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Investigation of the Validity and Reliability of the Turkish Adaptation of Allen Cognitive Level Screen-5 (ACLS-5) with Individuals with Schizophrenia AQ1

Left running head: L. Kayaozturk [Kaya-Ozturk] et al.

Short title : Validity and Reliability of the Allen Cognitive Level Screen-5

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Abstract

This study aimed to explore validity and reliability of the Allen Cognitive Level Screen-5(ACLS-5) in individuals with schizophrenia. One hundred and twenty individuals (n = 60 with schizophrenia; n = 60 healthy individuals) were participants. Test-retest reliability, discriminant validity and construct validity analysis were performed. According to the analysis of construct validity, there was a significant correlation between ACLS-5 and Social Functioning Scale (r = 0.382–0.487, p < 0.05) and between ACLS-5 and Wisconsin Card Sorting Test (r = 0.257–0.557, p < 0.01). The ACLS-5 has shown strong test-retest reliability with an intra-class correlation coefficient (ICC = 0.93) and discriminant validity (z = 7.065, p < 0.001). This study provides preliminary evidence for the validity and reliability of the Turkish version of the ACLS-5.

KEYWORDS

Schizophrenia; cognitive tests; cognitive impairments; psychometrics

Introduction

Schizophrenia is a mental health disorder characterized by positive symptoms such as delusions, hallucinations, speech and behavioral disorders, and negative symptoms such as low motivation, anhedonia [anhedonia,] and lack of energy (American Psychiatric Association, 2013). More than 20 million people [people worldwide] are known to be affected by schizophrenia (Sun et al., 2019). Schizophrenia symptoms may negatively affect the individual's emotions, thoughts, behaviors, communication, and social skills and especially cognition (McCutcheon et al., 2020). Cognitive impairments in schizophrenia are usually observed in areas including attention, memory, learning, perception, information processing, verbal fluency, and executive functions (McCutcheon et al., 2020; Tripathi et al., 2018; Zanelli et al., 2019). These impairments cause the individuals to experience occupational performance

problems and difficulties carrying out their roles and responsibilities in daily life (Shimada et al., 2018). Cognitive impairments usually precede other symptoms of schizophrenia and persist in the course of the disease (Zanelli et al., 2019). Additionally, these impairments are important for occupational therapists' interventions regarding community living; cognition is a process that includes the individual's goal setting, goal comprehension and goals realization alongside being related to functional outcomes and necessary for the continuation of [delete "the continuation of"] daily living (Brown et al., 2019; Store, 2019). In individuals with schizophrenia, activities of daily living such as eating, dressing, hygiene, self-care, toileting, and instrumental activities of daily life such as food preparation, shopping, communication, money management, and housework are affected by the aforementioned cognitive impairments (American Occupational Therapy Association, 2020; Kim et al., 2021). Occupational therapists have an important role in assessing the cognitive functions necessary for occupational performance in the lives of individuals with schizophrenia (Store, 2019). Therefore, they should accurately assess cognition to determine the occupational performance capacity necessary for independent daily living of individuals with schizophrenia (Brown et al., 2019).

Cognitive assessment tools used routinely comprise four different types: self-report measures, interview-based measures, performance-based ratings, and computerized-based measures (Bakkour et al., 2014). In a review by Bakkour et al. (2014), it was stated that performance-based assessments evaluating daily living activities of individuals with schizophrenia were more common, and their clinical use was more appropriate for measuring cognitive functions. In addition, Kwon and Oh (2015) stated that the use of performance-based cognitive tests would be more useful in detecting problems associated with occupational performance. In the literature, there are many performance-based assessments developed by occupational therapists to measure the cognitive functions of individuals with schizophrenia: Executive Function Performance Test (EFPT) developed by Baum and Edwards (1993); Weekly Calendar Planning Activity (WCPA) developed

by Toglia (2015); Test of Grocery Shopping Skills (TOGSS) developed by Hamera and Brown (2000) [Please add the reference in the reference section.Hamera, E., & Brown, C. E. (2000). Developing a context-based performance measure for persons with schizophrenia: the test of grocery shopping skills. The American Journal of Occupational Therapy, 54(1), 20-25. https://doi.org/10.5014/ajot.54.1.20

] AQ3; and Allen Cognitive Level Screen (ACLS) developed by Claudia Allen et al. (1985) [Please delete 1985 and add 2007. The reference was in the reference section.

] AQ4; Many of these have been used by occupational therapists to measure cognitive functions of individuals with schizophrenia. Several of these tests including the TOGSS as well as the Multiple Errands Test (MET), developed by Shallice and Burgess [Please add the reference in the reference section.Shallice, T., & Burgess, P. W. (1991). Deficits in strategy application following frontal lobe damage in man. Brain, 114(2), 727-741. https://doi.org/10.1093/brain/114.2.727

] (1991) AQ5 have greater ecological validity because they are carried out in natural settings; they are used as assessments of executive function in daily life in individuals with schizophrenia (Bulzacka et al., 2016). The Trail Making Test-TMT (Reitan, 1955) and Wisconsin Card Sorting Test-WCST (

Berg, 1948) are examples of performance-based measures used in individuals with schizophrenia where validity and reliability has been established for their Turkish versions However, TMT and WCST do not contain any daily life activities and are time-consuming to administer in a clinical setting (Harris et al., 2021)

