmet satma
Science	Bilim	Understand the scientific basis of a medical breakthrough.	Tıbbi bir buluşun bilimsel temellerini anlama
Teaching	Öğretim	Train employees in new procedures.	İnsanlara yeni şeyler öğretme
Teamwork	Takım Çalışması	Work effectively with others on a team.	Takım arkadaşlarıyla etkili bir şekilde çalışma
Using Technology	Teknoloji Kullanımı	Edit photographs using a computer.	Bilgisayar kullanarak fotoğrafları düzenlemek
Writing	Yazma	Write a book report.	Bir kitap ile ilgili rapor yazma

Appendix-2. The Results of first-order CFA for Pretest 1

Pretest 1	df	Chi-Square	Chi-Square/df	RMSEA	SRMR	NNFI / TLI	CFI
Creative Production (CS)	35	185,55	5,30	0,104	0,080	0,92	0,94
Cultural Sensivity (CS)	35	112,26	3,21	0,074	0,059	0,96	0,97
Data Management (DM)	35	284,84	8,14	0,133	0,073	0,93	0,95
Helping (HE)	9	59,52	6,61	0,118	0,041	0,97	0,98
Leadership (LE)	35	279,93	8,00	0,132	0,077	0,93	0,94
Mathematics (Ma)	35	356,83	10,20	0,151	0,075	0,91	0,93
Mechanical (Me)	35	452,59	12,93	0,172	0,098	0,90	0,92
Office Services (OS)	35	611,92	17,48	0,203	0,130	0,81	0,85
Organizational Management (OM)	27	149,94	5,55	0,107	0,063	0,95	0,96
Project Management (PM)	35	106,60	3,05	0,714	0,040	0,99	0,99
Public Speaking (PS)	27	198,91	7,37	0,126	0,059	0,96	0,97
Sales (Sa)	35	197,02	5,63	0,107	0,060	0,97	0,97
Science (Sc)	35	181,02	5,17	0,102	0,048	0,97	0,98
Teaching (Te)	35	358,37	10,24	0,152	0,093	0,89	0,91
Teamwork (TW)	35	117,80	3,37	0,077	0,046	0,98	0,99
Using Technology (UT)	35	317,29	9,07	0,142	0,066	0,95	0,96
Writing (Wr)	35	160,46	4,58	0,095	0,056	0,96	0,97

Appendix-3. The Results of first-order CFA for Pretest 2

Pretest 2	df	Chi-Square	Chi-Square/df	RMSEA	SRMR	NNFI / TLI	CFI
Creative Production (CS)	35	133,70	3,82	0,16	0,10	0,87	0,90
Cultural Sensivity (CS)	35	53,90	1,54	0,07	0,06	0,98	0,98
Data Management (DM)	35	44,10	1,26	0,05	0,06	0,99	0,99
Helping (HE)	9	14,58	1,62	0,08	0,07	0,98	0,98
Leadership (LE)	35	81,90	2,34	0,11	0,08	0,94	0,96
Mathematics (Ma)	35	141,40	4,04	0,17	0,15	0,84	0,87
Mechanical (Me)	35	61,25	1,75	0,08	0,07	0,97	0,98
Office Services (OS)	27	62,10	2,30	0,11	0,09	0,93	0,95
Organizational Management (OM)	35	68,60	1,96	0,09	0,09	0,92	0,94
Project Management (PM)	35	57,05	1,63	0,08	0,07	0,98	0,98
Public Speaking (PS)	27	44,01	1,63	0,08	0,07	0,97	0,98
Sales (Sa)	35	71,75	2,05	0,10	0,08	0,95	0,96
Science (Sc)	35	85,40	2,44	0,13	0,09	0,93	0,94
Teaching (Te)	35	114,10	3,26	0,15	0,10	0,88	0,91
Teamwork (TW)	35	52,15	1,49	0,07	0,07	0,98	0,98
Using Technology (UT)	35	50,05	1,43	0,06	0,04	0,99	0,99
Writing (Wr)	35	73,85	2,11	0,10	0,07	0,97	0,97