Test your memory-Turkish version (TYM-TR): reliability and validity study of a cognitive screening test

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Background/aim: The test your memory (TYM) is reported to be a sensitive cognitive function assessment scale for people with dementia. The aim of the present study was to investigate the reliability and validity of an adapted Turkish version of the TYM (TYM-TR) among Turkish dementia patients.

Materials and methods: The TYM-TR was given to 59 patients with dementia aged 60+ and 336 normal controls aged 23–75+. The diagnostic utility of the TYM-TR was compared with that of the mini-mental state examination (MMSE) to validate it.

Results: The internal consistency of the TYM-TR was α = 0.85. The test–retest reliability was 0.97 (P < 0.001). The TYM-TR showed a statistically significant correlation with MMSE; r (57) = 0.628 P < 0.001. The TYM-TR distinguished dementia patients from controls (AUC = 0.994). A cut-off point of 34 was optimal for detecting dementia with a sensitivity of 96.61% and a specificity of 96.13% [95% CI (0.981–0.999)].

Conclusion: The Turkish version of the TYM was found to have good reliability and validity to distinguish dementia in the Turkish population.

Key words: Test your memory-Turkish version, dementia, validity, reliability

1. Introduction

It is estimated that there are 32 million patients with dementia in the world (1). The prevalence of dementia is also increasing in Turkey, affecting approximately 20% of people over the age of 70 (2).

As the prevalence of dementia increases due to the growth of the aging population (3), the issue of screening will become increasingly important. Recognition of dementia syndrome is an essential step for addressing a specific etiology. Unfortunately, a vast majority of the current dementia screening tools have some disadvantages in detecting early stage dementia or are not easily administered in primary care settings (4).

The mini-mental state examination (MMSE) (5) is one of the favorite tests to assess demented people worldwide, including Turkey. It includes the assessments of orientation, memory, concentration, language, and motor skills in general. Although its specificity (82%) and sensitivity (87%) are high in distinguishing dementia and delirium,

it may not be sufficient to distinguish a true cognitive disorder from mild memory problems. The MMSE is an easy and fast to use test; however, it may produce pseudo results. False positive results may occur with mild cognitive impairment, late cognitive impairment, frontal dementia, low level education, and false negative results with high education (6); for example, patients with lower levels of education may be wrongly classified as demented (7). Accordingly, underdiagnosis is one of a number of deficiencies (i.e. providing timely detection or diagnosis, lack of sufficient information or appropriate referral, lack of suitable supports and services, etc.) in both diagnosis and management of dementia in primary care settings (8).

The test your memory (TYM) (9) is a self-administered cognitive screening test requiring minimal administration time, assessing a reasonable range of cognitive functions and being sensitive to mild Alzheimer disease (AD). This feature facilitates the widespread use of the test by nonspecialists. The instrument has been validated in

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English, Afrikaans, Japanese, Chinese, Spanish, and Polish populations (9–15).

Short and quick cognitive screening tests that help identify dementia are vital for different populations. The aim of this study was to test the reliability and validity of the TYM in the Turkish population (TYM-TR) with an emphasis on its sensitivity and specificity in distinguishing dementia (AD) from other (cognitive) deficits.

2. Materials and methods

2.1. Study population

Two groups of participants between the ages of 23 and 75+ were included in the study. The study group (n = 59) was recruited from the Department of Neurology in Eskişehir Osmangazi University Hospital and diagnosed as 'demented' by an expert neurologist and a psychiatrist. Eligibility criteria were as follows: participants should be over 18 years old, should have given informed consent to take the test, and were free of any additional debilitating cognitive impairment that could interfere with neuropsychological assessment or underlying medical or psychiatric illness that could negatively affect cognition. The neurologist diagnosed dementia (AD) based on detailed neurological, neuropsychological, and laboratory data and blood tests for each participant. The Hamilton Depression Rating Scale (16) and the MMSE (17) were administered to all individuals with dementia as well.