The Cognitive Disability Model (CDM), developed by Claudia Allen, examines functional cognition in mental disorders such as schizophrenia. Functional cognition refers to the interaction between cognitive functions and task. Functional cognition provides a better understanding of cognitive functions and the difficulties experienced by people while carrying out activities (Allen et al., 2007). Environmental and activity modifications are used as an intervention for functional cognitive impairments and cognitive problems (Allen et al., 2007; Rojo-Mota et al., 2017). Tests are performed in order to determine the functional cognitive levels of the individuals. Allen Cognitive Level Screen (ACLS) was created by the Allen Group within the framework of the Cognitive Disability Model (Allen et al., 2007; Brown et al., 2019; Schubmehl, 2016). The ACLS is a screening tool aimed at evaluating the cognitive skills of individuals with psychiatric and geriatric diseases. ACLS has multiple versions and the ACLS-5 (the eighth and final version of the ACLS) is a performance-based rapid screening tool that requires the individual to perform a sensorimotor task involving a complex series of leather lacing stitches that increase in difficulty (Allen et al., 2007; Su et al., 2011). A relationship was found between individuals' ACLS scores and attention, working memory, perceptual organization (problem solving and executive functions (Secrest et al., 2000). In addition, the ACLS-5 has been used to assess the functional cognition of groups with different mental health problems, addiction [including addiction,], and acquired brain injury (Huertas-Hoyas et al., 2022; Park & Lee, 2020; Rojo-Mota et al., 2017). Chan et al. (2001) adapted the ACLS to the South Chinese language, and Cusick and Harai (1992) adapted the ACLS to the Japanese language.

According to the literature, the ACLS-5 is a tool that screens different aspects of cognitive function in different groups (Huertas-Hoyas et al., 2022; Park & Lee, 2020; Rojo-Mota et al., 2017; Scanlan & Still, 2013; Schubmehl et al., 2018). The cognitive functions assessed by the ACLS-5 are attention, memory, visuospatial perception, and executive functions. The ACLS-5 provides a functional cognition score for older adults and individuals with psychiatric diseases. The literature also demonstrates the importance of assessing functional cognition in clinics (Huertas-Hoyas et al., 2022; Leung & Man, 2007; Scanlan & Still, 2013). By using the ACLS-5 in clinics, it has been stated that professionals may quickly and practically gain an understanding about the cognitive skills of the individual before or during discharge, which may guide the course of their

treatment or the therapies they will continue after discharge (Scanlan & Still, 2013; Stewart et al., 2019). Therefore, there is a need for valid and reliable screening tools that evaluate functional cognition (Celikbaş & Ergün, 2018; Temuçin, 2020). For these reasons, it was considered important to verify the validity and reliability of the Turkish version of the ACLS. The aim of this study is to examine the Turkish version of the Allen Cognitive Level Screen-5 (ACLS-5) in individuals with schizophrenia and to investigate its validity and reliability.

Method

This study was planned to assess the validity and reliability of the ACLS-5 in individuals with schizophrenia. The study was conducted in Gaziantep/Turkey in Dr. Ersin Arslan Training and Research Hospital. The study's ethics committee approval was obtained from the hospital's Ethics Committee (decision number GO 19/105). The researchers obtained permission from the Allen Group for the cultural adaptation, and to test the validity and reliability of the ACLS-5. ACLS-5 includes the information form (in which the sociodemographic information of the individual is recorded, including the name, gender, age, date, evaluator's name, and score), the manual form (background information, administration instructions), and the score table. All forms were translated into Turkish. The translation and cultural adaptation of the score table and the instructions in the manual into the Turkish language were done according to the protocol of Beaton et al. (2000). According to the Beaton protocol, the Turkish translation of the score table form and instructions was carried out separately by two researchers whose native language was Turkish; the two translations were examined by the entire research team and a merged translation document was created. The back-translation of the merged document from Turkish to English was made by a native English speaker, and the product was compared to the original forms. With that comparison, the research team prepared a final draft for the Turkish version. A researcher administered the draft Turkish forms to twenty individuals with schizophrenia in a pilot test following the translation process. These people were asked open-ended questions to understand their opinions about the test and the final version of the scale was created. Thus, the Beaton protocol was completed.

Cultural adaptation

Cultural adaptation was required during the pilot test. Since the translation of the names of specific stitches were meaningless in Turkish, the naming

of specific stiches was defined according to the names used in Turkey. These changes were as follows; the first stitch task ‘running stitch’ was adapted as ‘straight stitch;' the second stitch task ‘whip stitch’ was adapted as ‘diagonal stitch', and the third stitch task ‘single cordovan stitch’ as ‘single chain leather stitch'. With these changes, the final form was created. (Check the original and translated names of the stitches to make sure they are stated correctly.) [delete the sentence (check... correctly)]

Participants

This study was conducted in the psychiatry outpatient clinic with the permission of the hospital administration. NCSS PASS 11 programs was used to determine the sample size. The conducted power analysis at the 0.05 significance level, with an intra-class correlation coefficient of 0.93, resulted in a sample size of 55, assuming 95% power (Hintze, [Reference (Hintze, 2016) deleted. Please delete the "(Hintze, 2016)". And the reference was added as "(Hall et al., 2019)". Please add the "(Hall et al., 2019)."] 2016) For the study group, all individuals with schizophrenia (n = 62) who applied to the psychiatry outpatient clinics of the hospital for treatment and who met the criteria of the study were informed about the study and invited. Both individuals with schizophrenia (n = 60) and their relatives who volunteered to participate in the study were read and signed consent forms separately. In the study group, participants without consent (n = 2) were excluded. The inclusion criteria of this study for research group were as follows; being diagnosed with schizophrenia according to DSM-5 criteria, being between the ages of 18–64 and signing the voluntary informed consent form to participate in the study. Exclusion criteria of the research group were being diagnosed with intellectual disabilities and being admitted to the psychiatry service within the last month due to decompensation.

