

Psychometric Evaluation of the Arabic Version of the Voices Acceptance and Action Scale Among Clients with Schizophrenia

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Background: The Voices Acceptance and Action Scale (VAAS) is a tool used to measure acceptance and autonomous action in people with schizophrenia who are undergoing Acceptance and Commitment Therapy.

Aim: Translate and investigate the psychometric properties of the Egyptian (Arabic) version of the Voices Acceptance and Action Scale.

Design: A descriptive cross-sectional research design following STROBE guidelines.

Methods: A convenience sample of 300 clients with schizophrenia completed a sociodemographic questionnaire, the Arabic VAAS, the Positive and Negative Affect Schedule, and the Acceptance and Action Questionnaire-II. The scale was translated using a forward-backward translation method. Content validity was assessed by 10 experts. Exploratory and confirmatory factor analyses (EFA and CFA) were conducted to assess construct validity. Internal consistency was measured using Cronbach's alpha, and test-retest reliability was evaluated using the intraclass correlation coefficient (ICC).

Results: The Arabic version of the VAAS demonstrated good content validity (S-CVI = 0.94). EFA supported a five-factor structure, and CFA confirmed acceptable model fit (CFI = 0.94, RMSEA = 0.087). The tool showed strong internal consistency ($\alpha = 0.993$) and test-retest reliability (ICC = 0.85–0.95). No floor or ceiling effects were observed.

Conclusion: The Egyptian Arabic version of the VAAS is a reliable and valid measure for assessing acceptance and autonomous action toward auditory hallucinations among Arabic-speaking individuals with schizophrenia.

Impact: The Voices Acceptance and Action Scale is a tool used to measure acceptance and autonomous action in people with schizophrenia who are undergoing Acceptance and Commitment Therapy.

Keywords: voices, acceptance, autonomous actions scale, psychometric evaluation, Arabic version, schizophrenia

Introduction

Schizophrenia is a persistent and severe mental illness that affects 7 to 8 people per 1000 globally. According to Aminoff et al (2022) and WHO (2018), it is one of the top 10 primary causes of disability and is frequently accompanied by hospitalization, subpar care, and recurrence. It is distinguished by the patient's thoughts, perceptions, attitudes, and disturbed emotions.^{1,2} Around 90% of all schizophrenia patients have hallucinations, making it one of the disease's primary positive symptoms.³ Auditory hallucinations are the most prevalent kind of hallucinations reported by these patients, with a frequency of 70%, and roughly 35% of those patients are still taking antipsychotic drugs.⁴

Acceptance and Commitment Therapy (ACT) is a Third-wave cognitive behavioral treatment that emphasizes the patient's relationship with voices rather than the voices themselves. It can help patients focus more on worthwhile activities by reducing the impact of symptoms, particularly auditory hallucinations.⁵ With additional flexibility and

reaction possibilities, ACT strongly emphasizes the patient's behavioral viability.⁶ To offer a more adaptable alternative to both engagement and resistance towards auditory hallucinations, Hayes et al (1999) and Ong et al (2020).^{7,8} There are two primary skill sets needed. First, a non-judgmental awareness that consciously listens to sounds without evaluating them as excellent or wicked or responding to them. To separate the experience (sounds or words) from what it symbolizes (literal reality) or to perceive things as they indeed are, one must first disengage (detach) from the literal meaning of the content of voices and accompanying evaluations.

In 1995, Chadwick and Birchwood suggested that auditory hallucinations exist on a continuum with normal functioning and can be characterized by four dimensions: malevolence, benevolence, engagement, and resistance. However, research has shown that engagement and resistance, associated with positive and negative beliefs about the voices, can lead to poorer adaptation. This may be because both types of responses involve interacting with the voices. New therapeutic approaches based on acceptance and mindfulness suggest that two additional dimensions, which may be more adaptive responses to auditory and command hallucinations, should be considered.⁹

Acceptance involves a willingness to experience auditory hallucinations while effectively disengaging from them, whereas autonomous action refers to self-directed behavior rather than reacting to the voices. These concepts differ from engagement and resistance, which involve interacting with the voices. The Voices Acceptance and Action Scale (VAAS) is a tool used to measure acceptance and autonomous action in clients with schizophrenia who are undergoing ACT. The VAAS was developed based on the principles of ACT, which prioritize accepting challenging experiences instead of attempting to eliminate them.¹⁰

While the VAAS has been validated in several languages, the psychometric properties of the Arabic version still need to be established. Therefore, this study aimed to evaluate the psychometric properties of the Arabic version of the VAAS among clients with schizophrenia.

Aim of the Study

This study aims to perform an Arabic translation of the VAAS and evaluate its psychometric properties, including content validity, internal consistency, and construct or component validity, in a sample of clients with schizophrenia.

Research Questions

1. How does the Arabic translation of the VAAS compare to the original English version in terms of content validity?
2. What is the internal consistency of the Arabic translation of the VAAS in a sample of clients with schizophrenia?
3. What is the factor structure of the Arabic translation of the VAAS in a sample of clients with schizophrenia, and does it align with the original English version?

Methods

Study Design and Setting

A cross-sectional validation study following STROBE (STrengthening the Reporting of Observational studies in Epidemiology) guidelines was conducted at the inpatient Psychiatric Medicine wards of ELmaamoura Hospital, affiliated with the Egyptian Ministry of Health and Population. The hospital houses 28 wards and provides a total of 948 beds for patients with mental illnesses. These beds are spread across paid and unpaid wards, serving both male and female patients.

The hospital also features an intensive psychiatric care ward. In addition to inpatient services, the hospital operates an outpatient clinic that treats patients with mental health issues and substance use disorders. The hospital offers various care services, including psychiatric examinations, diagnoses, and treatments. Treatments include the administration of psychotropic medications and Electroconvulsive therapy sessions. The hospital caters to approximately 573–580 clients with mental illnesses. According to the Statistical Department, nearly 76% of all clients diagnosed with psychotic diseases in 2023 were diagnosed with schizophrenia. This includes 411 male clients and 162 female clients.