The normal controls (n = 336) were recruited from among patients who presented to two hospitals in Eskişehir with various complaints (headache, problems with lumbar disc, etc.) other than memory problems. One neurologist and a psychiatrist excluded the possibility of any neurological diseases or psychiatric conditions that could affect cognitive function by formal and informal ways of assessment. The main language of all the participants was Turkish, which was also an inclusion criterion for the study. The Hamilton Depression Rating Scale was used to exclude the possibility of depression in control subjects. Subjects whose scores were above 7 points were excluded from the study.

2.2. Development of the TYM-TR

The TYM-TR consists of 10 tasks that assess 11 cognitive domains: orientation (10 points), copying (ability to copy a sentence) (2 points), semantic knowledge (retrograde memory) (3 points), calculation (4 points), verbal fluency (phonemic) (4 points), abstraction (similarities) (4 points), naming (5 points), visiospatial abilities (1–2) (letter M and clock drawing test) (7 points), anterograde memory (recall of a copied sentence) (6 points), and executive functions (capacity to complete the test without help) (5 points). The scores obtained from the TYM range from 1 to 50; a higher score indicates a higher degree of cognitive functioning. This handwritten self-assessment test requires approximately 5 min with no time limit and the total score is calculated by the sum of the scores of all the items.

For ethical considerations, written permission was obtained from the original developers to proceed with the translation and use of the tool for research and clinical purposes. The translation and cultural adaptation of the Turkish version of the TYM were performed by 3 speech and language therapists and the most suitable items were selected based on a consensus between the raters.

The *semantic knowledge*, *copying*, *anterograde memory*, and *naming* sections of the original test were modified to improve the cultural appropriateness for Turkish speakers. In the *copying* section, the sentence 'Good citizens always wear stout shoes' was changed to a new one: 'Gray hair indicates not wisdom but age' in Turkish, keeping the number of words in the original sentence constant. In the *semantic knowledge* part, the second question was changed to the 'death date of Atatürk, the founder of the Turkish Republic'. In the *naming* part, the words 'collar' and 'lapel' can be translated into the same word in Turkish and so the word 'lapel' was changed to the word 'jacket'. The letter W in the *visiospatial abilities* part of the original TYM was modified to M since the Turkish alphabet does not contain that letter (the full TYM-TR can be found in the Appendix, on the journal's website).

2.3. Statistical analysis

Statistical analyses of the data were conducted to examine the reliability of the TYM-TR. Full information is presented in Tables 1–5. Discrimination between demented and nondemented participants and determination of an optimal cut-off score for screening were aimed. Values were expressed as *M* and *SD*. Kolmogorov–Smirnov and Shapiro–Wilk tests measured the normality distribution of variants. The distribution of the group scores was not normal on all subtests of the TYM-TR; accordingly, a nonparametric Mann–Whitney U test was carried out. Median and 25–75 percentile scores are presented in Table 4.

Differences in sex, age, and education were analyzed using chi-squared tests. The correlations between scores of the TYM-TR and the MMSE-TR were evaluated using the Spearman rank correlation test. Interrater reliability was determined using the Spearman rank correlation test. A level of $P < 0.05$ was accepted as statistically significant. Statistical analyses were performed using SPSS 21.0 for Windows and MedCalc 11.1.0.0. The specificity and the sensitivity of the diagnostic index to discriminate between the normal controls and the study group were assessed using receiver operating characteristic (ROC) analysis.

3. Results

3.1. Demographic data

Both the study group and control group were divided into 4 age and 5 education groups. There were only 3 control

Table 1. Socio-demographic characteristic of the participants.