For the control group, advertisements created by the researchers containing information about this study were left in the cafeteria of the same hospital. Among the individuals (n = 75) who responded to this advertisement, those who volunteered to participate in the study composed the control group. A consent form was read and signed by individuals in the control group (n = 60). In the control group, 15 of those did not meet the criteria because of age (n = 8) or chronic disease (n = 7) and [delete the "and"] were excluded. The inclusion criteria of this study for control group [the control group] were as follows; being between the ages of 18–64 and signing the voluntary informed consent form to participate in the study. Exclusion criteria of the control group were being diagnosed any [diagnosed with any] disabilities (psychiatric, neurologic etc.). This study included a total of 120 participants, 60 were individuals with schizophrenia and 60 were healthy individuals.

Assessments

Socio-demographic [The socio-demographic] information of the research and control groups were [delete were; add was] recorded. ACLS-5 was administered to all individuals. Social Functioning Scale (SFS) and Wisconsin Card Sorting Test (WCST) were also administered to the research group.

Socio-demographic information form

Participants' age, gender, marital status, education, economic status, substance use (tobacco, alcohol, and drug use), and forensic history were recorded in the socio-demographic information form created by the researchers.

Allen Cognitive Level Screen -5 (ACLS-5)

ACLS-5 evaluates attention, processing speed, verbal memory, receiving feedback, problem-solving, and executive functions. Allen (1992) [Please delete 1992 and add 2007. the reference was in the reference section.] AQ6 defined six levels in line with the CDM; automatic action (level 1), postural action (level 2), manual actions (level 3), goal directed actions (level 4), exploratory actions (level 5) and normal ability (level 6). The ACLS-5 consists of a leather patch with holes around the perimeter, two leather threads with needles, and waxed thread with a needle. The application includes three different stitching activities, varying from easy to difficult. After the first two of these stitches are shown to the individual, they are asked to perform the stitches. The most difficult stitching activity includes a pre-made example, and the practitioner does not provide any instructions and guidelines. The individual is expected to understand the activity only by observing the pre-made example. The individual is expected to make mistakes but must make corrections and complete the stitches. The application of the test takes approximately 8-15 minutes. At the end of the application, a score between 3.0 and 5.8 is given. A higher score means better cognitive functioning (Allen et al., 2007; Su et al., 2011).

Social Functioning Scale (SFS)

SFS was developed by Birchwood et al. (1990) for patients with psychiatric disorder [disorders.]. The scale evaluates the social functionality of individuals in 7 sub-parameters. The sub-parameters are social engagement/withdrawal, interpersonal behavior, pro-social activities, recreation, independence-competence, independence-performance, and employment/occupation. A higher score means a better functionality. Erakay and Gulseren (2002) conducted Turkish validity and reliability study of SFS. In the reliability analysis for Turkish SFS, it was stated that the Cronbach alpha internal consistency coefficient was 0.81. In addition, it was stated that the inter-rater reliability

coefficient was 0.94 for the patient's two relatives and 0.95 between the patient and the patient's relative (Erakay & Gulseren, 2002).

Wisconsin Card Sorting Test (WCST)

WCST was developed by Berg and Grant (Berg, 1948). WCST has a computer-based version and was introduced by Heaton et al. (1993). The test evaluates problem-solving skills, memory, abstraction, and the ability to change behavior upon supervisor feedback. WCST consists of 128 cards and six categories. The WCST yields results regarding; total administered, total number and percentage of correct performances and errors, number and percentage of perseverative responses, number and percentage of perseverative errors, number and percentage of non-perseverative errors, and the number of categories completed. The test does not have any time limit. The test is terminated after the completion of six categories, or after the completion of 128 cards. The test's Turkish validity study was conducted by Karakas et al. (1998). [the year of reference was changed to "1999".]In the convergent construct validity analyses, it was found that within the defined age range of the WCST (6–10 years of age), there was no statistically significant difference between the scores of individuals with different ages. In the principal component analysis, a total of three factors were discovered. The collective rate of variance explained by those three factors was found to be 79.70% (Karakas et al., 1998).

Statistical analysis

Statistical analysis was performed using IBM SPSS version 23.00. Descriptive properties were reported using mean and standard deviation or median, minimum value and maximum value for continuous variables. For categorical variables, frequencies and percentages were calculated and reported. The normality assumptions of continuous variables were tested with the Shapiro-Wilk test, histogram, boxplot, and Q-Q plot. The significance level (p) was taken as 0.05 in all tests (Henseler et al., 2015).

The validity of the ACLS-5 was examined through the construct validity and discriminant validity analyses (Baig et al., 2010; Kang, 2013; Yao et al., 2022). ACLS-5 was applied to the research and control groups to examine the discriminant validity. Discriminant validity is important in terms of showing that the measurement is different from other measurements and that it can distinguish the group it measures (Henseler et al., 2015). ACLS-5 is a screening tool that evaluates the functional cognition of individuals with psychiatric and geriatric diseases (Allen et al., 2007). Therefore, it was hypothesized that there would be a significant difference between the study (individuals with psychiatric diseases) and control group (healthy individuals) in the discriminant analysis. Since ACLS-5 scores of the groups did not

show normal distribution, the medians for two groups were compared using the Mann-Whitney U test.

The Wisconsin Card Sorting Test (WCST) and the Social Functioning Scale (SFS) were used to examine the construct validity of the Turkish version of the ACLS-5. In examining the construct validity of a measure, it can be understood by analyzing its correlation with other measures that examine similar or different concepts (Baig et al., 2010). Secrest et al. (2000) stated that WCST and ACLS measure similar constructs, and there is a significant relationship between them. Therefore, as the WCST is considered to measure a similar construct to ACLS-5, it was hypothesized that construct validity would be supported if the correlation (*r*) between scores on the WCST and Turkish ACLS-5 was high. In addition, social functionality is negatively affected in individuals with mental health problems, and functional cognition is associated with social functionality. Scanlan and Still (2013), who assessed functional cognition with ACLS in their study, showed the relationship between functional cognition and functional performance areas of personal care/basic activities of daily living, housework, cooking and shopping.