Participants and Sample Size Calculation

As a result of the varying types of study tools and the number of items they contain, there are no strict rules regarding the sample size needed to validate constructs.¹¹ Almasreh et al (2019) have suggested respondent-to-item ratio guidelines of 5:1, 10:1, 15:1, or 30:1. To ensure accurate confirmatory factor analysis, a respondent-to-item ratio of 10:1 was selected for this study.¹¹ With a scale comprising 31 items, the final sample size required for the study was determined to be 310 clients diagnosed with schizophrenia.

Inclusion and Exclusion Criteria

The diagnosis of schizophrenia was made by the psychiatrist using the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition. The study included clients between 18 and 60 years old to minimize potential confounding factors among those diagnosed with persistent schizophrenia. Participants with cognitive impairment, schizoaffective disorder, drug-induced psychosis, or concurrent depressive episodes were excluded from the study based on their documented diagnosis and symptom profile in their medical records. Additionally, to ensure a comprehensive understanding of the population, sensitivity analyses were conducted to include first-episode and relapsed patients, as their experiences with the disorder may differ significantly.

Recruitment Process

The client charts were obtained between March 1st and May 30th, 2022, to confirm the participants' diagnosis and eligibility. Out of a total of 354 charts retrieved, 32 were deemed ineligible due to comorbidity, cognitive deficits, symptoms, or substance use, leaving 322 clients diagnosed with schizophrenia who were eligible to participate. Of these, 17 refused to participate, and five did not complete the questionnaire, enrolling 300 eligible clients (Figure 1). Each client underwent a face-to-face structured interview, which lasted approximately 30–40 minutes, conducted by professional psychiatric nursing researchers. The purpose of these interviews was to complete the study measures, and they were conducted only after obtaining the client's signed consent forms.

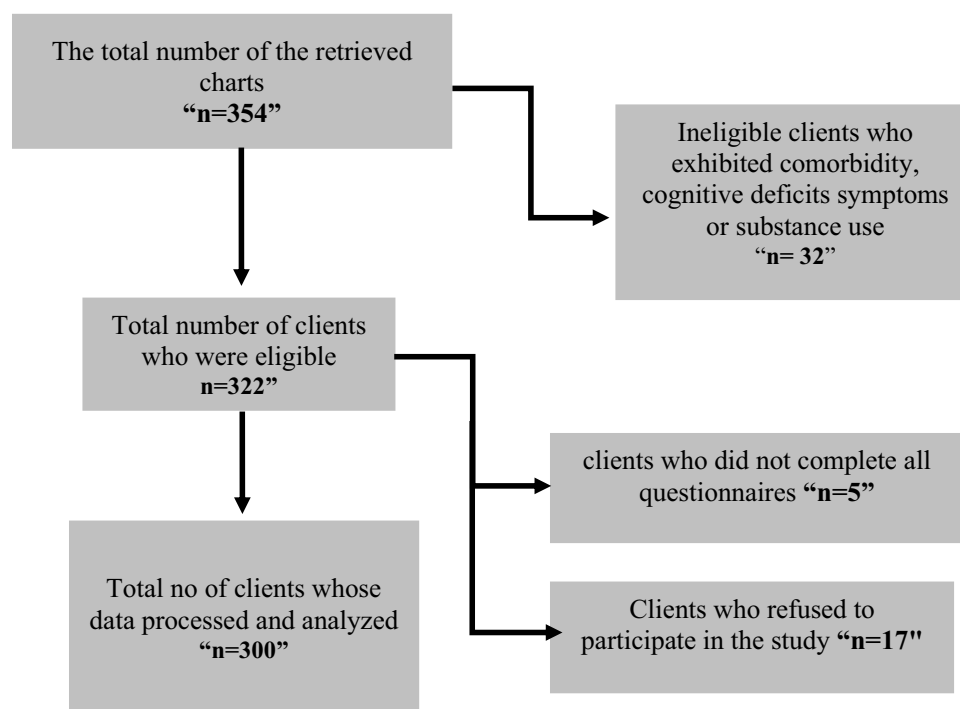


Figure 1 Participants' Recruitment Process Flow Chart.

Measurements of Interest

Sociodemographic and Clinical Data of Clients with Schizophrenia Sheet

This sheet contains sociodemographic and clinical information about the clients, including age, marital status, occupation, level of education, and living situation. It also records clinical data, such as the length of the current hospitalization, the types of hearing voices experienced by the clients, the duration of hearing voices in years, and the medication prescribed.

Voices Acceptance and Action Scale (VAAS)

VAAS is a tool designed to measure the ability to take independent action and the acceptance of experiencing auditory hallucinations.¹⁰ The scale comprises 31 items rated on a 5-point Likert scale, ranging from Strongly Disagree 0 to Strongly Agree 4. The scale comprises 16 items measuring the acceptance of the voices, with scores ranging from 0 to 64. Additionally, the 15 items evaluating autonomous acts related to the voices have a subscale score ranging from 0 to 60. The VAAS consists of five subscales: Section A1 measures acceptance attitudes toward general voices, and Section A2 assesses autonomous actions toward general voices. In addition, section B3 evaluates beliefs about command voice actions, section B4 evaluates acceptance attitudes toward command voice actions, and section B5 assesses the autonomous actions toward command voice actions. The VAAS and its subscales have shown good test-retest reliability and adequate internal consistency, with VAAS (acceptance subscale) =0.70, VAAS (action subscale) =0.830, and VAAS (total) =0.844.¹⁰

Positive and Negative Affect Schedule (PANSS)

PANSS is a scale used to measure the severity of symptoms in patients with schizophrenia.¹² The PANSS consists of 30 items, each scored on an ordinal scale ranging from 1 (indicating absence) to 7 (indicating extreme presence), reflecting the manifestation of psychopathological dimensions. These 30 items are divided into three subscales: the Positive subscale (P-PANSS), the Negative subscale (N-PANSS), and the General Psychopathology subscale. The Positive and Negative subscale contains seven items, while the General Psychopathology subscale includes 16. The Arabic version of the PANSS has been validated and found to be a reliable tool for assessing patients with schizophrenia, demonstrating good interrater and test-retest reliability (0.92 and 0.75, respectively).¹³ In the current study, only the seven items of the Arabic version of P-PANSS were administered.