	Control group (n = 336)	Group with dementia (n = 59)	Total (n = 395)
Sex	–	–	–
Male	110 (32.7%)	20 (33.9%)	130
Female	226 (67.3%)	39 (66.1%)	265
Age	–	–	–
23–44 years	123 (36.6%)	1 (1.7%)	124
45–49 years	118 (35.1%)	2 (3.4%)	120
60–74 years	65 (19.3%)	26 (44.1%)	91
75+ years	30 (8.9%)	30 (50.8%)	60
Level of education	–	–	–
Illiterate	3 (0.9%)	15 (25.4%)	18
1–5 years	97 (28.9%)	37 (62.7%)	134
6–8 years	81 (24.1%)	3 (5.1%)	84
9–11 years	87 (25.9%)	3 (5.1%)	90
12+ years	68 (25.9%)	1 (5.1%)	69

Table 2. Means and the standard deviations of the performances of normal controls (n = 336) and patients with dementia (n = 59) on TYM-TR subtests.

Subtest of TYM-TR	Groups	Mean	SD
Orientation (10 pts)	Control	9.83	0.74
	Dementia	3.47	2.81
Copying (ability to copy a sentence) (2 pts)	Control	1.97	0.27
	Dementia	0.67	0.95
Semantic knowledge (retrograde memory) (3 pts)	Control	2.77	1.05
	Dementia	0.83	0.59
Calculation (4 pts)	Control	3.68	0.76
	Dementia	0.45	0.79
Verbal fluency (phonemic) (4 pts)	Control	3.58	0.88
	Dementia	0.71	1.13
Abstraction (similarities) (4 pts)	Control	4.75	1.51
	Dementia	1.50	1.60
Naming (5 pts)	Control	4.75	0.57
	Dementia	1.50	2.04
Visuospatial abilities 1 (3 pts)	Control	2.19	1.28
	Dementia	0.10	0.54
Visuospatial abilities 2 (4 pts)	Control	3.96	0.17
	Dementia	0.88	1.30
Anterograde memory (6 pts)	Control	5.14	1.80
	Dementia	0.00	0.00
Need for assistance (5 pts)	Control	4.88	0.44
	Dementia	2.03	1.48
Total Score (50 pts)	Control	45.4	4.49
	Dementia	12.2	10.5

Table 3. Cronbach's α values of TYM-TR subtests.

Subtest	Cronbach's α values
Orientation	0.96
Copying	0.89
Semantic knowledge	0.77
Calculation	0.79
Verbal fluency	0.85
Abstraction	0.90
Naming	0.87
Visuospatial abilities 1	0.88
Visuospatial abilities 2	0.91
Anterograde memory	0.86
Need for assistance	0.81
Total	0.85

Table 4. Mann–Whitney U tests comparing average scores on subtests.

	Control group	Group with dementia	U	P
	Q2 (Q1;Q3)	Q2 (Q1;Q3)		
Orientation	10.0 (10.0; 10.0)	2.0 (2.0; 6.0)	807.5	P < 0.001
Copying	2.0 (2.0; 2.0)	0.0 (0.0; 2.0)	3.517	P < 0.001
Semantic knowledge	3.0 (3.0; 3.0)	2.0 (0.0; 1.0)	1.859	P < 0.001
Calculation	4.0 (4.0; 4.0)	2.0 (0.0; 1.0)	472.0	P < 0.001
Verbal fluency	4.0 (4.0; 4.0)	2.0 (0.0; 1.0)	1.115	P < 0.001
Abstraction	2.0 (2.0; 4.0)	1.0 (0.0; 2.0)	6.315	P < 0.001
Naming	5.0 (5.0; 5.0)	0.0 (0.0; 4.0)	2.281	P < 0.001
Visuospatial abilities 1	3.0 (0.5; 3.0)	2.0 (0.0; 0.0)	2.833	P < 0.001
Visuospatial abilities 2	4.0 (4.0; 4.0)	0.0 (0.0; 2.0)	867.5	P < 0.001
Need for assistance	5.0 (5.0; 5.0)	1.0 (1.0; 2.0)	1.728	P < 0.001
Total	46.0 (44.0; 49.0)	7.0 (5.0; 20.0)	110.0	P < 0.001

Q2: Median; Q1: 25 percentile; Q3: 75 percentile, U: Mann–Whitney U value; P-level

participants with no history of education; the rest of the group were either low or high educated with almost equal distribution among the various education levels. In the study group, more than half of the participants had received 1 to 5 years of education (62.7%). Males were fewer than women in both groups. Participants ≥60 years were higher in percentage in the group with dementia (94.9%) compared to the control group (28.2%). Detailed demographic characteristics of the groups are shown in Table 1.

