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ΕΡΕΥΝΗΤΙΚΗ ΕΡΓΑΣΙΑ

Validation with nursing students of the Greek version of the Multidimensional Attitudes Scale (MAS) towards people with disabilities

OBJECTIVE **To validate the Greek version of the Multidimensional Attitudes Scale (MAS) towards people with disabilities in nursing students.** METHOD **A cross-sectional study was conducted during October 2018. After forward-backward translation of the MAS into Greek, the scale was completed by 179 nursing students, psychometrically tested, and validated. The nursing students also completed the Attitudes Towards Disabled Persons Scale (ATDPS) for comparison.** RESULTS **Confirmatory and exploratory factor analysis both yielded a four-factor scale for the Greek translation. Construct validity was supported by the three subscales, Affect, Cognition and Behavior, but not the Calm subscale, indicating positive correlation with ATDPS (r=0.34, 0.34 and 0.20, respectively for Affect, Cognition, and Behavior). Cronbach's α coefficient for the MAS subscales was 0.90 for Affect, 0.92 for Cognition, 0.83 for Behavior and 0.88 for Calm. Test-retest reliability analysis in a subgroup of 45 students revealed good stability after a two-week interval. The MAS did not detect differences in attitudes towards people with disabilities between students who had enrolled in an elective disability studies course and those who had not taken this course.** CONCLUSIONS **The Greek version of the MAS is a psychometrically sound instrument that can be usefully implemented in the educational course to identify the attitudes of nursing students towards people with disabilities.**

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ΑΡΧΕΙΑ ΕΛΛΗΝΙΚΗΣ ΙΑΤΡΙΚΗΣ 2020, 37(4):521–528

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Στάθμιση της ελληνικής έκδοσης του ερωτηματολογίου Multidimensional Attitudes Scale αναφορικά με φοιτητές Νοσηλευτικής για άτομα με αναπηρία

Περίληψη στο τέλος του άρθρου

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The literature on disability issues has increased in recent decades and several self-evaluation studies have revealed prejudice against people with disability,[1,2] even among nursing students.[3] Conversely, one review showed that health care professionals,[4] and also nursing and medical students, had favorable attitudes towards people with disability.[5] Research in this field is of significant value, because many of the challenges that people with disabilities face are due to the prevailing prejudice,[6] even among health care professionals,[3] which reflects, to some extent, the attitudes of the society. Nursing students are the future professionals who, along with others, will determine health policies.

The recent increase in research is probably follows the main goal of the European Union (EU) concerning disability, which is the achievement of an open society, accessible to all, in which social, natural or structural limitations are pinpointed and eliminated.[7] Negative attitudes towards people with disabilities constitute a potential obstacle to fulfilling social roles and accessing health services.

According to the EU social policy, the protection of the rights of people with disabilities and their full integration in society should be a legal and constitutional requirement for all member states.[7] Social protection systems for the rights of the disabled, however, differ from country to country and are influenced by both related perceptions and the prevailing financial situation. Despite continuous reforms in the Southern Europe countries, there is less familiarization and awareness concerning the issue of disability than in other European countries.[8] In Greece, people with disabilities still face challenges and social exclusion. It is possible that people without disability tolerate people with disability, rather than accepting them into society fully and equally, as negative attitudes continue to be prevalent in Greek society, as in other European countries.[9]

A generally negative attitude towards children with disabilities has been identified among Greek nursing students and pediatric nurses.[10] In addition, senior medical students and young parents with healthy children have been found to have a negative to neutral opinion about disabled children.[11]

A valid and reliable instrument with good psychometric characteristics could improve research concerning attitudes toward disability, as a basis for making the necessary changes in the nursing curriculum. Reliable and valid measures of attitudes are vital for explaining discrimination and for drawing attention to possible solutions.[12,13] Several instruments are available for measuring societal attitudes toward disability,[13] some of which measure the attitudes of health care professionals and students.[14] The Attitudes Towards Disabled Persons (ATDP) scale, although a classic instrument, has been found to have poor reliability measures and inconsistent factor structure.[15,16]

Although the Multidimensional Attitudes Scale (MAS) is a new scale, it has already been validated in many languages, including Hebrew,[17] French,[18] Spanish,[19] and Turkish.[20] The aim of this study was to validate the Greek version of the MAS[21] in a sample of nursing students.