Acceptance and Action Questionnaire II (AAQ-II)

The AAQ-II is a 7-item self-report measure of psychological flexibility.¹⁴ Each item is rated on a scale from 1 (never true) to 7 (always true). The total score is calculated by summing the scores for each item, with higher total scores indicating greater psychological inflexibility. It has been translated into many languages, including Arabic, and is reliable across various populations. The Arabic version of the AAQ-II has shown high reliability, with Cronbach's α of 0.92.¹⁵ In this study, the Arabic version was utilized.

Procedure

Ethical Approval

The study was conducted following Helsinki guidelines, and the necessary formal approval and permission to conduct the study were obtained from the Research Ethics Committee (IRB00013620-AU-22-7-2021) of the Faculty of Nursing at Alexandria University, Egypt. Additionally, approval was obtained from the head of the Hospital for Psychiatric Medicine and the Mental Health Secretariat. Prior to the commencement of the study, each study subject was informed of its purpose, and informed written consent was obtained from them.

Arabic Translation of VAAS

A rigorous process was followed to ensure the accuracy and consistency of the Arabic translation of the VAAS. Firstly, two independent translators translated the English version and compared their translations to create an initial version.

Five psychiatric and mental health nursing experts reviewed and revised the initial version. To confirm that the Arabic translation was consistent with the English version, it was back-translated into English by two translators who needed to become more familiar with the original English version. This back-translation process was carried out using Ozolins et al's (2020) method, which ensured that the synonyms and translations used in the Arabic version were consistent with those in the English version.¹⁶ See [Table S1](#).

Content Validity

A panel of 15 psychiatric and mental health nursing experts assessed the content validity of the Arabic version of the VAAS. Each expert independently reviewed each item of the scale for clarity, relevance, and translation accuracy using a three-point ordinal scale. The content validity index (CVI) was calculated at the item level (I-CVI), expert level (E-CVI), and scale level (S-CVI).

The I-CVI was calculated by dividing the number of experts who rated an item as relevant or explicit by the total number of experts. The E-CVI was calculated by dividing the number of items scored 3 for relevance by the total number of items. An item's CVI was considered appropriate if it was greater than or equal to 0.79, needed revision if it fell between 0.70 and 0.79, and was eliminated if it was less than 0.70. The S-CVI was assessed using the average approach by summing all I-CVI values for relevancy and dividing by the total number of items. The scale was considered valid if the S-CVI was 0.90 or higher.¹⁷

The formulas used to calculate the I-CVI and S-CVI were based on previous studies. The I-CVI was calculated as the number of experts rating item 3 divided by the total number of experts. In contrast, the S-CVI was calculated as the Sum of the I-CVIs divided by the total number of items.¹⁷

The internal consistency of the VAAS-Arabic was evaluated by completing the final version on a sample of 300 clients with schizophrenia. Internal consistency was assessed using Cronbach's alpha reliability coefficients. An alpha value of 0.50 to 0.70 was considered acceptable, while 0.70 or higher indicated good homogeneity among the items.¹⁸ The reliability assessment followed a logical sequence, with the content validity assessment preceding the evaluation of internal consistency.

Exploratory Factor Analysis (EFA)

Robust Maximum Likelihood (RML) rotation with MPlus was used to conduct exploratory factor analysis on the 31 items to determine the number of factors to retain. Parallel analysis was used to determine the number of factors to retain, a common approach for determining the appropriate number of factors in EFA. Finally, the goodness-of-fit indices were chosen based on conventional guidelines, which help evaluate the model's overall fit to the data.^{19,20}

Convergent Validity

The significant correlations between these measures support the convergent validity of the VAAS, AAQ-II, and PANSS. The VAAS and AAQ-II had a significant negative correlation of -0.448 ($p < 0.01$), indicating that as the ability to take independent action and acceptance of experiencing auditory hallucinations increases, psychological inflexibility and experiential avoidance decrease. Similarly, the VAAS and PANSS showed a significant negative correlation of -0.417 ($p < 0.01$), suggesting that as the ability to accept and act upon auditory hallucinations increases, the severity of symptoms decreases. Lastly, the AAQ-II and PANSS had a significant positive correlation of 0.518 ($p < 0.01$), implying that as psychological inflexibility and experiential avoidance increase, the severity of symptoms also increases (see [Table 1](#)).

Test-Retest Reliability

A group of 50 patients with schizophrenia was asked to complete the scale twice, with a two-week interval between the two administrations. Subsequently, the scores from the first and second administrations were compared. The high correlation between the two sets of scores, with test-retest reliability coefficients ranging from 0.78 to 0.81, indicates good consistency.

Table 1 Correlation Matrix Between VAAS, AAQ-II, and PANSS

		Voices Acceptance and Action Scale	Acceptance and Action Questionnaire-II	Positive and Negative Syndrome Scale
Voices Acceptance and Action Scale^a	Pearson correlation			
	Sig. (2-tailed)			
Acceptance and Action Questionnaire-II^b	Pearson correlation	−0.448*		
	Sig. (2-tailed)	0.001		
Positive and Negative Syndrome Scale^c	Pearson correlation	−0.417*	0.518*	
	Sig. (2-tailed)	0.001	0.001	

Notes: *Correlation is significant at the 0.01 level (2-tailed). ^aHigh scores indicate more ability to take independent action and the acceptance of experiencing auditory hallucinations. ^b Higher scores indicate greater psychological inflexibility/experiential avoidance. ^cHigher scores indicate more symptoms of severity.