The total sample included 395 participants with 130 male and 265 female. No significant relationship was found between the study and control groups with respect to sex [χ^2 (1) = 0.31, P < 0.861]. However, level of education [χ^2

Table 5. Receiver operating characteristic curves for the TYM-TR subtests.

Subtest	AUC	Cut-off	Sensitivity	CI (95%)	Specificity	CI (95%)
Orientation	0.95	8 pts	93.22	0.93	96.73	0.97
Copying (ability to copy a sentence)	0.82	0 pts	66.10	0.78	98.21	0.85
Semantic knowledge (retrograde memory)	0.90	1 pt	76.27	0.87	96.73	0.93
Calculation	0.97	2 pts	98.31	0.95	91.96	0.98
Verbal fluency (phonemic)	0.94	2 pts	89.83	0.91	89.29	0.96
Abstraction (similarities)	0.68	1 pt	50.85	0.63	81.55	0.72
Naming	0.88	3 pts	74.58	0.84	98.21	0.91
Visuospatial abilities (1)	0.85	0 pts	96.61	0.81	69.35	0.89
Visuospatial abilities (2)	0.95	2 pts	91.53	0.93	100.00	0.97
Anterograde memory	0.96	0 pts	100.00	0.93	91.96	0.97
Need for assistance	0.91	3 pts	79.66	0.88	97.62	0.93
Total score	0.99	34 pts	96.61	0.98	96.13	0.99

CI: Confidence interval; AUC: Area under curve

(4) = 111.1, P < 0.001] and age [χ^2 (3) = 107.4, P < 0.001] were significantly different between the groups.

3.2. TYM-TR results
Table 2 shows the means of TYM-TR total and subtest scores for both controls and the patients. As can be seen, patients with dementia obtained low scores especially on *Anterograde memory*, which required the patient to remember and write the sentence again that s/he had copied previously. Patients also obtained low scores on semantic knowledge, calculation, verbal fluency, and visuospatial tasks. In total, all subtests indicated a significant difference between patients and normal controls (cf. Table 4).

3.3. Reliability of the TYM-TR
The reliability of the TYM-TR was estimated by test–retest, interrater reliability, and internal consistency. The test–retest reliability was evaluated in 30 randomly selected normal controls, readministrated 3 weeks after the initial one. The test was observed to be reliable over a period of 3 weeks with α = 0.97 (P < 0.001).

A random sample of 30 control participants was rated by two speech and language therapy master students who were trained in the test. An interrater reliability analysis using the Spearman correlation was performed to determine consistency among raters. The correlation between raters was significant (r = 0.98, P < 0.001). The TYM-TR with its subtests was assessed to be internally consistent with an overall Cronbach's α = 0.85, listed in Table 3 below.

3.4. Validity of the TYM-TR
Table 4 shows the Mann–Whitney U test results comparing the subtest scores of the participants with dementia (n = 59) versus the control participants (n = 336). The results indicated significant differences in all subtests between the groups (P < 0.001).

ROC analysis was performed to determine the ability of the TYM-TR to discriminate between dementia patients and controls. The TYM-TR distinguished patients with dementia from controls sharply, as can be seen from the area under curve value of AUC = 0.994. A cut-off point of 34 was optimal for detecting dementia with a sensitivity of 96.61% and a specificity of 96.13% [95% CI (0.981–0.999)], indicating high overall diagnostic utility of the TYM-TR to identify cases of dementia (Table 5). As seen in the table, AUC values were classified as having good (>0.8) to excellent (>0.9) utility.