MATERIAL AND METHOD

Study design

A cross-sectional study was conducted during October 2018. The study population consisted of 179 nursing students who were attending the 7th semester in the Faculty of Nursing, University of West Attica, in Greece. Of these students, 60 were also enrolled in a rehabilitation studies course, which is an elective course in the curriculum. Specifically, in the course "Nursing Rehabilitation" the students learn about legislation, different categories of disability, and about societal and nursing responsibilities for including disabled people in the community. The data were collected in the form of a self-completed questionnaire, which was answered anonymously and voluntarily by the students at the end of the 7th semester of their studies. The study was approved by the Review Board of the University of West Attica.

Questionnaires

The MAS is a new instrument based on the theory that attitudes are composed of three dimensions: Affect, Cognition, and Behavior,[21] consisting of 34 items, which attempt to measure explicit attitudes toward disabled persons. The participants were asked to read a social scenario of an interaction between a person with disabilities and another person without disabilities. They were then asked to put themselves in the place of the second person (without disabilities) and complete the items of the questionnaire, on a five-point Likert scale, ranging from 1 (very much) to 5 (not at all). The original MAS consists of 16 affective items, 10 cognitive items, and 8 behavioral items. The Affect subscale includes emotions that may arise from interaction (e.g., depression, fear, guilt), the Cognition subscale includes particular thoughts, and the Behavior subscale includes behaviors that one may demonstrate after interaction with a disabled person.[21] Higher scores indicate more negative attitudes, while lower scores indicate more positive attitudes toward those with disabilities.

The ATDPS is a classic, generic instrument for attitude examination.[16] The questionnaire has been translated into the Greek language and it has been used in studies many times.[10,11] In this study, we used the ATDPS form O, which has been shown to be internally consistent, stable and reliable, with split-half reliability coefficient ranging from 0.75 to 0.85 and test-retest reliability values of 0.66 to 0.89 examination.[16] Cronbach's α coefficient in a Greek study[10] was determined to be 0.80. The ATDPS takes about 15–20 minutes to complete. It consists of 20 items, scored on a 6-point Likert type scale ranging from -3 (disagree very much) to +3 (agree very much). The score ranges from 0 to 120, with higher scores representing more positive attitudes towards disabled persons.

Statistical analysis

The data were entered, checked for missing values and analysed using the Statistical Package for Social Sciences (SPSS), version 21.0. The normal distribution of the data was examined using the Kolmogorov-Smirnov test and P-P plots.

Evaluation of the validity of a questionnaire included factor analysis, convergent or criterion validity, subscale validity and known group validity.

Confirmatory factor analysis (CFA) was used to examine and confirmed the factor structure of the questionnaire. The CFA was carried out using the Analysis of Moment Structure (AMOS), version 7.0. The sample size required[22] for CFA based on research conventions ranging for the participants ratio 3:1 to as high as

12:1. Stable factor models can be found with samples as small as 100 and with samples as small as 150, if 10 or more items load at 0.4 or higher.[23] The MAS consisted of 34 items, thus our sample size of 180 is within the above guidelines.

Rejecting or accepting a model was based on the Chi-square test, the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI), the Normed Fit Index (NFI), the Goodness Fit Index (GFI), and the Adjusted GFI (AGFI). The Chi-square degrees of freedom (df) ratio <2.0, RMSEA <0.06, CFI >0.90, GFI >0.85, AGFI >0.80, and NFI >0.90, indicate an acceptable fit.[23–25]

Exploratory factor analysis (EFA) was conducted to identify a viable factor structure. EFA, using principal component extraction method with Varimax rotation, was conducted to determine the factor structure of the 34 items of the MAS questionnaire. Items with factor loadings ≥0.40 and those that did not load on more than one factor were retained. Items not meeting these criteria were removed one at a time. Factor analysis was repeated until a solution was attained in which all items included in the analysis met all criteria.

For the final model we used the combination of the following selection criteria: (a) Kaiser's Criterion/Eigenvalue >1, (b) scree plot, (c) fixed % of variance explained/all factors ≈60%, and (d) each factor contains at least three questions with loading >0.40.[26]

Convergent or criterion validity of the MAS questionnaire was determined by establishing the correlation between the questionnaire subscales and the ATDP scale, a commonly employed instrument with proven validity measuring attitudes toward disabled persons, using the Pearson's correlation coefficient.