Data Analysis

The data were initially checked for missing data, univariate and bivariate outliers, normality, linearity, and homoscedasticity. SPSS version 26 (IBM et al, USA) was used for data analysis. Qualitative variables were presented in frequency and percentage, while quantitative variables were presented as mean (SD). The CVIs were computed for each item and each expert. A significance level of $p \leq 0.05$ was considered statistically significant. To assess the validity and conduct factor analysis, Robust Maximum Likelihood (RML) rotation with MPlus was used on the full scale.^{20,21} RML was chosen due to its ability to handle non-normal data distributions. Cronbach's alpha coefficients, inter-item correlations, and corrected item-total correlations were used to determine internal consistency, with Cronbach's alpha value of 0.70 or higher indicating acceptable reliability. Goodness-of-fit for the factor analysis was evaluated using the following criteria: root mean square error of approximation (RMSEA ≤ 0.10), comparative fit index (CFI > 0.90 or ideally ≥ 0.95), and standardized root mean square residual (SRMR ≤ 0.08).²²

The proportion of missing responses per item ranged from 0.0% to 1.3%. Little's MCAR test indicated that missing data were Missing Completely at Random (MCAR) ($\chi^2 = [value]$, $df = [value]$, $p > 0.05$). For EFA and CFA, listwise deletion was applied to maintain a consistent correlation matrix. For internal consistency and test-retest reliability analyses, pairwise deletion was used to retain the maximum available responses for each item.

Results

Table 2 presents the sociodemographic characteristics of 300 clients with schizophrenia who participated in the study. Most clients (48.7%) were in the age group of 31–40 years, with 66.3% unemployed, 69.3% reported having enough income, and 45.3% had a secondary education. Regarding marital status, 77.0% of clients were single, with 62.3% living with their parents or siblings and 81.0% residing in urban areas. Concerning hospital admission, 73.3% of the clients

Table 2 Sociodemographic Characteristics of Clients with Schizophrenia (N = 300)

Variable	No.	%
Age of the client		
20-30 years	94	31.3
31-40 years	146	48.7
41-50 years	37	12.3
51-60 years	23	7.7

(Continued)

Table 2 (Continued).

Variable	No.	%
The job of the client		
Unemployed	199	66.3
Employed	17	5.7
Student	2	0.7
Hand worker	59	19.7
Free worker	23	7.7
Level of education		
Read and write	86	28.7
Primary education	33	11.0
Secondary education	136	45.3
University education	45	15.0
Marital status		
Single	231	77.0
Married	34	11.3
Divorced	35	11.7
Living condition		
Alone	85	28.3
With wife	28	9.3
With parents or sibling	187	62.3
Place of residency		
Urban	243	81.0
Rural	57	19.0
Financial income		
Not enough	92	30.7
Enough	208	69.3
Number of admissions		
Twice	54	18.0
Three	116	38.7
Recurrent	130	43.3
Type of voice		
Benevolent	1	0.3
Malevolent	247	82.3
Mixed	52	17.3

(Continued)

Table 2 (Continued).

Variable	No.	%
Duration of hearing voices/ years		
1-5 years	226	75.3
6-10 years	63	21.0
11-15 years	11	3.7
Type of medication		
A typical antipsychotic	209	69.7
Typical antipsychotic	18	6.0
Mixing typical and atypical antipsychotics	8	2.7
A typical antipsychotic+ ECT	65	21.7
Compliance with medications		
Yes	180	60.0
No	120	40.0
Type of admission		
Involuntary	220	73.3
Voluntary	80	26.7

were admitted involuntarily, while 26.7% were admitted voluntarily. Most clients (75.3%) reported experiencing auditory hallucinations for 1–5 years, and 82.3% of clients reported hearing malevolent voices. Finally, concerning medications, 69.7% of clients were on atypical antipsychotic medications, while 21.7% were on a combination of atypical antipsychotic medications and electroconvulsive therapy (ECT), with 60.0% reporting being compliant with their medication.

Table 3 provides the content validity indices for the Arabic version of the Voices Acceptance and Action Scale (VAAS), emphasizing the clarity and relevance of each item based on expert evaluations. The individual item-level

Table 3 Content Validity Indices (per Item, per Expert, and Total Scale) of the VASS-Arabic Version

Item Number	I-CVI for Clarity	I-CVI for Relevance	Expert	E-CVI for Relevance	E-CVI for Clarity
Item 1	0.867	0.933	1	0.935	0.968
Item 2	0.800	0.911	2	0.871	0.946
Item 3	0.800	0.933	3	0.806	0.925
Item 4	0.800	0.889	4	0.903	0.968
Item 5	0.867	0.956	5	0.903	0.957
Item 6	0.800	0.933	6	0.871	0.935
Item 7	1.000	1.000	7	0.806	0.925

(Continued)

Table 3 (Continued).

Item Number	I-CVI for Clarity	I-CVI for Relevance	Expert	E-CVI for Relevance	E-CVI for Clarity
Item 8	0.933	0.978	8	0.935	0.968
Item 9	0.867	0.933	9	0.935	0.978
Item 10	0.867	0.956	10	0.839	0.946
Item 11	0.733^	0.889	11	0.806	0.925
Item 12	0.867	0.911	12	0.774^	0.914
Item 13	1.000	1.000	13	0.742^	0.871
Item 14	0.867	0.956	14	0.935	0.978
Item 15	0.867	0.956	15	1.000	1.000
Item 16	1.000	1.000			
Item 17	0.800	0.911			
Item 18	0.867	0.956			
Item 19	1.000	1.000			
Item 20	0.867	0.956			
Item 21	0.933	0.978			
Item 22	1.000	1.000			
Item 23	0.800	0.911			
Item 24	1.000	1.000			
Item 25	0.800	0.911			
Item 26	0.867	0.911			
Item 27	0.800	0.933			
Item 28	0.867	0.956			
Item29	0.800	0.933			
Item 30	0.867	0.956			
Item 31	0.800	0.911			
S – CVI	0.871	0.947		0.871	0.947

Notes: Bold values indicate significant relevance and clarity as determined by expert evaluations. Values marked with ^ indicate items that may require further review for clarity or relevance.

Abbreviations: I-CVI, item level; E-CVI, expert level; S-CVI, scale level.