In our study, 59 patients with dementia were given the TYM-TR as well as the MMSE in Turkish. We used the data to plot a ROC curve. A direct comparison between the TYM-TR and the MMSE-TR was performed in identifying the patients with dementia using the cut-off <34 for the TYM-TR (Figure) and <23/24 for the MMSE-TR (17).

Güngen et al. (17) provided the following values for the MMSE-TR: sensitivity 0.91, specificity 0.95, positive and negative predictive values 0.90 and 0.95, and kappa score 0.86. Interrater reliability analysis showed high
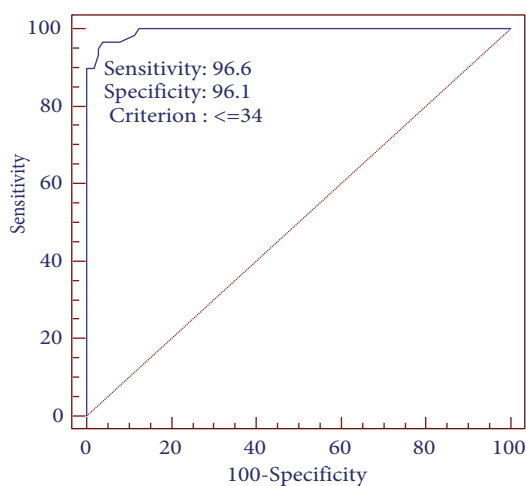
Figure. The receiver operating characteristic curve for TYM-TR scores as a screening tool for dementia (AD).

correlation (r = 0.99) and high kappa (0.92). On the other hand, the TYM-TR had the following values: sensitivity 0.97, specificity 0.96, and Cronbach's alpha score 0.85. Interrater reliability analysis showed a high correlation (r = 0.98). Accordingly, the TYM-TR showed a statistically significant correlation with the MMSE-TR, r (57) = 0.628, P < 0.001.

4. Discussion

Dementia is a significant public health problem that is usually underrecognized and underdiagnosed in the community. Efforts to develop sensitive and specific cognitive screening tools that are valid, easy to administer, and minimally time-consuming are needed to discriminate dementia from normal aging characteristics. The MMSE is one of the most widely used cognitive screening tools (17) in Turkey. Yet, most neurologists think that it takes rather long for routine use in general practice (18) and has a limited score range, which can induce ceiling and floor effects (19). Other criticisms include its utility to detect cognitive changes in general medical populations (20) with lower sensitivity and specificity (21). The authors of that test did not recruit more patients with moderate to severe levels of dementia because they thought it would decrease the values of specificity and sensitivity. In contrast, the sensitivity and specificity values of the TYM-T are higher than those of the MMSE, which means that there are few false negative results, and thus fewer cases of disease are missed. Accordingly, determining the patients' likelihood of having dementia is much higher with the TYM-TR than with the MMSE.

The TYM is originally a self-administered cognitive screening test requiring minimal administration time, assessing a reasonable range of cognitive functions and being sensitive to mild Alzheimer's disease (9). Thus, it is also of great value to develop this test to be used in resource limited primary care settings in Turkey due to its higher practicality.

The findings of the present study show that the TYM-TR is a reliable and valid instrument for assessing dementia in the Turkish population. The TYM-TR showed a statistically significant correlation with the MMSE, which also supported its validity. The total score and the subscore analysis of TYM-TR also showed that the performance in all parts of the test is significantly lower among patients with dementia compared to normal controls, which showed that the TYM-TR differentiates people with dementia from the controls. The average total TYM test score for the control group was consistent with those obtained by Brown et al. (9), Hanyu et al. (11), and Szczesniak et al. (14), as 45.4/50. However, Turkish patients with dementia presented lower results than patients from the original English, as well as from the Japanese and Polish studies. Turkish patients scored an average of 12.25/50 compared to English (33/50), Japanese (35.7/50), and Polish (23.4/50) versions. In the Turkish version, the optimal cut-off score is 34 with a sensitivity of 96.61% and specificity of 96.13%. The discrepancy between the results of the original version (TYM = 42) and TYM-TR may be because of several possible reasons. It might be due to the fact that all mentioned studies involved more patients with mild or early dementia, while in our study most of the Turkish participants had moderate to severe dementia, as evident from their scores on the MMSE (average score = 13.7/30).