Subscale validity was evaluated by examining the subscale correlations. Known groups validity of MAS questionnaire was examined in terms of the ability of questionnaire to distinguish between subgroups of patients formed on the basis of their knowledge concerning nursing rehabilitation course (no vs yes). In that case, we used independent samples t-test.

The reliability or precision of a questionnaire concerns the degree of stability or consistency with which the questionnaire measures the concept that it is supposed to measure. The estimation of reliability of a questionnaire includes internal consistency reliability and test-retest reliability.[27] Internal consistency validity of the MAS was determined by calculating the Cronbach alpha (α) coefficient. A Cronbach α coefficient >0.7 indicates sufficient reliability for research purposes and suggests that items are interdependent and homogeneous in terms of the construct they measure. For clinical applications α >0.8 is desirable. Test-retest reliability (stability) indicates the stability of the participant response over time and it was determined by calculating the intraclass correlation coefficient (ICC), namely the error in measurements as a proportion of the total variance, between the subscales scores of MAS on the initial assessment and the reassessment after a 2-week interval in a subgroup of 45 of the nursing students.

RESULTS

Of the 179 nursing students who participated, 14% were male and 86% were female, with a mean age of 23.6 years. The descriptive statistics of the responses for both the scales are presented in table 1. The mean value for the ADTP scale was 70.45±12.16. For the MAS subscales the higher mean value was observed for the Calm, the fourth factor that emerged from the MAS-Greek translation.

Validity

A three-factor model was conducted by CFA, giving unacceptable global fit indices. The resulting global fit indices (x^2=1,402.65, p<0.0005, Chi-square-degrees of freedom ratio=2.67, RMSEA=0.097, CFI=0.728, NFI=0.629, GFI=0.665, AGFI=0.621) showed that the three-factor solution proposed by the primary researchers should be rejected for the Greek MAS.

Table 1. Scores of Greek nursing students on the Attitudes Towards Disabled Persons Scale (ATDP) and subscales of the Multidimensional Attitudes Scale (MAS): Initial assessment (n=179) and reassessment (n=45).

	MAS subscales	Mean	Standard deviation	Minimum	Maximum
Initial assessment (n=179)	Affect	2.36	0.83	1.00	4.83
	Cognition	2.31	0.76	1.00	4.20
	Behavior	2.37	0.76	1.00	4.25
	Calm	3.51	1.06	1.00	5.0
	ATDP	70.45	12.16	41.00	99.0
Reassessment (n=45)	Affect	2.24	0.52	1.42	3.33
	Cognition	2.34	0.69	1.00	4.20
	Behavior	2.44	0.81	1.13	4.50
	Calm	3.44	0.89	1.67	5.0

The Bartlett Test of Sphericity was 3,465.28 ($p<0.0005$). The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was 0.878, showing that the data is suitable for factor analysis. The 34 items were analysed via Principal Component extraction method, using a Varimax rotation. Six factors, with an eigenvalue of over 1 and items factor loadings (apart from item 14) greater than or equal to 0.40 were identified. Item 14 had factor loading <0.40 (0.32) and was excluded from the analysis (tables 2, 3).

Table 2. Eigenvalues and explained variance of items on the Multidimensional Attitudes Scale (MAS).

Items	Eigenvalues	% of variance	Cumulative (%)
1	9.161	27.759	27.759
2	4.551	13.790	41.549
3	3.206	9.714	51.263
4	1.807	6.475	57.738
5	1.264	3.936	
6	1.133	3.448	
7	0.963	2.917	
8	0.895	2.714	
9	0.835	2.530	
10	0.752	2.278	
11	0.707	2.142	
12	0.640	1.940	
13	0.575	1.742	
14	0.573	1.735	
15	0.508	1.539	
16	0.481	1.459	
17	0.440	1.332	
18	0.398	1.205	
19	0.371	1.125	
20	0.359	1.088	
21	0.327	0.991	
22	0.323	0.979	
23	0.289	0.877	
24	0.283	0.858	
25	0.271	0.822	
26	0.257	0.779	
27	0.235	0.714	
28	0.219	0.662	
29	0.199	0.603	
30	0.183	0.555	
31	0.170	0.515	
32	0.129	0.390	
33	0.128	0.387	

We used the Scree test to determine the number of factors and since factors 5 and 6 contained only 2 items with explained variance of less than 4% (3.9% and 3.5%, respectively) we reanalyzed our data using 4- and 5-factor models.