Content Validity Index (I-CVI) varies, with most items showing robust values; notably, item 7 received perfect scores for both clarity and relevance. Conversely, item 11 scored lower in clarity (0.733), highlighting potential areas for enhancement. The Expert-Level Content Validity Index (E-CVI) indicates strong consensus among experts, with an overall scale-level S-CVI of 0.947 for both relevance and clarity, suggesting the scale is predominantly valid and clear for its intended use.

Table 4 presents the results of the exploratory factor analysis for the Voices Acceptance and Action Scale (VAAS), detailing the factor loadings for each item across five identified factors. Items in Section 1, which focuses on acceptance

Table 4 Exploratory Factor Analysis and Factor Loadings of the Voices Acceptance and Action Scale (VAAS)

Item Number	Sections	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Item 1	1	0.437	0.043	0.414	0.180	-0.093
Item 2	1	0.352	0.034	0.370	0.271	-0.037
Item 3	1	0.463	-0.142	0.409	0.116	0.157
Item 4	1	0.395	-0.013	0.497	0.140	-0.049
Item 5	1	0.899	-0.016	-0.028	0.125	-0.025
Item 6	1	0.627	0.125	0.133	0.086	0.052
Item 7	1	0.401	0.115	0.351	0.166	-0.014
Item 8	1	0.617	0.124	0.129	0.104	0.043
Item 9	1	-0.090	0.176	0.922	-0.159	0.135
Item 10	2	0.447	0.147	0.156	0.273	-0.001
Item 11	2	0.578	0.136	0.103	0.084	0.122
Item 12	2	0.124	0.059	0.433	0.319	0.065
Item 13	3	0.358	0.521	0.144	0.092	-0.138
Item 14	3	0.689	0.337	-0.001	-0.083	0.046
Item 15	3	0.051	0.768	0.078	-0.005	0.122
Item 16	3	-0.118	0.689	0.071	0.387	-0.015
Item 17	3	0.646	-0.004	0.061	0.293	-0.018
Item 18	3	0.796	-0.016	0.030	0.154	0.000
Item 19	3	0.216	0.259	0.103	0.225	0.249
Item 20	3	-0.026	-0.086	0.153	0.475	0.536
Item 21	4	0.716	0.095	0.070	0.059	0.078
Item 22	4	0.491	0.114	0.174	0.233	0.003
Item 23	4	0.304	0.076	-0.085	0.669	0.032
Item 24	4	0.892	-0.028	-0.131	0.202	-0.005
Item 25	4	0.251	0.079	0.266	0.411	0.033
Item 26	4	0.782	0.131	-0.133	0.121	0.099
Item 27	4	0.210	0.201	0.088	-0.020	0.589
Item 28	5	0.790	0.060	0.049	-0.013	0.120
Item 29	5	0.968	-0.056	0.149	-0.167	0.026
Item 30	5	0.101	0.183	-0.107	0.737	0.094
Item 31	5	0.491	0.020	0.019	0.441	0.037

Notes: The boldface indicates salient (> 0.30) loading. Section 1: Acceptance attitudes toward general voices actions. Section 2: Autonomous actions toward general voices actions. Section 3: Beliefs about command voice actions. Section 4: Acceptance attitudes toward command voice actions. Section 5: Autonomous actions toward command voice.

attitudes toward general voices, demonstrate strong loadings, particularly item 5 (0.899) and item 6 (0.627), indicating their significant relevance to this construct. In Section 2, dedicated to autonomous actions, items such as item 15 (0.768) and item 16 (0.689) also show notable loadings, suggesting they effectively represent this aspect. Section 3, addressing beliefs about command voices, highlights items like item 18 (0.796) and item 14 (0.689) as key indicators. The other sections similarly exhibit meaningful loadings, with many items surpassing the 0.30 threshold, reinforcing the VAAS's multidimensional nature.

Table 5 presents the results of the confirmatory factor analysis for the Voices Acceptance and Action Scale (VAAS), detailing key fit indices that evaluate the model's adequacy. The chi-square value of 1374.620 with 424 degrees of freedom yields a chi-square to degrees of freedom ratio of 3.242, indicating a reasonable fit despite being slightly above the ideal threshold of 2.0. The Root Mean Square Residual (RMR) is reported at 0.029, suggesting a good fit, as values below 0.05 are considered acceptable. The Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) values of 0.940 and 0.935, respectively, further support this, as both indices exceed the recommended cutoff of 0.90. Finally, the Root Mean Square Error of Approximation (RMSEA) is 0.087, which is slightly above the preferred threshold of 0.08 but still reflects an acceptable model fit.

Table 6 and Figure 2 show the reliability of the VAAS if any item were deleted. The item “My voices stop me doing what I want to do” from the “Autonomous actions toward general voice” subscale has a corrected item-total correlation of 0.88 and a Cronbach's Alpha of 0.90 if deleted. Similarly, the item “When I disagree with a voice, I simply notice it and move on” from the same “Autonomous actions toward general voice” category has a corrected item-total correlation

Table 5 Findings Confirmatory Factor Analysis for the Voices Acceptance and Action Scale (VAAS)

χ^2	df	χ^2/df	RMR	CFI	TLI	RMSEA
1374.620*	424	3.242	0.029	0.940	0.935	0.087

Note: *indicates significant results.

Abbreviations: RMR, Root Mean Square Residual; CFI, Bentler's Comparative Fit Index; TLI, Tucker-Lewis Index; RMSEA, Root Mean Square Error of Approximation.

Table 6 Cronbach's Alpha if Item Deleted for Voices Acceptance and Action Scale (VAAS-31) and Its Subscales

N	VAAS	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
	Acceptance attitudes toward general voice actions		
1	I accept the fact that I hear voices.	0.921	0.976
2	There are worse things in life than hearing voices	0.905	0.977
3	There is no point getting on with my life while I hear voices*	0.912	0.977
4	My voices are just one part of my life	0.908	0.977
5	I cannot have a good life while I hear voices*	0.900	0.977
6	Hearing voices has taken over my life*	0.935	0.976
7	I have learned to live with my voices	0.930	0.976
8	I struggle with my voices*	0.924	0.976
9	There is more to me than just my voice	0.831	0.979

(Continued)

Table 6 (Continued).

