

## Research Paper



## Cross-cultural adaptation of the short forms of Wisconsin Schizotypy Scales: Psychometric evaluation in Iran

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**Abstract**

**Introduction and Objective:** Since their development the Wisconsin Schizotypy Scales have been extensively used to assess schizotypy in clinical and nonclinical samples. The purpose of this study was to examine the psychometric properties of the short forms of the Wisconsin Schizotypy Scales (SWSS) in an Iranian population.

**Research Methodology:** This research was a correlational design. Three hundred and twelve participants from universities students along with thirty-four schizophrenic patient, and fifty their first degree relatives were included in this study. Participants answered to Persian version of SWSS, Short form Oxford-Liverpool Inventory of Feelings and Experiences (SO-LIFE) Questionnaire and Coleridge's STA scale.

**Findings:** The results showed internal consistency in terms of Cronbach's  $\alpha$ , and test-retest reliability. The results of the two methods showed a good reliability for the shortened WSS. Concurrent validity was tested by comparing with SO-LIFE and STA which showed acceptable relationship. Differential validity was tested by comparing SWSS scores between schizophrenic patients, their first degree relatives and normal people which was acceptable.

**Conclusion:** Moreover, the factor structure of Persian version of SWSS showed two factor solutions, and resembles that seen in previous related studies, providing further cross-cultural empirical evidence of the two factorial structures of the WSS. The present results provide the further demonstration of the validity of the shortened WSS and support their use in the study of schizotypy particularly among Iranian population.

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## Introduction

From many aspects schizotypal personality is important because of its relationship with schizophrenia (Ettinger et al., 2015; Pfarr et al., 2023). Schizotypy is a personality trait that plays a role in the liability for psychosis in general, and schizophrenia in particular (Lenzenweger, 2010). Schizophrenia is not only a debilitating condition with severe relapses to patients and their relatives, but it also imposes moral and economic costs on society (Olesen, et al., 2012; Gaillard et al., 2022). Therefore, the growing need for the early and proper diagnosis has led to necessary incentives for the conduct of clinical research to identify populations at high risk for developing schizophrenia (Modenato and Draganski, 2015; Wang et al 2021; Frattaroli et al, 2022). Schizotypy measurement scales are considered as one of the methods of assessing people at risk. The increasing interest in individual differences in schizotypal personality is reflected in the expanding use of self-report measures of schizotypal traits, and over the past decades many self-report scales have been developed for assessing schizotypal traits in non-clinical samples (O'Hare and Linscott 2023). Historically after the development of the Psychoticism scale (Eysenck and Eysenck 1975), scales to measure Physical and Social Anhedonia (Chapman, Chapman, and Raulin, 1976), Magical Ideation (Eckblad and Chapman 1983), Perceptual Aberration (Chapman et al. 1978), Schizophrenism (Venables et al. 1990), the Survey of Attitudes and Experiences (SAE – Venables et al., 1990), the Schizotypal Personality Questionnaire (SPQ – Raine, 1991), Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE - Claridge et al., 1996), and Schizotypal Traits Questionnaire (STQ - Claridge and Broks 1984) have been developed. Wisconsin Schizotypy Scales (WSS), also known as the Chapman Scales of Psychosis Proneness, including the Perceptual Aberration, Magical Ideation, Physical Anhedonia, and Revised Social Anhedonia Scales. Since their development the Wisconsin Schizotypy Scales have been extensively used to assess schizotypy in clinical and nonclinical samples (Winterstein, Ackerman, Silvia, & Kwapil, 2011; Gross, Mellin, Silvia, Barrantes-Vidal, Kwapil, 2014). But despite the demonstrated validity of the WSS, the combined length of the scales (166 items) can be problematic; therefore, in order to create a quicker, more convenient instrument for assessing the psychosis proneness, Winterstein et al. (2011) developed 15-item short versions for each of the four WSS scales. The availability of shortened versions of the WSS offers some advantages including that shorter forms of the scales are more feasible for inclusion in research with clinical samples (Gross Silvia, Barrantes-Vidal and Kwapil, 2012). Winterstein et al. (2011) reported preliminary good validity and acceptable internal consistency for the short-form WSS scales. Gross et al. (2012) studied the psychometric properties of the short-form WSS. Using interview ratings of psychotic-like and schizophrenia-spectrum symptoms and questionnaire measures of personality and social impairment, they reported good reliability, correlated highly with the full length original scales, and exhibited predictable relationships with measures of psychopathology and personality. Fonseca-Pedrero Paino, Ortuño-Sierra, Lemos-Giráldez and Muñiz (2014) reported that the short forms of the Perceptual Aberration and Magical Ideation Scales had good validity and reliability coefficients. According to their results, short forms of the Perceptual Aberration and Magical Ideation Scales loaded on a single underlying factor. However, they did not investigate the properties of the other WSS scales.