Finally, the EFA yielded a 33-item scale, with a 4-factor solution. The eigenvalues and explained variance for the

Table 3. Principal component analysis for items on the Greek Multidimensional Attitudes Scale (MAS) (factor loadings).

Items	Affect*	Cognition*	Behavior*	Calm*
1	0.685			
2	0.653			
3	0.704			
4	0.724			
5	0.681			
6				0.786
7				0.810
8				0.840
9	0.661			
10	0.613			
11	0.741			
12	0.704			
13	0.643			
15	0.671			
16	0.435			
17		0.660		
18		0.764		
19		0.788		
20		0.772		
21		0.776		
22		0.711		
23		0.749		
24		0.691		
25		0.794		
26		0.635		
27			0.774	
28			0.862	
29			0.684	
30			0.457	
31			0.792	
32			0.683	
33			0.432	
34			0.468	

Rotation Method: Varimax with Kaiser Normalization
*Loadings below 0.4 are not presented

1st, 2nd, 3rd and 4th factor were 9.2–27.8%, 4.6–13.8%, 3.2–9.7% and 1.8–6.5%, respectively. Factor loadings ranged from 0.432 to 0.862 (tab. 3).

A 4-factor model was analyzed by CFA, giving almost acceptable global fit indices. The resulting global fit indices (x^2=1,032, p<0.0005, Chi-square-degrees of freedom ratio=1.97, RMSEA=0.062, CFI=0.87, NFI=0.85, GFI=0.780, AGFI=0.75) showed that the 4-factor solution could be accepted for the Greek population, namely Affect, Cognition, Behaviour, and Calm.

Table 4 summarizes the correlation between the scores on the MAS subscales with ATDP total score. Moderately significant positive correlation was demonstrated between the ATDP score and scores on the three MAS subscales: Affect (r=0.337, p<0.0005), Cognition (r=0.340, p<0.0005) and Behavior (r=0.202, p=0.009), but not between ATDP and the Calm factor (r=0.073, p=0.329).

Moderately significant positive correlation was also demonstrated between the four MAS factors, except between Calm and Behavior. The lowest correlation was between Cognition and Affect (r=0.254, p=0.001) and the highest between Cognition and Calm (r=0.373, p<0.0005) (tab. 5).

The MAS questionnaire could not discriminate between groups based on knowledge of nursing care rehabilitation.

Table 4. Correlation between the scores of Greek nursing students (n=179) on the Attitudes Towards Disabled Persons Scale (ATDP) and the subscales of the Multidimensional Attitudes Scale (MAS).

MAS subscales	ATDP	
	Pearson's (r)	p-value
Affect	0.337	<0.0005
Cognition	0.340	<0.0005
Behavior	0.202	0.009
Calm	0.073	0.329

Table 5. Validity of the subscales of the Greek Multidimensional Attitudes Scale (MAS).

MAS subscales		Affect	Cognition	Behavior
Cognition	Pearson's r	0.254		
	p-value	0.001		
Behavior	Pearson's r	0.341	0.275	
	p-value	<0.0005	<0.0005	
Calm	Pearson's r	0.323	0.373	0.036
	p-value	<0.0005	<0.0005	0.629

No difference in scores on MAS subscales was detected between the students who had attended a course on nursing rehabilitation and the others (p>0.05) (tab. 6).

Reliability

The internal consistency the MAS questionnaire measured with Cronbach's α yielded a value of 0.901 for the Affect, 0.916 for Cognition, 0.830 for Behavior and 0.884 for Calm, indicating excellent internal consistency, and showing that the items are interdependent and homogeneous in terms of the construct they measure (tab. 7).

The ICC between initial assessment and reassessment of the test subscales were for Affect 0.630 (p=0.001), Cognition 0.577 (p=0.002), Behavior 0.602 (p=0.001) and Calm 0.557 (p=0.003). These numbers indicate that scores on the MAS subscales were moderately consistent between the two occasions (tab. 7).