In addition, due to the strong psychometric properties of the Turkish version of the SFS and its widespread use in the clinic (Kaya, 2019), ACLS-5 was thought to be an appropriate scale for construct validity analysis. In assessing its construct validity with SFS, it was hypothesized that there would be no significant difference between the two because the cognitive problems of the individual with schizophrenia would not directly affect their social functionality. The relationships between ACLS-5 and WCST and SFS were analyzed with the Spearman correlation coefficient since the variables did not show normal distribution.

The test/re-test method was used to examine the reliability of the ACLS-5. Two weeks after the ACLS-5 was administered, 25% of the individuals in the research group were randomly selected by the SPSS 26.00 for Windows and were assessed with the ACLS-5 scale again (Noble et al., 2019). Intra-class correlation coefficient (ICC) reliability was analyzed.

Results

The mean age of individuals with schizophrenia was 41.58 ± 10.66, while the mean age of the control group was 39.05 ± 9.58. Demographic properties of all participants are summarized in Table 1.

Note: The table layout displayed in 'Edit' view is not how it will appear in the printed/pdf version. This html display is to enable content corrections to the table. To preview the printed/pdf presentation of the table, please view the 'PDF' tab.

Table 1. Descriptive Statistics of Participants' Marital Status, Education, and Economic Status Variables.

	Research group		Control group	
	n	(%)	*n*	(%)
Gender				
Male	37	61.7	34	56.7
Female	23	38.3	26	43.3
Marital status				
Married	20	33.3	40	66.7
Single	40	66.7	20	33.3
Education level				
Literate	10	16.7	0	0
Primary school	40	66.7	43	71.7
High school	7	11.7	4	6.7
University	3	5.0	13	21.0
Economic status				
Below min wage	26	43.3	0	0
Min wage	23	38.3	45	75.0
Above min wage	11	18.3	15	25.0
No table footnotes are available				

Validity results of the ACLS-5

Results of discriminant validity

As a result of the analysis, a statistically significant relationship was found between the control group and the study group in terms of ACLS-5 median

scores. This relationship validated our hypothesis regarding discriminant validity (Table 2).

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Table 2. Discriminant Validity Results.

	Median (Min–Max)	Test statistics	p
Research group (*n* = 60)	5 (4.0–5.8)		<.001**
Control group (*n* = 60)	5.5 (4.6–5.8)	7.065	

Median (Min–Max) Test statistics p

**$p < .001$.

Construct validity

SFS and WCST were administered to the participants to analyze the construct validity of ACLS-5. A Spearman Correlation test between the scales was used. It was found that there existed correlation coefficients (r: 0.382–0.487, $p < 0.05$) between the ACLS-5 scores and SFS total and some sub-scores (Table 3). This finding showed that the ACLS-5 had acceptable construct validity with SFS. In addition, there was a significant relationship between the ACLS-5 scores and interpersonal behavior, recreation, independence-competence, independence-performance, and employment/occupation sub-parameters of the SFS ($p < 0.05$). There was no relationship between the ACLS-5 scores and social engagement/withdrawal and pro-social activities sub-parameters of the SFS ($p > 0.05$). Construct validity results are shown in Table 3.

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Table 3. Construct Validity Results with SFS.

		ACLS-5
SFS total	*r (p)*	0.426** (<.001)
Social Engagement	*r (p)*	0.181 (.16)
Interpersonal behavior	*r (p)*	0.392* (.00)
Pro-social activities	*r (p)*	0.104 (.42)
Recreation	*r (p)*	0.384* (.02)
Independence-competence	*r (p)*	0.487** (<.001)
Independence-performance	*r (p)*	0.382* (.03)
Employment/occupation	*r (p)*	0.441** (<.001)

*$p < .05$; **$p < .001$.

It was found that there existed correlation coefficients (r: 0.257–0.557, $p < 0.01$) between the ACLS-5

scores and WCST sub-scores (Table 4). A significant correlation was found between *the total correct, total errors, percentage of total error, perseverative responses, percentage of perseverative responses, perseverative errors, percentage of perseverative errors, percentage*

of non-perseverative errors, and *categories* ($p < 0.05$). There was no significant correlation with *non-perseverative errors* ($p > 0.05$). These results validated our hypothesis regarding that the ACLS-5 had acceptable construct validity with WCST.

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Table 4. Construct Validity Results with WCST. [please delete the bold and italic format. there is no significance for bold and italic.] AQ12

		ACLS-5
Total correct	*r (p)*	***0.429*** (<.001)***
Total errors	*r (p)*	***−0.475*** (<.001)***
Percentage of total error	*r (p)*	***−0.484*** (<.001)***
Perseverative responses	*r (p)*	***−0.537*** (<.001)***
Percentage of perseverative responses	*r (p)*	***−0.540*** (<.001)***
Perseverative errors	*r (p)*	***−0.557*** (<.001)***
Percentage of perseverative errors	*r (p)*	***−0.555*** (<.001)***
Non-perseverative errors	*r (p)*	*0.213 (.10)*
Percentage of non-perseverative errors	*r (p)*	***0.257*** (<.001)***
Categories	*r (p)*	***0.437*** (<.001)***

*$p < .05$; **$p < .001$.

Reliability results with the test-retest method

The test-retest method was used to measure the reliability of the ACLS-5. Intra-class correlation coefficient reliability and 95% confidence interval were found as 0.93 (0.85–0.94). It may be stated that ACLS-5 has acceptable test-retest reliability for individuals with schizophrenia.