In relation to factorial structure Chan et al. (2015) investigated the reliability and validity of the full length form WSS among Chinese population. They reported that the best fitting model was a two-factor model with positive schizotypy (Perceptual Aberration and Magical Ideation) scales and negative schizotypy (Social Anhedonia and Physical Anhedonia) scales, showing that the measurement of schizotypal traits is consistent across cultures. These results were replicated by Gross, Silvia, Barrantes-Vidal & Kwapil (2015) using short version WSS scales as well as by Preti et al (2018).

Studies in several countries have provided support for the reliability and validity of the full length and short forms of the Wisconsin Schizotypy Scales, including Caucasian and African American (Kwapil et al. 2008), German (Meyer and Keller, 2001) Spanish (Kwapil, Ros-Morente, Silvia, Barrantes-Vidal, 2012) and Chinese (Chan et al. 2015) samples. However, no Iranian data are available about reliability and validity of the Wisconsin Schizotypy Scales and its short forms. Cross-cultural studies on the same tools of Schizotypy can define the similarities and differences of factors involved in Schizotypal traits across different cultures. The differences may lead us to understand the cultural influences in Schizotypy. Hence, it was felt that a study of the Wisconsin Schizotypy Scales within Iranian culture would be useful, and would provide an international measure for further study of Schizotypy within the Iranian context. The aim in this study is to evaluate the factor structure and psychometric properties of the short forms of the Wisconsin Schizotypy Scales in a non-clinical Iranian sample.

## Methodology

### Participants

Stratified random sampling was carried out, in a population of approximately 5,000 university students. Selected final sample consisted of 312 undergraduate students (88 males, 224 females). Their mean age was 29.11 (SD = 7.76: range 18–57 yr). The participants were asked questions about suffering any possible serious mental disorder and history of schizophrenia disorders. There were almost no cases of mental disorders.

Along non clinical samples, thirty-four schizophrenic patients, and fifty their first degree relatives were included in this study. Their mean age was 42.18 (SD = 12.21: range 18–76 yr).

### Measure

All participants were administered a set of questionnaires, including short forms of the four Wisconsin Schizotypy scales (Winterstein et al., 2011), Persian version of " Schizotypal Traits Questionnaire " (STA - Claridge and Broks 1984), Short Version of Schizotypal Oxford-Liverpool Inventory of Feelings and Experiences (SO-LIFE) Questionnaire (Mason, Linney, and Claridge, 2005) and other checklists to capture demographical status. The originally psychometric properties of short forms of Wisconsin Schizotypy scales have been reported elsewhere (Winterstein et al., 2011).

### Procedure

This research was a correlational design. The short forms of the Wisconsin Schizotypy Scales were first translated into Persian language by the authors. Then, the translated version was given to fifteen university students to complete and to report any problems if they had in understanding the items. After some revision in the items, the translated version of the short forms of the Wisconsin Schizotypy Scales was given to two (assistant and associate) professors in the English Language Department to back-translate it into English, as suggested by Brislin, Lonner, and Thorndike (1973). Finally, the original and the back-translated versions were compared to minimize the differences between the two versions. Participants completed questionnaires in a group session (30 to 50 students), during a standard hour-long class. Participants were informed about the study and, after signing the consent form, were asked to complete anonymous questionnaires. Administration was always under the supervision of first researcher.