MMSE scores of the demented group in this study were rather low (below 17) in 42 patients, which supported the severity of the condition. Moreover, the observed full assistance level in the TYT-TR (measuring executive function) reached 55.9% in the dementia group. Approximately 33 patients were assisted to fill in the test. The examiner reported only 9 patients administrating the test by themselves and 5 of them got minor help.

The level of education of the group with dementia was also low (illiterate = 15 patients; 5-year elementary education = 37 patients), which may be another possible explanation for the lower total mean scores obtained. Accordingly, when looking at their scores on the TYM-TR, we observed that patients performed lower on the test; 33 patients scored 1 to 9, 14 patients scored 10 to 20, and 10 patients scored 21 to 34, the cut-off score. Scores below 34 were presumably sensitive to education and age, which were not considered in this study but the data were saved for a further study with a larger population of normal controls.

Consequently, the first and major limitation is that the cut-off score is derived from a sample consisting of

moderate to severe dementia and the results might not be generalizable to patients with early or mild dementia. Further studies should involve patients with mild or early dementia and the performance of these groups in terms of their TYM-TR scores should be compared. Yet, the TYM-TR can be used as a screening tool that could differentiate between mildly demented and nondemented subjects.

Another limitation of this study is the very low educational level of the participants. This made it difficult to further analyze the TYM-TR cut-off scores according to different educational levels. In future studies, it may be useful to examine the utility of the TYM-TR as a screening instrument for cognitive impairment for moderately young and educated subjects and to investigate the effect of education and ages on the scores.

The third limitation is the lack of correlation of the TYM-TR with other standardized tests screening for dementia except for the MMSE. Further studies are needed to confirm the validity of the test, which can include other validated tests like the MoCA-TR (22), the neuropsychological test battery (23), or clock drawing tests (24), which have subtests like visuospatial abilities, executive functions, semantic memory, or abstract thinking measuring similar constructs.

To conclude, the Turkish version of the TYM test is a useful instrument and may be used as an alternative to the MMSE screening test in clinical practice in patients with dementia.

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APPENDIX

TÜRKÇE BELLEK TESTİ
TEST YOUR MEMORY-TR (TYM-TR)

ADINI SOYADINI YAZ…………………………………………4

BUGÜN GÜNLERDEN   ………………..

BUGÜNÜN TARİHİ: …...…   ………….(AY)   20……

KAÇ YAŞINDASIN?   ………………..

DOĞUM TARİHİNİ YAZ? ……….. / …………… (AY)   19……

(10)

AŞAĞIDAKİ CÜMLEYİ (BAKARAK) YAZIN:

BEYAZ SAÇ, AKLIN DEĞİL YAŞIN İŞARETİDİR

……………………………………………………………………………...

CÜMLEYİ TEKRAR OKUYUN VE AKLINIZDA TUTMAYA ÇALIŞIN

(2)

TÜRKİYE'NİN BAŞBAKANI KİMDİR? ……………… …...…..………...

ATATÜRK'ÜN ÖLÜM TARİHİ NEDİR? …………………………….

(3)

HESAPLAYIN

20 – 4   = ………..
16 + 17 = ………..
8 x 6   = ………..
4 + 15 - 17 = ……....

(4)

"S" İLE BAŞLAYAN DÖRT NESNE ADI YAZIN. Örnek: **Saat**
1 S…………………….
2 S…………………….
3 S…………………….
4 S…………………….