Discussion

These results support the discriminant and construct validity and test-retest reliability of the Turkish version of the ACLS-5 in individuals with schizophrenia. Cognitive problems, one of the symptoms of schizophrenia, may affect the individual's social participation (American Occupational Therapy Association, 2020; Trepper & Shean, 2013). Cognitive problems were related to individuals' participation in work by affecting their working performance (Keefe & Harvey, 2012), making friends by affecting their communication skills (Brown et al., 2019), and their participation in leisure activities that require social interaction (Peña et al., 2016). Cognitive assessments are necessary to analyze these cognitive problems. Therefore, this

study is important for healthcare professionals working with people who have cognitive deficits.

In this study, cultural adaptation of the assessment was necessary; the names of the specific stitches had to be adapted for Turkish as their literal translations did not have meaning, and the same or similar types of stiches were named entirely differently in Turkish. Therefore, the culturally appropriate term 'straight stitch' was used for 'running stitch'; 'diagonal stitch' was used for 'whipstitch', and 'single chain leather stitch' was used for 'single cordovan stitch'. ACLS was adapted to South Chinese (Chan et al., 2001) and to Japanese (Cusick & Harai, 1992). However, it was reported that no cultural adaptation was made in these studies.

ACLS-5 was administered to the individuals with schizophrenia and healthy individuals to examine its discriminant validity. The average ACLS score of individuals with schizophrenia was significantly lower than that of healthy individuals. Because cognitive problems are one of the symptoms of schizophrenia (McCutcheon et al., 2020) this result supports our hypothesis that the ACLS-5 can discriminate between healthy individuals and individuals with schizophrenia. Leung and Man (2007) administered the ACLS to 61 individuals with schizophrenia and 61 healthy individuals. Similarly, they reported that the average ACLS scores of individuals with schizophrenia were lower than the average of healthy individuals. In addition, Lee et al. (2003) examined the scores of the ACLS in 30 healthy individuals and 32 individuals with mental health problems. They found that the average ACLS score of individuals with mental health problems was lower than the average of healthy individuals. The results of this study are consistent with this evidence. Considered together, these results emphasize again that functional cognition is impacted more in individuals with schizophrenia than in healthy individuals. The results also affirm that the Turkish ACLS-5 has discriminant validity and is an acceptable screening tool for cognitive functionality for individuals with schizophrenia compared to healthy individuals.

Construct validity of the scale was examined by analyzing its relationship with the WCST and SFS. According to the results of the correlation analysis, there was a moderate relationship (r: 0.257–0.557, $p <$ 0.01) in all of the WCST sub-parameters (except non-perseverative errors). In the literature, the relationship

with different cognitive tests has been examined to analyze the construct validity of ACLS (Leung & Man, 2007; Park & Lee, 2020; Schubmehl et al., 2018; Secrest et al., 2000). Secrest et al. (2000) examined the correlation between the scales with the results obtained from 33 patients with schizophrenia and found that there was a significant correlation between the ACLS and two sub-parameters of WCST (perseverative errors r=-0.47 and completed category $r = 0.57$, $p < 0.005$). In addition,

Schubmehl et al. (2018) examined the correlation between Trail Making Test A, which assesses attention, memory, and executive functions in 31 individuals with acute psychotic disorders. They found that there was a significant correlation between the ACLS and Trail Making Test A ($r = 0.45$, $p < 001$). When Park and Lee (2020) examined the correlation of the Lowenstein Occupational Therapy Cognitive Assessment (LOTCA) which assesses orientation, thinking operation, praxis in individuals with acquired brain injury, they found a linear correlation between ACLS and LOTCA (orientation $r = 0.470$, $p < 0.01$ and thinking operation $r = 0.341$, $p < 0.05$). Leung and Man (2007) stated that the ACLS had an acceptable convergent validity after examining the correlation of Mini-Mental State Assessment (MMSE) which assess orientation, memory, and language in 61 individuals with schizophrenia. In previous studies, it has been shown that the ACLS has a relationship with different scales such as the MMSE, Trail Making Test A and LOTCA. This may imply the relationship of ACLS to some cognitive functions such as attention, memory, orientation, thinking operation and executive functions. In addition, the strong relationship of ACLS-5 with WCST in this study is evidence that functional cognition is negatively correlated with the sub-parameters of WCST, perseverative response (r=-0.537, $p < 0.001$) and perseverative errors (r=-0.557, $p < 0.001$). According to the findings of this study, it is possible to say that construct validity with WCST for ACLS-5 was acceptable and ACLS-5 can be used to measure cognitive functions.

In order to investigate the construct validity of ACLS-5, the relationship between ACLS-5 and SFS scores were analyzed in this study. Accordingly, a significant correlation was found between SFS total and sub-parameters scores (except for social engagement and pro-social activities) and ACLS-5, (r: 0.382–0.487, $p <$ 0.05). SFS assesses social functioning, which is generally negatively affected in individuals with schizophrenia (Kaya, 2019). Therefore, it is important to demonstrate the relationship between cognitive dysfunction, which is one of the symptoms of schizophrenia, and social functionality. In addition, with these findings, it may also be argued that ACLS-5 has acceptable construct validity with SFS. Park and Lee (2020) investigated the relationship between Social Behavior Sequence Task (SBST) and ACLS in individuals with traumatic brain injury. A linear correlation between SBST and ACLS ($r = 0.376$, $p < 0.05$) was detected. In addition, Leung and Man (2007) stated that there was a significant correlation ($r = 0.714$, p < 0.001) between the ACLS and The Functional Needs Assessment (FNA) which assesses functionality in individuals with schizophrenia. Although Leung and Man (2007) stated that ACLS-5 may be a predictor of occupational and social functioning, we could not draw this conclusion because the results of this study showed only a moderate

relationship. Although, we found a moderate relationship between cognitive function and social functionality, it is often thought that they are two independent concepts. However, while planning cognitive interventions for individuals with schizophrenia, our study conclusions suggest that social functionality may affect cognitive functions and therefore, these concepts should be evaluated and targeted together in the evaluation and intervention program.