## Results

### 1. Reliability

#### 1.1. Internal consistency

Cronbach's  $\alpha$  of the Wisconsin Schizotypy Scales in Iranian sample are shown in Table 1.

**Table 1.** Internal consistency of the short forms of the Wisconsin Schizotypy Scales

	Perceptual Aberration	Magical Ideation	Physical Anhedonia	Social Anhedonia
<b>sWSS</b>				
<b>Total</b>	0.86	0.75	0.65	0.72
<b>Male</b>	0.87	0.79	0.70	0.71
<b>Female</b>	0.84	0.72	0.61	0.72

According to results internal consistency of SWSS were found to be good, confirming reliability of the SWSS.

#### 1.2. test–retest reliability

Test-retest data on the short forms of the Wisconsin Schizotypy Scales were collected from 45 of the participants. The test–retest correlations for a 4-week interval are depicted in Table 2.

**Table 2.** test–retest reliability of the short forms of the Wisconsin Schizotypy Scales

	Perceptual Aberration	Magical Ideation	Physical Anhedonia	Social Anhedonia
<b>SWSS</b>				
<b>Total</b>	0.89	0.91	0.86	0.82
<b>Male</b>	0.91	0.90	0.86	0.84
<b>Female</b>	0.88	0.92	0.85	0.81

The test–retest reliability between the first and second test of the SWSS and its subscales were from  $r = .81$  ( $p < .01$ ) to  $r = .92$  ( $p < .01$ ). These findings suggest that SWSS had acceptable reliability.

2. Validity

2.1. Concurrent

Correlations of SWSS with SO-LIFE (Short Version of Schizotypal Oxford-Liverpool Inventory of Feelings and Experiences) and STA (Schizotypal Traits questionnaire- A form) scores were examined next in a subsample of participants in order to calculating concurrent validity. The SWSS scores were significantly correlated with SO-LIFE and STA total score. Results are shown in Table 3.

**Table 3.** Concurrent validity of the short forms of the Wisconsin Schizotypy Scales

SWSS	Magical Ideation	Perceptual Aberration	Social Anhedonia	Physical Anhedonia
STA	0.67	0.63	0.27	NS
F1: unusual perceptual experiences	0.65	0.75	0.36	NS
F2: paranoid ideation	0.55	0.62	0.48	NS
F3: magical thinking	0.88	0.54	NS	NS
SO-LIFE	0.54	0.43	0.22	NS
F1: cognitive disorganization	0.69	0.85	NS	NS
F2: impulsive nonconformity	0.28	0.44	0.25	0.35
F3: unusual perceptual experiences	0.75	0.66	NS	NS
F4: introvertive anhedonia	NS	NS	0.75	0.68

Table 3 displays the correlations of short WSS with the STA. As expected, the Perceptual Aberration and Magical Ideation Scales (positive schizotypy dimension) were associated strongly with STA (a scale of measuring positive schizotypy) and its subscales (unusual perceptual experiences, paranoid ideation, magical thinking), and the Physical and Social Anhedonia Scales (Negative schizotypy dimension) were not associated or modestly associated with STA and its subscales.

Also, the Perceptual Aberration and Magical Ideation Scales (positive schizotypy dimension) were associated with SO-LIFE and its positive symptoms subscales (unusual perceptual experiences, cognitive disorganization), but modestly or not associated with its negative symptom's subscales (impulsive nonconformity, introvertive anhedonia). The Physical and Social Anhedonia Scales (Negative schizotypy dimension) were associated modestly or not with SO-LIFE and its positive symptoms subscales (unusual perceptual experiences, cognitive disorganization), but strongly associated with its negative symptoms subscales (impulsive nonconformity, introvertive anhedonia).