(4)

HAVUÇ İLE PATATES ARASINDA NASIL BİR BENZERLİK VARDIR?……………………
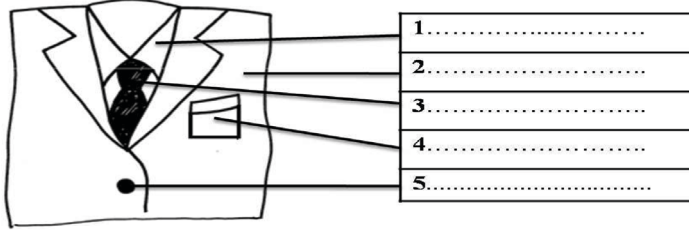
ASLAN İLE KURT ARASINDA NASIL BİR BENZERLİK VARDIR?……………………………

(4)

HATIRLA: BEYAZ SAÇ, AKLIN DEĞİL YAŞIN İŞARETİDİR

TÜRKÇE BELLEK TESTİ

GÖSTERİLEN GİYSİ PARÇALARININ ADINI YAZIN

1. ………………...…………
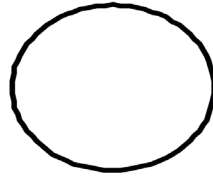2. …………………………
3. …………………………
4. …………………………
5. ……………………………

⑤

AŞAĞIDAKİ DAİRELERİ BİR HARF OLUŞTURACAK ŞEKİLDE BİRLEŞTİRİN (KARELERİ GÖRMEZDEN GELİN)
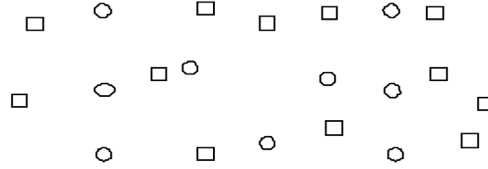
③

BEN BİR SAAT ÇİZDİM. SİZ İÇİNE 1'DEN 12'YE KADAR NUMARALARI YERLEŞTİRİN; SAAT <u>9.20</u>'Yİ GÖSTERSİN.

④

SAYFAYI BİTİRMEDEN, DAHA ÖNCE YAZDIĞINIZ CÜMLEYİ TEKRAR YAZIN:

⑥

……………………………………………………………………………………………………

TESTİ UYGULAYANLAR İÇİN:
YARDIM: YOK / AZ / ORTA / ÇOK
YANITLARI (HASTANIN YERİNE) SİZ YAZDIYSANIZ KUTUYU İŞARETLEYİN
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TYM-TR INSTRUCTIONS

1. Orientation (10 pts): The participant is asked to write his/her full name, age, birthday, and the assessment date.

2. Copying (ability to copy a sentence) (2 pts): The participant is asked to copy the sentence (Gray hair indicates not wisdom but age), read it, and try to remember it.

3. Semantic knowledge (retrograde memory) (3 pts): The participant is asked to write the name of the prime minister (2 pts) and the date Atatürk, the founder of the Turkish Republic, died (1 pt).

4. Calculation (4 pts): The participant is asked to do some calculations except *division* (Each correct calculation is 1 pt).

$20 - 4 =$ -------; $16 + 17 =$ -------; $8 \times 6 =$ --------; $4 + 15 - 17 =$ --------

5. Verbal fluency (phonemic) (4 pts): The participant is asked to list 4 objects beginning with 's'. The word 'saat' (watch) may be given as an example. (Each correct object starting with 's' is 1 pt).

6. Abstraction (similarities) (4 pts): The participant is asked to state in what way a carrot is like a potato and a lion is like a wolf. (2 pts each)

[Following this section, the participant is asked to recall the sentence 'Gray hair indicates not wisdom but age']

7. Naming (5 pts): The participant is asked to name each item on the 'jacket' (each correct item is 1 pt. for 1: collar, 2: jacket, 3: tie, 4: pocket, 5: button)

8. Visuospatial-1 (3 pts): The participant is asked to join the circles together to form a letter 'M', ignoring the circles.

9. Visuospatial-2 (4 pts): The participant is asked to draw on a clockface, puttting in the numbers 1 to 12 and placing the hands at 9:20.

10. Anterograde memory (6 pts): The participant is asked to recall the sentence 'Gray hair indicates not wisdom but age' and write it down in Turkish.