There were studies with test-retest reliability analysis of ACLS. McAnanama et al. (1999) investigated the test-retest reliability of the ACLS test in 40 individuals with mental problems, with the Pearson correlation coefficient ($r = 0.71$), which was moderately reliable. In addition, Chan et al. (2001) investigated the test-retest reliability of the ACLS in 30 healthy individuals with the intra-class correlation coefficient and found test-retest reliability ($r = 0.73$) of the Chinese translation. In this study, similar to Chan et al. (2001) the intra-class correlation coefficient was used to investigate the test-retest reliability of ACLS-5. The intra-class correlation coefficient between measurements ($r = 0.93$) was found to be high. These results provide evidence for the test-retest reliability of the Turkish translation of the ACLS-5.

This study had some strengths and limitations. The large number of participants compared to other studies can be considered one of the study's strengths (Lee et al., 2003; Leung & Man, 2007; McAnanama et al., 1999; Secrest et al., 2000). The fact that the individuals were taken from a single-center and the socioeconomic status of the participants was heterogeneously distributed are limitations of this study. An inter-rater reliability analysis should be considered in future studies with participants from different centers. In addition, it is recommended that the relationship between ACLS and social participation, activities of daily living and quality of life be examined in a broader framework. This could be done by investigating the relationship of the Turkish ACLS-5 with other tests that evaluate social participation, activities of daily living and quality of life in individuals with schizophrenia.

Conclusion

This study provided evidence of construct validity with WCST and SFS, discriminant validity with healthy individuals, and test-retest reliability of ACLS-5 (Turkish version). Thus, occupational therapists in Turkey could use the ACLS-5 to screen the cognitive levels of their patients in the clinic. Moreover, it could be said that ACLS-5 is a screening tool that can be used to distinguish individuals with schizophrenia from healthy individuals. In addition, this study provided evidence that there was a relationship between

functional cognition and attention, memory, executive functions, and functionality. Finally, this study contributed to the field of occupational therapy by providing a Turkish version of a functional screening tool for professionals in clinics and research areas.

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Disclosure statement

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References

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Allen, C. K., Austin, S. L., David, S. K., Earhart, C. A., McCraith, D. B., & Riska-Williams, L. (2007). *Allen Cognitive Level Screen-5 (ACLS-5) and Large Allen Cognitive Level Screen-5 (LACLS-5)*. ACLS and LACLS Committee.

American Occupational Therapy Association. (2020). Occupational therapy practice framework: Domain and process. *American Journal of Occupational Therapy*, *56*, 609–639. https://doi.org/10.5014/ajot.2020.74S2001

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5®)*. American Psychiatric Pub.

Baig, L., Violato, C., & Crutcher, R. (2010). A construct validity study of clinical competence: A multitrait multimethod matrix approach. *The Journal of Continuing Education in the Health Professions*, *30*(1), 19–25. https://doi.org/10.1002/chp.20052

Bakkour, N., Samp, J., Akhras, K., El Hammi, E., Soussi, I., Zahra, F., Duru, G., Kooli, A., & Toumi, M. (2014). Systematic review of appropriate cognitive assessment instruments used in clinical trials of schizophrenia, major depressive disorder and bipolar disorder. *Psychiatry Research*, *216*(3), 291–302. Retrieved from https://doi.org/10.1016/j.psychres.2014.02.014.

Baum, C., & Edwards, D. F. (1993). Cognitive performance in senile dementia of the Alzheimer's type:

The kitchen task assessment. *The American Journal of Occupational Therapy*, *47*(5), 431–436. https://doi.org/10.1177/153944920702700202.

Beaton, D. E., Bombardier, C., Guillemin, F., & Ferraz, M. B. (2000). Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine*, *25*(24), 3186–3191. https://doi.org/10.1097/00007632-200012150-00014

Berg, E. A. (1948). A simple objective technique for measuring flexibility in thinking. *The Journal of General Psychology*, *39*(1), 15–22. https://doi.org/10.1080/00221309.1948.9918159

Birchwood, M., Smith, J., Cochrane, R., Wetton, S., & Copestake, S. (1990). The Social Functioning Scale. The development and validation of a new scale of social adjustment for use in family intervention programmes with schizophrenic patients. *The British Journal of Psychiatry*, *157*, 853–859. https://doi.org/10.1192/bjp.157.6.853.

Brown, C., Stoffel, V. C., & Munoz, J. (2019). *Occupational therapy in mental health: A vision for participation.* FA Davis.

Bulzacka, E., Delourme, G., Hutin, V., Burban, N., Méary, A., Lajnef, M., Leboyer, M., & Schürhoff, F. (2016). Clinical utility of the multiple errands test in schizophrenia: A preliminary assessment. *Psychiatry Research*, *240*, 390–397. https://doi.org/10.1016/j.psychres.2016.04.056

Celikbaş, Z., & Ergün, S. (2018). The relationship between neurocognitive dysfunction and functionality in schizophrenia. *Journal of Contemporary Medicine*, *8*(2), 183–187. https://doi.org/10.16899/gopctd.424417

Chan, C. L., Ray, S., & Trudeau, S. (2001). The development and reliability of the Cantonese version of the Allen Cognitive Level Screen. *Occupational Therapy International*, *8*(4), 287–300. https://doi.org/10.1002/oti.152

Cusick, A., & Harai, H. (1992). The Allen tests for cognitive disability: A cross cultural pilot study. *Occupational Therapy in Mental Health*, *11*(4), 61–75. https://doi.org/10.1300/J004v11n04_05.