2.2. Differential

In order to examine the differential validity of the short forms of the Wisconsin Schizotypy Scales, it was administrated on three groups of people as follows: patients with schizophrenia, their first degree relatives and normal people. The patients were selected from Tabriz psychiatric hospitals by the author and a psychiatrist using DSM-5 criteria for diagnosis. Patients were matched with normal participants according to age and sex variables. Comparison by means of the one-way analysis of variance (using scheffe post hoc test) reveals statistically significant groups differences (Table 4). On the total score of SWSS, patients with schizophrenia and their first degree relatives tend to score higher than normal people, respectively.

The mean scores of three groups in SWSS and its factors are summarized in Table 4.

**Table 4.** Groups mean and standard deviation of scores in SWSS

Groups	Schizophrenia		First-degree relatives		Normal	
	Mean	SD	Mean	SD	Mean	SD
SWSS	14.79	4.82	6.45	5.31	2.48	2.32
Magical Ideation	2.29	1.93	1.22	1.72	0.61	0.69
Perceptual Aberration	5.41	1.58	2.52	2.06	0.91	1.24
Social Anhedonia	2.88	1.45	0.84	1.33	0.12	0.33
Physical Anhedonia	4.21	1.65	1.78	1.75	0.79	0.92

Table 5 compares the results of one-way analysis of variance based on scores in SWSS and its factors which have earned.

**Table 5.** results of one-way analysis of variance in SWSS

SWSS	Sources	Sum of Square	df	Mean Square	F	P Value
	Between group	2684.8	2	1342.4	66.07	0.001
	Within group	2295.92	113	20.32		
	Total	4980.72	115			
<b>Magical Ideation</b>	Between group	49.30	2	24.65	9.98	0.001
	Within group	281.62	114	2.47		
	Total	330.92	116			
<b>Perceptual Aberration</b>	Between group	356.12	2	178.06	59.98	0.001
	Within group	341.45	115	2.97		
	Total	697.57	117			
<b>Social Anhedonia</b>	Between group	142.49	2	71.25	51.28	0.001
	Within group	159.78	114	1.39		
	Total	302.27	116			
<b>Physical Anhedonia</b>	Between group	211.42	2	105.71	45.02	0.001
	Within group	267.65	114	2.35		
	Total	479.08	116			

The above table shows significantly differences between schizophrenia, first-degree relatives and normal groups. In order to determine significant differences between paired groups in SWSS, Scheffe's multiple comparison tests was used, according to results:

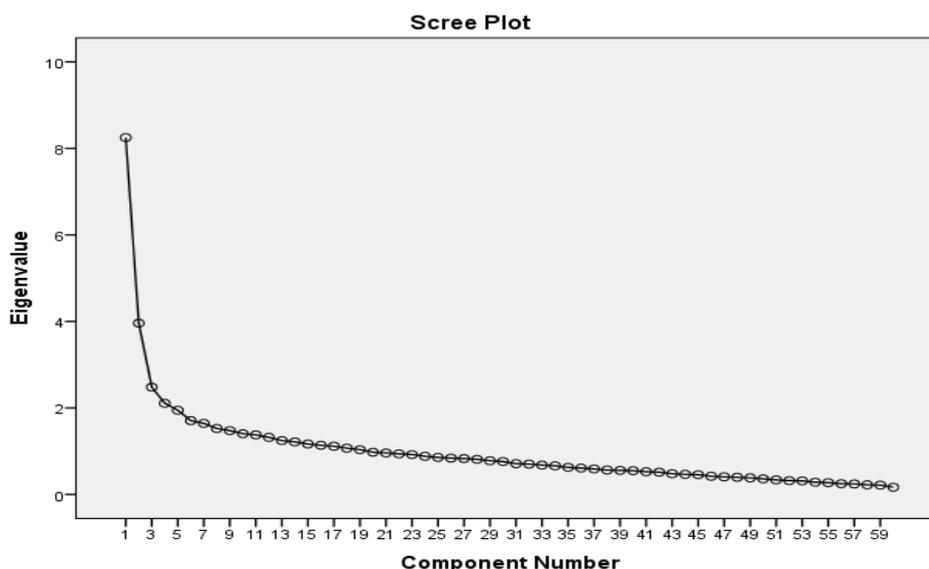
- 1- SWSS scores significantly different between patients with schizophrenia and normal individuals, and schizophrenics have more scores.
- 2- SWSS scores significantly different between patients with schizophrenia and their first degree relatives, and schizophrenics have more scores.
- 3- SWSS scores significantly different between their first-degree relatives and normal individuals, and first degree relatives have more scores.