N	VAAS	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
	Autonomous actions toward general voice		
10	When I disagree with a voice, I simply notice it and move on	0.896	0.903
11	My voices stop me doing the things that I want to do*	0.889	0.909
12	When my voices say things, I accept what is helpful and reject what is not	0.857	0.934
	Beliefs about command voice actions		
13	I decide what I do, not my voices	0.889	0.962
14	Hearing a command from a voice can cause me to do what it says*	0.890	0.962
15	I have to do what my voices say, even if I do not agree with it*	0.857	0.964
16	Just because a voice tells me to do something, it does not mean I have to do it	0.861	0.964
17	My voices should take the blame when I obey them, not me*	0.892	0.962
18	Hearing my voices tell me to do something is as bad as doing it*	0.885	0.963
19	My voices are not responsible for my actions, I am	0.898	0.962
20	It is not what my voices say, but what I do, that matter	0.831	0.966
	Acceptance attitudes toward command voices actions		
21	I feel overwhelmed by it*	0.932	0.966
22	I notice it, but I do not react to it	0.915	0.967
23	I just accept that the voice is speaking	0.890	0.969
24	I try hard to avoid feeling upset*	0.892	0.969
25	I put up with it	0.920	0.967
26	I argue with the voice*	0.921	0.966
27	I think what the voice says does not matter	0.837	0.973
	Autonomous actions toward command voices actions		
28	I have to stop what I am doing and focus on the voice*	0.918	0.922
29	I worry about what I might do*	0.864	0.939
30	I listen to the voice but make my own decisions	0.837	0.948
31	I keep focused on what I want to do	0.907	0.926

Note: *Negative questions with reversed score.

of 0.896 and Cronbach's Alpha of 0.903 if deleted. This further confirms the internal consistency and reliability of the scale.

Table 7 reveals that the subscale for acceptance attitudes toward general voice actions has a mean score of 13.39 with a standard deviation of 11.45, reflecting a high level of variability among responses. The total score for Section A, which combines acceptance attitudes and autonomous actions, shows a mean of 17.70 and a high Cronbach's alpha of 0.984, indicating excellent internal consistency. In Section B, which focuses on beliefs and attitudes toward command voices,

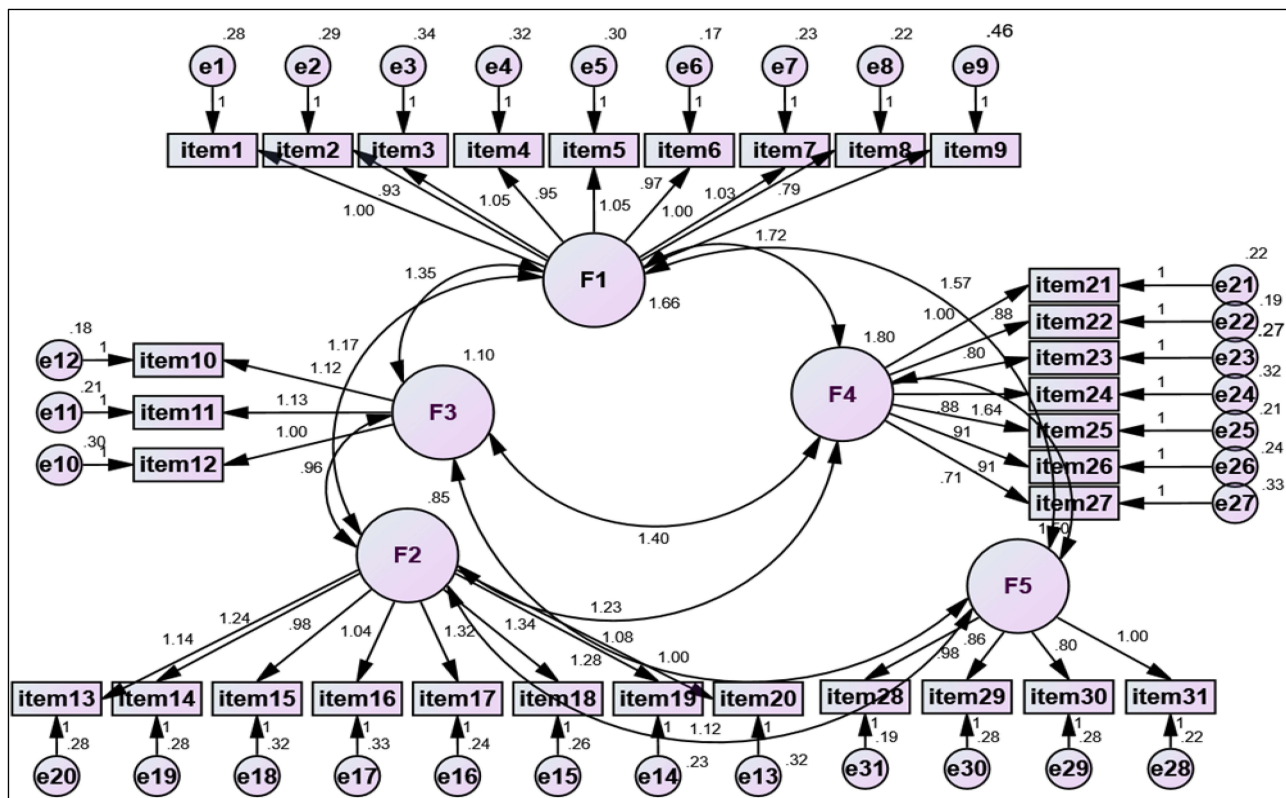


Figure 2 Five-factor implicit structure established with CFA.

the mean score is 29.64, and the overall internal consistency for this section is also strong at 0.988. The total VAAS score has a mean of 47.34 and a remarkable Cronbach's alpha of 0.993, further supporting the scale's reliability.