11. Need for assistance (5 pts): The TYM tester is asked to assess the 'amount of help' that the participant needed (help amount: none, trivial, minor, moderate, and major).

Note: A more detailed scoring sheet is available at www.tymtest.com

TYM-TR YÖNERGELERİ

1. Oryantasyon (10 puan) : Bu bölümde, katılımcıdan adı-soyadını, yaşını, doğum tarihini, uygulama gününü ve günün tarihini yazmasını isteyen maddeler yer almaktadır.

2. Cümleyi tekrar yazma (2 puan) : Bu bölümde, katılımcıdan, 'Beyaz saç aklın değil, yaşın işaretidir.' cümlesini bakarak yazması ve yazdığı cümleyi aklında tutması istenmektedir

3. Semantik bilgi (3 puan) : Bu bölümde, 'Başbakanın adının ve Atatürk'ün ölüm tarihinin' istendiği maddeler yer almaktadır. Başbakanın adı ve soyadının bilinmesi 2 puan, Atatürk'ün ölüm tarihinin bilinmesi 1 puan olarak değerlendirilmektedir.

4. Hesaplama (4 puan) : Bu bölümde, bölme işlemi haricindeki matematiksel işlemler değerlendirilmektedir. Her doğru işlem 1 puandır.

$20 - 4 =$ -------; $16 + 17 =$ -------- ; $8 \times 6 =$ -------- ; $4 + 15 - 17 =$ --------

5. Sözel Akıcılık (4 puan): Bu bölümde, katılımcılardan "S" ile başlayan 4 nesne yazması istenmekte, yazılan her doğru nesne için 1 puan verilmektedir. "Saat" sözcüğü örnek olarak verilmektedir.

6. Benzerlikler (4 puan) : Bu bölümde, patates ile havucun (sebze) ve aslan ile kurdun (hayvan) ne açıdan birbirlerine benzedikleri sorulmaktadır. [Benzerlikler bölümünden sonra katılımcıdan aklında tutması istenen "Beyaz saç aklın değil yaşın işaretidir" cümlesini hatırlayarak söylemesi gerekmektedir.]

7. Adlandırma (5 puan) : Bu bölümde bir giysi (ceket) resmi bulunmakta; katılımcıdan giysi üzerindeki bazı parçaları adlandırması istenmektedir. Numaralandırılmış her giysi parçasının (1 = yaka, 2 = ceket, 3 = kravat, 4 = cep, 5 = düğme) adlandırılması 1 puan olarak değerlendirilmektedir.

8. Görsel - Uzamsal Beceriler-1 (3 puan) : Bu bölümde, katılımcıdan verilen ipuçlarını takip ederek bir harf oluşturması beklenmektedir. Katılımcıya 'Aşağıdaki daireleri bir harf oluşturacak şekilde birleştirin, kareleri görmezden gelin.' şeklinde bir yönerge verilmektedir. İstenilen şekilde tamamlanan görev sonucunda, bu bölüm 3 puan ile değerlendirilmektedir.

9. Görsel-Uzamsal Beceriler - 2 (4 puan) : Bu bölümde, katılımcının verilen dairenin içine bir saat çizmesi, dairenin içine 1'den 12'ye kadar sayıları yerleştirmesi, akrep ve yelkovanı çizmesi ve saati 9 : 20'yi gösterecek şekilde ayarlaması istenmektedir.

10. Hatırlama ve Cümleyi Tekrar Yazma (6 puan) : Katılımcıdan daha önceden aklında tutması istenen 'Beyaz saç aklın değil, yaşın işaretidir' cümlesini bu bölümde hatırlayıp yazması istenmektedir.

11. Hastanın testi tamamlama becerisi (5 puan) : Son bölümde, uygulamacıdan, katılımcıya verdiği yardım düzeyini 5 puan üzerinden değerlendirmesi istenmektedir (yardım yok = 5, az = 4, orta = 3, çok = 2, yardımlı = 1). Bu puanın eklenmesi ile test sona ermektedir.