According to table, comparison based on the SWSS subscales indicates that:

- 4- All SWSS subscales scores significantly different between patients with schizophrenia and normal individuals, and schizophrenics have more scores.
- 5- All SWSS subscales scores significantly different between patients with schizophrenia and their first degree relatives, and schizophrenics have more scores.
- 6- All SWSS subscales scores significantly different between their first-degree relatives and normal individuals, and first-degree relatives have more scores.

### 3. Factor analysis

The principal components analysis with Promax rotation method with eigenvalues greater than 1. was used to investigate the factor structure of the short forms of the Wisconsin Schizotypy Scales. However, the scree plot (shape 1) test indicated two substantive factors, which accounted for 20.35% of the variance (Table 5).



Shape 1. The scree plot results

**The following dimensions were identified:**

- Factor 1 (30 items): The first factor had an eigenvalue equal to 8.25 and accounted for 13.75% of the variance and was termed “positive schizotypy”. Perceptual Aberration and Magical Ideation items loaded on this factor.
  - Factor 2 (30 items): The second factor had an eigenvalue equal to 3.96 and accounted for 6.7% of the variance and was termed “Negative schizotypy”. Social Anhedonia and physical Anhedonia items loaded on this factor.
- Table 6 presents the factor analysis information of SWSS.

**Table 6:** Results of SWSS factor analysis using principal components analysis (PCA)

Factors	eigenvalues	% of variance	Items
Positive schizotypy	8.25	13.75	Perceptual Aberration, Magical Ideation
Negative schizotypy	3.96	6.7	Social Anhedonia, Physical Anhedonia

The positive and negative schizotypy correlated modestly ( $r = .21$ ), consistent with past work on the full scales (Kwapil et al., 2008).

**Discussion and Conclusion**

Psychotic-like symptoms, can be found in the general population, below the clinical threshold, and without necessarily being associated with a mental disorder (Linscott and van Os, 2013). Such experiences expressed at a subclinical level are known as schizotypal or psychosis proneness traits. Chapmans' psychosis proneness scales are scales that measured such experiences as well. The Chapmans' original WSS have been widely used, and several cross-sectional and longitudinal as well as cross-cultural studies support their good psychometric properties. This study presented the translation of the SWSS into Persian via a strict translation/back-translation process; the study also examined the psychometric properties of the SWSS (Persian version) in an Iranian population.

In order to determine the reliability of the SWSS, two methods were used: internal consistency and test–retest. The internal consistency of SWSS was estimated through Cronbach’s alpha, and was found to be 0.86, 0.75, 0.65, and 0.72 for Magical Ideation, Perceptual Aberration, Social Anhedonia and physical Anhedonia subscales, respectively. Nunnally (1978) suggests that coefficients of 0.7 are ideal, but he describes 0.6 as an acceptable level of given measurement error in psychological/social science.