Table 7 indicates a significant negative correlation between the VAAS and the AAQ-II ($r = -0.448$, $p < 0.01$), suggesting that as clients exhibit greater acceptance and autonomy in dealing with auditory hallucinations, their levels of psychological inflexibility and experiential avoidance decrease. Moreover, the VAAS demonstrates a significant negative correlation with the PANSS ($r = -0.417$, $p < 0.01$), indicating that higher scores in acceptance and action are linked to lower severity of schizophrenia symptoms. In contrast, there is a significant positive correlation between the AAQ-II and

Table 7 Means, Standard Deviations and Cronbach's Alpha for Voices Acceptance and Action Scale (VAAS-31) and Subscales

	M	SD	Skewness	Kurtosis	N of Items	Cronbach's α
Acceptance attitudes toward general voice actions	13.39	11.45	0.812	-0.965	9	0.979
Autonomous actions toward general voice	4.32	3.51	0.845	-0.666	3	0.942
Total section A	17.70	14.85	0.829	-0.925	12	0.984
Beliefs about command voice actions	14.10	8.57	0.755	-0.790	8	0.968
Acceptance attitudes toward command voices actions	10.50	8.29	0.895	-0.838	7	0.973
Autonomous actions toward command voices actions	5.04	4.57	0.946	-0.593	4	0.950
Total section B	29.64	21.19	0.884	-0.799	19	0.988
Total section VAAS	47.34	35.86	0.877	-0.845	31	0.993

Notes: Cronbach's α : Indicates the internal consistency of the scale; values closer to 1 indicate higher reliability.

PANSS ($r = 0.518$, $p < 0.01$), which means that increased psychological inflexibility is associated with greater symptom severity.

Discussion

Although the evidence base for third-wave cognitive and behavioral therapy techniques has grown significantly over the past ten years, the lack of change measures that are pertinent to these therapies when used to treat psychosis may be hindering empirical development in this area. One prominent exception is the VAAS, which assesses acceptance of voice experiences. However, except for the information the scale's creators provided, there is no published data on its psychometric properties.²¹ The current study evaluated the psychometric properties, including content validity, internal consistency, and construct or component validity, in a sample of clients with schizophrenia.

The content validity index (CVI) is a widely used method for quantitatively calculating content validity. There are several ways to evaluate content validity, with the item-level CVI (I-CVI) being the most popular technique. This study considered the I-CVI, expert-level CVI (E-CVI), and scale CVI (S-CVI) as the average score, which is susceptible to skewing by outliers. It is essential to distinguish between content validity at the item and scale levels.¹⁷

The I-CVI scores reflect the extent to which experts agree on the relevance and precision of each item. Fifteen experts were deemed sufficient for content confirmation.¹⁹ The findings reveal that most items have I-CVI values above 0.8, indicating good expert agreement. However, Item 11 has a lower I-CVI value of 0.73. This suggests that this item may require further clarification or modification to ensure clear understanding by the respondents, as an I-CVI of 0.78 or higher is considered excellent. An item-deleted Alpha was conducted to confirm the reliability of this item. It showed that the item "My voices stop me doing the things that I want to do" from the "Autonomous actions toward general voice" subscale has a corrected item-total correlation of 0.88 and a Cronbach's Alpha of 0.90 if deleted.

The E-CVI for relevance ranges from 0.74 to 1, with an overall mean of 0.87. The E-CVI for clarity ranges from 0.87 to 1, with an overall mean of 0.94. This indicates good agreement among the experts regarding the relevance and clarity of the items. It was concluded that individual items were important and relevant to measuring the content validity.

The S-CVI ratings show the consensus of experts regarding the overall scale's relevance and clarity. The findings reveal that the S-CVI values are over 0.8, which denotes strong agreement on the overall scale's relevance and intelligibility. The minimum acceptable S-CVI is between 0.80 and 0.90.^{13,19} Overall, the results suggest that the VAAS-Arabic version has good content validity. It is important to note that content validity is just one aspect of a scale's validity, and other aspects, such as construct and criterion validity, are essential to be evaluated.¹⁹

The exploratory factor analysis (EFA) results for the Voices Acceptance and Action Scale (VAAS) reveal critical insights into its factor structure and the relationships between items. The findings indicate a multidimensional nature of the scale, essential for understanding the various aspects of acceptance and action related to auditory hallucinations. In Section 1, which focuses on acceptance attitudes toward general voices, items demonstrate strong loadings, particularly item 5 (0.899) and item 6 (0.627), underscoring their vital role in capturing this construct. These high loadings suggest that these items are central to assessing how individuals perceive and accept their voice experiences. Similarly, Section 2 highlights autonomous actions, with items such as item 15 (0.768) and item 16 (0.689) effectively representing the capacity for self-directed behavior in the presence of voices, which is crucial for therapeutic interventions aimed at enhancing personal agency. In Section 3, beliefs about command voices are strongly indicated by item 18 (0.796) and item 14 (0.689), suggesting that these beliefs significantly influence how individuals interact with their auditory experiences, thereby impacting treatment outcomes. The remaining sections also exhibit meaningful loadings, with many items exceeding the 0.30 threshold, reinforcing the scale's robustness and its alignment with the theoretical framework of Acceptance and Commitment Therapy (ACT). This framework emphasizes acceptance and commitment to values in the face of challenging experiences, which is particularly relevant for clients grappling with schizophrenia.