Erakay, S. Y., & Gulseren, S. (2002). *Şizofreni tanılı hastalarda Sosyal İşlevsellik Ölçeği Türkçe Formu'nun geçerlilik ve güvenilirliğinin araştırılması.* Bahar Sempozyumları VI, Kongre özet kitabı, 134–135.

Harris, M., Blanco, E. A., & Rempfer, M. (2021). Cognition and daily life functioning among persons with serious mental illness: A cluster analytic examination of heterogeneity on the Test of Grocery Shopping

Skills. *Neuropsychology*, *35*(1), 57–68. https://doi.org/10.1037/neu0000700.

Heaton, R., Chelune, G., Talley, J., Kay, G., & Curtiss, G. (1993). *Wisconsin card sorting test manual revised and expanded*. Psychological Assessment Resources.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, *43*(1), 115–135. https://doi.org/10.1007/s11747-014-0403-8

~~Hintze, J. (2016). PASS 11. NCSS, LLC. 2011.~~ Hall, B. R., Leinicke, J. A., Armijo, P. R., Smith, L. M., Langenfeld, S. J., & Oleynikov, D. (2019). No survival advantage exists for patients undergoing loop ileostomy for clostridium difficile colitis. *The American Journal of Surgery*, *217*(1), 34-39. https://doi.org/10.1016/j.amjsurg.2018.09.023 **AQ7**

Huertas-Hoyas, E., Rojo-Mota, G., Carretero-Serrano, Y., Martínez-Piédrola, R. M., Pérez-de-Heredia-Torres, M., Camacho-Montaño, L. R., & Pedrero-Pérez, E. J. (2022). Clinical validation of the Allen's Cognitive Level Screen in acquired brain injury. *Brain Injury*, *36*(6), 775–781. https://doi.org/10.1080/02699052.2022.2065031.

Kang, H. (2013). A guide on the use of factor analysis in the assessment of construct validity. *Journal of Korean Academy of Nursing*, *43*(5), 587–594. https://doi.org/10.4040/jkan.2013.43.5.587.

~~Karakas, S., Irak , & M., Ersezgin. (1998). Wisconsin Kart Eşleme Testi (WCST) ve Stroop Testi TBAG formu puanlarının test içi ve testler-arası ilişkileri. ÖU Ulusal Psikoloji Kongresi Özet Kitabı, 44.~~ Karakas S, Irak M, Kurt M, Ersezgin Ö. (1999). Wisconsin Kart Eşleme Testi ve Stroop Testi TBAG formu: Ölçülen özellikler açısından karşılaştırmalı analiz. *Psikiyatri Psikoloji Psikofarmakoloji Dergisi, 7*(3), 179 - 192. **AQ8**

Kaya, B. (2019). *Toplum Ruh Sağlığı Merkezi'ne (TRSM) kayıtlı psikotik bozukluğu bulunan hastaların TRSM programına katılım sıklıklarına göre sosyal işlevsellik, içgörü ve ilaç uyumu açısından karşılaştırılması* [Master's thesis]. Hasan Kalyoncu Üniversitesi.

~~Keefe, R. S., & Harvey, P. D. (2012). Cognitive impairment in schizophrenia. Novel Antischizophrenia Treatments, 11–37.~~ Keefe, R.S.E., Harvey, P.D. (2012). Cognitive Impairment in Schizophrenia. In: Geyer, M., Gross, G. (eds) Novel Antischizophrenia Treatments. Handbook of Experimental Pharmacology, vol 213. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-25758-2_2 **AQ9**

Kim, S.-J., Jung, D.-U., Moon, J.-J., Jeon, D.-W., Seo, Y.-S., Jung, S.-S., Lee, Y.-C., Kim, J.-E., & Kim, Y.-S. (2021). Relationship between disability self-awareness and cognitive and daily living function in schizophrenia. *Schizophrenia Research. Cognition*, *23*, 100192. https://doi.org/10.1016/j.scog.2020.100192.

Kwon, J.-S., & Oh, D.-W. (2015). The use of task-based cognitive tests for defining vocational aptness of individuals with disabilities. *Osong Public Health and Research Perspectives*, *6*(3), 164–169. https://doi.org/10.1016/j.phrp.2015.05.002

Lee, S. N., Gargiullo, A., Brayman, S., Kinsey, J. C., Jones, H. C., & Shotwell, M. (2003). Adolescent performance on the Allen Cognitive Levels Screen. *The American Journal of Occupational Therapy*, *57*(3), 342–346. https://doi.org/10.5014/ajot.57.3.342.

Leung, S. B., & Man, D. W. (2007). Validity of the Chinese version of the Allen Cognitive Level Screen Assessment for individuals with schizophrenia. *Occupation, Participation and Health*, *27*(1), 31–40. https://doi.org/10.1177/153944920702700105.

McAnanama, E. P., Rogosin-Rose, M. L., Scott, E. A., Joffe, R. T., & Kelner, M. (1999). Discharge planning in mental health: The relevance of cognition to community living. *The American Journal of Occupational Therapy*, *53*(2), 129–135. https://doi.org/10.5014/ajot.53.2.129.

McCutcheon, R. A., Marques, T. R., & Howes, O. D. (2020). Schizophrenia—an overview. *JAMA Psychiatry*, *77*(2), 201–210. https://doi.org/10.1001/jamapsychiatry.2019.3360.