The test-retest reliability correlation score was found to be 0.89, 0.91, 0.86, and 0.82 for Magical Ideation, Perceptual Aberration, Social Anhedonia and physical Anhedonia subscales, respectively. It was observed that the Iranian version of the SWSS has sufficient reliability, which is similar to the original version (Winterstein et al. 2011) and previous studies (Gross et al. 2012; Fonseca-Pedrero et al. 2014), demonstrating great similarity amongst the findings for that particular measurement property. Such reliability coefficients are consistent with

those reported in the full-length version and in some of the different cross-culturally adapted versions found in the literature, as mentioned.

According to Winterstein et al (2011) suggestion that proposed the future research would be to evaluate the Wisconsin short scales in light of other brief measures of schizotypy, concurrent validity of SWSS was tested by comparing with SO-LIFE and STA which showed acceptable relationship. Similar correlations were found during the measurement properties testing of the original version as well as in other cross-cultural adaptations of SWSS (Blanchard et al. 2011; Gross et al, 2012).

According to differential validity, When the SWSS scores were used to differentiate between three groups of participants (schizophrenic, their first degree relatives and healthy people), the mean of the schizophrenic group was different from the first-degree relatives and healthy group statistically, and three groups had higher scores on SWSS respectively. Accordingly, the SWSS appears to be a useful measure for differentiating schizophrenic patients and nonclinical high traits on schizotypy cases from normal people in Iranian samples. These results can be discussed in line of phenomenology of schizotypy; at clinical levels of extremity, schizotypal traits are recognized as schizotypal personality disorder (Davidson, Hoffman & Spaulding, 2016). However, they are not exclusive to the schizophrenia spectrum (Dinsdale Hurd, Wakabayashi, Elliot, and Crespi, 2013; Gooding, 2023). At low levels, schizotypal traits are a source of variance in individual differences (e.g., Fonseca-Pedrero, Lemos-Giraldez, Paino-Pineiro, Villazon-Garcia and Muniz, 2010), a vulnerability or prodromal factor for psychosis, and schizophrenia (Horan, Reise, Subotnik, Ventura, and Nuechterlein, 2008; Lenzenweger, 2010).

The factor structure in Iranian sample was similar to the factor structure in Spain (Fonseca-Pedrero et al. 2014), Chinese (Chan et al. 2015), and United States (Gross et al, 2015) samples. A two-factor solution obviously fits the data. In confirmation of this results, some studies consistently indicate that a two-factor structure underlies the many schizotypal related scales (Kelly and Coursey, 1992; Vollema and van den Bosch, 1995; Kerns, 2006; Brown, Silvia, Myins-Germeys, Lewandowski, Kwapil, 2008; Kwapil et al., 2008, 2012, 2013). So, it seems that Schizotypy, is conceptualized as two-dimensional constructs, and positive and negative symptom dimensions are the most consistently replicated factors.

The SWSS demonstrated good psychometric properties and consists of simple and easily understood language. The results of this study generally support the hypotheses regarding the cultural validity of SWSS and provide information for the psychometric properties of Chapmans' psychosis proneness scales. The findings supported that the Persian version of the SWSS is a reliable and valid instrument that has a potential be used as a research and clinical instrument to measure schizotypal dimensions. The availability of a translated SWSS will provide an opportunity for researchers to evaluate schizotypy and psychosis proneness among Iranians samples especially in schizophrenia related research, and choosing a suitable control group for these patients. Because people with high scores in schizotypy are similar to schizophrenic patients in all respects (at very low levels of symptomatology), but the effects of institutionalization such as receiving medication are not present in this group.

Some limitations should be considered in the interpretation of these results; first, the samples were comprised of university students, therefore, it is unknown whether the Persian version of SWSS will evidence comparable psychometric properties when distributed to patients with schizotypal personality or related disorders. Research using more diverse samples is an important value for future inquiry. Second, validation methodology conducted in this study involved questionnaires. It is recommended that future studies use other methods that are not questionnaire-focused.

### **Ethical Considerations**

All ethical principles have been considered in this article.

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### **Conflict of Interest**

The authors of this article declare that they have no conflict of interest.

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