This analysis using the total score and all five factors would likely yield the most clinically reliable information regarding VAAS, mainly when used in psychotic-based samples. These factors align with the ACT theoretical model, which emphasizes accepting and acting in the presence of challenging ideas or experiences rather than attempting to control or eradicate them. The VAAS was created to quantify these ideas explicitly about auditory hallucinations.^{10,21}

The hypothesized factor structure of the VAAS offered an excellent fit to the data, according to the goodness-of-fit statistics. The current study's Chi-square (χ^2/df) ratio is 3.242, above the recommended value of 2.0 but still within an acceptable range. According to Kline (2023), a χ^2/df ratio between 2.0 and 5.0 indicates a reasonable fit between the model and the data. The RMR value of 0.029 in the current study indicates a good fit between the model and the data, as values less than 0.05 are considered a good fit.²³

The current study's CFI and TLI values are higher than the suggested level of 0.90, indicating that the model and the data fit each other well. Although the RMSEA value of 0.087 is slightly higher than the advised value of 0.08, it is still considered acceptable. As Kline (2023) noted, an RMSEA value between 0.08 and 0.10 indicates a reasonable fit between the model and the data.²³

The current results indicated that all subscales have high internal consistency, with alpha coefficients of 0.984 for section A and 0.988 for section B. The overall VAAS-31 scale has an alpha coefficient of 0.993, indicating high internal consistency. Cronbach's alpha is a measure of internal consistency that assesses the reliability of a scale or measure by examining the degree to which individual items in the scale are interrelated. Alpha coefficients range from 0 to 1, with higher values indicating greater internal consistency and reliability. The table shows the number of items in each subscale of the VAAS-31, along with Cronbach's alpha coefficient. This finding is consistent with previous research demonstrating the VAAS-31's good psychometric properties, high internal consistency, and test-retest reliability.^{21,23}

Limitations

This study presents several important limitations that should be considered when interpreting the findings. First, the reliance on a single-site, convenience sample restricts the generalizability of the results to other Arabic-speaking populations with schizophrenia. This limitation is particularly significant for contexts in different regions or healthcare systems, where the clinical characteristics and treatment responses may vary. Additionally, the exclusion of individuals with schizoaffective disorder, cognitive impairment, comorbid depression, or substance-induced psychosis may result in a lack of representation of the clinical diversity inherent in psychotic disorders. This is crucial, as first-episode and relapsed patients often have vastly different disease experiences, which were not adequately addressed in the inclusion and exclusion criteria. Consequently, the findings may not fully capture the spectrum of schizophrenia-related challenges.

While the Arabic version of the VAAS demonstrated strong psychometric properties, the reliance on self-report measures introduces potential biases, particularly in a population that may experience impaired insight and communication difficulties. Furthermore, the focus on the Positive subscale of the PANSS (P-PANSS) may overlook the significant impact of negative symptoms and general psychopathology on patient responses during interviews, limiting the breadth of understanding regarding their experiences. Moreover, although content and construct validity were thoroughly assessed, other critical aspects such as criterion validity and sensitivity to clinical change over time were not examined. This gap restricts our ability to evaluate the scale's effectiveness in dynamic clinical environments. The absence of treatment-resistant schizophrenia patients further limits our understanding of the scale's applicability in more complex clinical scenarios.

Lastly, while model fit indices from the confirmatory factor analysis were generally acceptable, the slightly elevated RMSEA indicates that further refinement of the scale structure may be necessary. To enhance the findings' applicability, future research should aim to include a more diverse clinical population, particularly focusing on first-episode and relapsed patients, as well as treatment-resistant individuals. Longitudinal designs should also be employed to assess the scale's responsiveness to therapeutic interventions, including Cognitive Behavioral Therapy (CBT). This approach will provide a stronger evidence base for extrapolating the findings to other Arabic-speaking contexts with varying service structures.

Conclusion

The findings demonstrate that the VAAS had a multidimensional structure, good internal consistency, and strong construct validity. The VAAS-Arabic is a potentially helpful tool that healthcare professionals can use to gauge patient acceptance of and response to auditory hallucinations among Arabic-speaking populations. Overall, VAAS is a promising measure of acceptance and action related to auditory hallucinations and provides comprehensive information because of its multidimensional structure (see [Table S1](#)).

Recommendations

This study provides initial evidence for the validity and reliability of the Arabic version of the Voices Acceptance and Action Scale (VAAS) among clients with schizophrenia. To further strengthen these findings, additional validation studies are essential, particularly those that assess the scale's psychometric properties across diverse populations, including first-episode and relapsed patients. These groups have markedly different disease experiences, and their inclusion will enhance the scale's applicability and relevance. Future research should also investigate the scale's sensitivity to change over time, particularly in relation to various treatment modalities, including Cognitive Behavioral Therapy (CBT). Understanding how the VAAS responds to treatment will provide valuable insights into its effectiveness in tracking acceptance and action related to auditory hallucinations.

Moreover, clinicians and researchers are encouraged to use the VAAS alongside other assessment tools to capture a broader spectrum of acceptance and action related to schizophrenia and other mental health conditions. It is crucial that future studies explicitly address the limitations and exclusions identified in this research, including the representation of treatment-resistant schizophrenia patients. Finally, some items on the VAAS may require adaptation to better reflect the cultural context of Arabic-speaking clients with schizophrenia. Researchers and clinicians should carefully evaluate the cultural and linguistic nuances of their target population to ensure that appropriate adaptations are made for the effective use of the scale.

Abbreviations

AAQ-II, Acceptance and Action Questionnaire-II; ACT, Acceptance and Commitment Therapy; CFA, Confirmatory Factor Analysis; CVI, Content Validity Index; E-CVI, Expert-Level Content Validity Index; EFA, Exploratory Factor Analysis; ICC, Intraclass Correlation Coefficient; IRB, Institutional Review Board; PANSS, Positive and Negative Syndrome Scale; RMSEA, Root Mean Square Error of Approximation; RML, Robust Maximum Likelihood; S-CVI, Scale-Level Content Validity Index; VAAS, Voices Acceptance and Action Scale; WHO, World Health Organization.

Data Sharing Statement

Data will be available upon reasonable request from the corresponding author.

Ethics Approval and Consent to Participate

Every method was used under the relevant rules and regulations of the Declaration of Helsinki (DoH-Oct2008). The necessary formal approval and permission to conduct the study were obtained from the Research Ethics Committee (IRB00013620-AU-22-7-2021) of the Faculty of Nursing, Alexandria University, Egypt. Informed written consent was obtained from every patient who agreed to participate in the study.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors declare that there are no conflicts of interest.

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