DISCUSSION

This study was conducted in order to evaluate the validity and reliability of the Greek translation of the MAS

Table 6. Known-groups validity of the Greek Multidimensional Attitudes Scale (MAS).

MAS Subscales	Nursing rehabilitation course	n	Mean (standard deviation)	p-value
Affect	No	95	2.27 (0.81)	0.153
	Yes	84	2.45 (0.85)	
Cognition	No	95	2.35 (0.78)	0.453
	Yes	84	2.27 (0.7)	
Behavior	No	95	2.32 (0.66)	0.448
	Yes	84	2.41 (0.87)	
Calm	No	95	3.50 (1.02)	0.919
	Yes	84	3.52 (1.11)	

Table 7. Internal consistency and test-retest reliability of the Greek Multidimensional Attitudes Scale (MAS) (two-week interval).

MAS subscales	Cronbach's alpha (n=179)	ICC (95% confidence interval)	p-value
Affect	0.901	0.630 (0.35–0.80)	0.001
Cognition	0.916	0.577 (0.24–0.77)	0.002
Behavior	0.830	0.602 (0.33–0.78)	0.001
Calm	0.884	0.557 (0.21–0.75)	0.003

ICC: Intraclass correlation coefficient

for measuring the attitudes of nursing students towards people with disabilities.

Other versions of MAS have shown strong psychometric characteristics as an outcome measure in assessing attitudes towards people with disabilities[17,19–21] and this was also confirmed for the Greek translation.

According to the primary researchers, higher scores on MAS represent more negative attitudes.[21] They also found that the most negative attitudes towards people with disabilities were in the cognitive component, and the least negative attitudes were on the behavioral component. In our study, the mean score for Calm dimension was found to be the highest, followed by Behavior, Affect, and Cognition.

The Greek version of MAS was well accepted by the nursing students as the questions were clear and short, and the mean time required to complete the scale was 15 minutes. Missing values were kept to a minimum. The scores on the subscales are easily interpretable and thus the scale can be a useful tool in assessing attitudes towards people with disabilities.

Evidence of construct validity was found when assessing the convergent, known group validity and the scales structure with CFA and EFA. Regarding the convergent validity, only moderate positive correlation was found between the ATDP total score and the three MAS subscales Affect, Cognition and Behavior, but not the Calm subscale. Similar studies demonstrated positive correlation between ATDP and the three original MAS subscales.[20,21]

Although the original MAS revealed three clearly distinct factors,[21] the present study supported the use of the Greek version of MAS as a 4-factor measure. According to the literature many different forms of MAS have been derived, e.g., a 22-item 5-factor model[17] and a 4-factor model.[18,26] The CFA revealed also the exclusion of the factor "Pity" as recommended in the original study, which applied a strict statistical standard and included in the final stage of the analysis only items with factor loading of higher than 0.4.[21] As a result, based on the original instrument, we accepted the 33-item, 4-factor model. Consequently, the original Affect factor was found to be divided into three distinguishing factors.

The EFA conducted in the present study showed that the four factors explained 57.74% of the total variance, while in other studies the variance was 47.5% for the 3-factors model,[21] 66% for the 5-factors model,[17] and 43% for the 4-factors model.[18]

Pearson correlation between the four factors of the Greek version of the MAS questionnaire was significant and positive, but moderate. The lowest correlation was between Cognition and Affect and the highest between Cognition and Calm. No correlation was found between the Calm and Behavior subscales. Inter-correlations among most of the factors tended to confirm the link between the various dimensions of the scale. In other studies, the strongest correlation was found between behavior and emotions, followed by behavior and cognition, and cognition and emotion.[21]

The reliability of the study was investigated through the test-retest analysis and investigation of internal consistency. Concerning the short-term stability, the MAS factors were moderately consistent between the two measurements two weeks apart. Similar results have been reported for a three-factor scale.[20] Cronbach's α coefficient showed the internal consistency to be satisfactory and psychometrically sufficient, as in previous studies of other versions of MAS.[1,17–20,28]

Our study had some limitations. The sample size was small and restricted. A sample size of at least 330 individuals is required to meet the empirical rule of 10 individuals per scale item.[29] The study was conducted with nursing students in only one university of Athens, who might not be representative of all nursing students in Greece. The use of both CFA and EFA requires two different samples, which would have doubled the sample requirements,[30] and the cross-sectional design of the study may have led to selection bias. Longitudinal research, including other samples of nursing students is therefore recommended to evaluate the effects of nursing education programs and other demographic and social variables on the attitudes of the students towards disabilities. Finally, the instrument relied on the self-reporting of the participants, and future studies should also use observational measures of real-life situations.