Noble, S., Scheinost, D., & Constable, R. T. (2019). A decade of test-retest reliability of functional connectivity: A systematic review and meta-analysis. *NeuroImage*, *203*, 116157. https://doi.org/10.1016/j.neuroimage.2019.116157.

Park, M. O., & Lee, S. H. (2020, December). Relationship between basic neurological cognition and social cognition among Allen cognitive disability levels of acquired brain injury. In *Healthcare* (vol. *8*, p. 412). Multidisciplinary Digital Publishing Institute.

Peña, J., Ibarretxe-Bilbao, N., Sánchez, P., Iriarte, M. B., Elizagarate, E., Garay, M. A., Gutiérrez, M., Iribarren, A., & Ojeda, N. (2016). Combining social cognitive treatment, cognitive remediation, and functional skills training in schizophrenia: A randomized controlled trial. *NPJ Schizophrenia*, *2*(1), 1–7. https://doi.org/10.1038/npjschz.2016.37

Reitan, R. M. (1955). The relation of the trail making test to organic brain damage. *Journal of Consulting Psychology*, *19*(5), 393–394. https://doi.org/10.1037/h0044509

Rojo-Mota, G., Pedrero-Pérez, E. J., Huertas-Hoyas, E., Merritt, B., & MacKenzie, D. (2017). Allen Cognitive Level Screen for the classification of subjects treated for addiction. *Scandinavian Journal of Occupational Therapy*, *24*(4), 290–298. https://doi.org/10.3109/11038128.2016.1161071.

Scanlan, J. N., & Still, M. (2013). Functional profile of mental health consumers assessed by occupational therapists: Level of independence and associations with functional cognition. *Psychiatry Research*, *208*(1),

29–32. https://doi.org/10.1016/j.psychres.2013.02.032.

Schubmehl, S. (2016). *Construct validity of Allen Cognitive Level Screen-5: Role of executive function* [Doctoral dissertation]. The Wright Institute.

Schubmehl, S., Barkin, S. H., & Cort, D. (2018). The role of executive functions and psychiatric symptom severity in the Allen Cognitive Levels. *Psychiatry Research*, *259*, 169–175. https://doi.org/10.1016/j.psychres.2017.10.023.

Secrest, L., Wood, A. E., & Tapp, A. (2000). A comparison of the Allen Cognitive Level Test and the Wisconsin Card Sorting Test in adults with schizophrenia. *The American Journal of Occupational Therapy*, *54*(2), 129–133. https://doi.org/10.5014/ajot.54.2.129.

Shimada, T., Ohori, M., Inagaki, Y., Shimooka, Y., Sugimura, N., Ishihara, I., Yoshida, T., & Kobayashi, M. (2018). A multicenter, randomized controlled trial of individualized occupational therapy for patients with schizophrenia in Japan. *PLOS One*, *13*(4), e0193869. https://doi.org/10.1371/journal.pone.0193869.

Stewart, K., Hancock, N., & Stancliffe, R. J. (2019). Factors related to hospital utilisation for people living with schizophrenia: Examining Allen's Cognitive Level Scores, recommended supports and routinely collected variables. *Australian Occupational Therapy Journal*, *66*(5), 591–602. https://doi.org/10.1111/1440-1630.1259.

Store, A. S. S. A. (2019). *Functional cognition and occupational therapy: A practical approach to treating individuals with cognitive loss.* AOTA Press.

Su, C. Y., Tsai, P. C., Su, W. L., Tang, T. C., & Tsai, A. Y. (2011). Cognitive profile difference between Allen Cognitive Levels 4 and 5 in schizophrenia. *The American Journal of Occupational Therapy*, *65*(4), 453–461. https://doi.org/10.5014/ajot.2011.000711.

Sun, H., Gong, T. T., Jiang, Y. T., Zhang, S., Zhao, Y. H., & Wu, Q. J. (2019). Global, regional, and national prevalence and disability-adjusted life-years for infertility in 195 countries and territories, 1990–2017: Results from a global burden of disease study, 2017. *Aging*, *11*(23), 10952–10991. https://doi.org/10.18632/aging.102497

Temuçin, K. (2020). Yürütücü İşlev Performans Testi'nin Şizofrenili Bireylerde Türkçe'ye Uyarlanmasının Geçerlilik ve Güvenilirlik Çalışması. Retrieved from http://hdl.handle.net/11655/22543

Toglia, J. (2015). *Weekly Calendar Planning Activity (WCPA): A performance test of executive function*. AOTA Press.

Trepper, T. S., & Shean, G. D. (2013). *Understanding and treating schizophrenia: Contemporary research, theory, and practice*. Routledge. ↑

Tripathi, A., Kar, S. K., & Shukla, R. (2018). Cognitive deficits in schizophrenia: understanding the biological correlates and remediation strategies. *Clinical Psychopharmacology and Neuroscience*, *16*(1), 7–17. https://doi.org/10.9758/cpn.2018.16.1.7 ↑

Yao, J., Lim, S., Guo, C. Y., Ou, A. Y., & Ng, J. W. X. (2022). Experienced incivility in the workplace: A meta-analytical review of its construct validity and nomological network. *The Journal of Applied Psychology*, *107*(2), 193–220. https://doi.org/10.1037/apl0000870 ↑

Zanelli, J., Mollon, J., Sandin, S., Morgan, C., Dazzan, P., Pilecka, I., Reis Marques, T., David, A. S., Morgan, K., Fearon, P., Doody, G. A., Jones, P. B., Murray, R. M., & Reichenberg, A. (2019). Cognitive change in schizophrenia and other psychoses in the decade following the first episode. *The American Journal of Psychiatry*, *176*(10), 811–819. https://doi.org/10.1176/appi.ajp.2019.18091088. ↑

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