In conclusion, the Greek version of the MAS is a valid, reliable, and psychometrically sound multifactor instrument. The scale could be used in nursing education to identify the effects of courses on disability and to provide information about student perceptions toward disabled individuals, in order to modify possible prejudices. Finally, it is hoped that validation of the Greek version of MAS will increase the relevant research in Greece, so that nursing curricula will include interventions aimed at the positive modification of the attitudes of nursing students towards disabilities. Use of MAS will contribute to the understanding of how attitudes are created and persist and how they can be modified. It is very difficult to change people's at-

titudes, but if modification is a continuous process from an early age, positive attitudes will predominate. Nursing students are the future nursing staff that can contribute to the elimination of prejudice in the healthcare setting and in society, with the creation of equal opportunities for everyone.

ΠΕΡΙΛΗΨΗ

Στάθμιση της ελληνικής έκδοσης του ερωτηματολογίου Multidimensional Attitudes Scale αναφορικά με φοιτητές Νοσηλευτικής για άτομα με αναπηρία

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ΣΚΟΠΟΣ Η στάθμιση της ελληνικής έκδοσης του ερωτηματολογίου Multidimensional Attitudes Scale (MAS) σε φοιτητές Νοσηλευτικής για άτομα με αναπηρία. **ΥΛΙΚΟ-ΜΕΘΟΔΟΣ** Εκπονήθηκε μια συγχρονική μελέτη τον Οκτώβριο του 2018. Έπειτα από την «εμπρός-πίσω» μετάφραση του MAS στα Ελληνικά, το ερωτηματολόγιο συμπληρώθηκε από 179 φοιτητές Νοσηλευτικής για τη στάθμισή του και την εκτίμηση των ψυχομετρικών ιδιοτήτων. Οι φοιτητές συμπλήρωσαν επίσης και το ερωτηματολόγιο Attitudes Towards Disabled Person Scale (ATDPS). **ΑΠΟΤΕΛΕΣΜΑΤΑ** Η διερευνητική και η επιβεβαιωτική ανάλυση παραγόντων οδήγησε στην ελληνική έκδοση του ερωτηματολογίου με τέσσερις παράγοντες. Η εγκυρότητα κατασκευής οδήγησε σε τρεις κλίμακες, μη περιλαμβάνοντας την κλίμακα της ηρεμίας. Βρέθηκε θετική συσχέτιση μεταξύ MAS και ATDPS (r=0,34, 0,34 και 0,20 για τις κλίμακες επίδρασης, γνωστικής λειτουργίας και συμπεριφοράς, αντίστοιχα). Ο συντελεστής εσωτερικής συνέπειας Cronbach's alpha για τις κλίμακες επίδρασης, γνωστικής λειτουργίας, συμπεριφοράς και ηρεμίας του MAS ήταν 0,9, 0,92, 0,83 και 0,88, αντίστοιχα. Η ανάλυση ελέγχου-επανελέγχου μεταξύ δύο εβδομάδων σε μια ομάδα φοιτητών (n=45) έδειξε καλή αξιοπιστία. Το MAS δεν βρήκε διαφορές μεταξύ μιας ομάδας φοιτητών που παρακολούθησαν ένα μάθημα για άτομα με αναπηρία σε σχέση με τους φοιτητές που δεν παρακολούθησαν το μάθημα αυτό. **ΣΥΜΠΕΡΑΣΜΑΤΑ** Η ελληνική έκδοση του MAS έχει αρκετά καλές ψυχομετρικές ιδιότητες και μπορεί να χρησιμοποιηθεί στην εκπαίδευση για την αναγνώριση της στάσης των φοιτητών απέναντι σε άτομα με αναπηρία.

Λέξεις ευρετηρίου: Αναπηρία, Αξιοπιστία, Εγκυρότητα, Στάθμιση, Φοιτητές Νοσηλευτικής

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