

## **Validation of the Automatic Thoughts Questionnaire-18 item- Multiple Sclerosis-Arabic (ATQ-18-MS-Ar) among multiple sclerosis patients in Syria.**

**Muaweah Ahmad Alsaleh<sup>1,3</sup>, Amani Kubitary<sup>2</sup>**

<sup>1</sup>Center for Research on Risks and Vulnerabilities at the University of Caen Normandy & CHU de Caen, France.

<sup>2</sup>PhD student-Laboratory of Mental Health, Faculty of Education, University of Damascus, Syrian Arab Republic.

<sup>3</sup>University of Aleppo, Syria

### **Abstract**

**Objective:** Our study has validated the Automatic thoughts Questionnaire among Syrian multiple sclerosis patients. The Automatic Thoughts Questionnaire-18 item-Multiple Sclerosis-Arabic has included both the version of the 8-item Negative Automatic Thoughts Questionnaire and 10 positive items from the Automatic Thoughts Questionnaire-Revised.

**Method:** A total of 65 Syrian multiple sclerosis patients have been recruited in Damascus Hospital and Ibn Alnafees Hospital for validation of Automatic Thought Questionnaire-18 item-Multiple Sclerosis-Arabic.

**Results:** The internal consistency reliability ( $\alpha > 0.70$ ) and the split-half reliability were very good. Exploratory factor analysis (accounted for 72.28% of total variance) indicated 3 factors for the Automatic Thought Questionnaire-18 item-Multiple Sclerosis-Arabic: negative thought, positive thought (emotional), and positive thought (cognitive). The Negative Automatic Thoughts Questionnaire was positively related to depression, stress and anxiety ( $p < 0.01$ ), and negatively related to self-esteem and life satisfaction ( $p < 0.01$ ). The Positive Automatic Thoughts Questionnaire subscale score was negatively related to depression, stress and anxiety ( $p < 0.05$ ), and positively related to self-esteem and life satisfaction ( $p < 0.01$ ).

**Conclusion:** This study is the first research that examines the positive and negative cognitions in multiple sclerosis patients and confirms the internal and external validity of the Automatic Thought Questionnaire-18 item-Multiple Sclerosis-Arabic. This study suggested that an examination of both the positive and negative dimensions of thoughts contribute to understanding of the depression in multiple sclerosis.

**Clinical implications:** The validation of a tool (Automatic Thought Questionnaire-18 item-Multiple Sclerosis-Arabic) has three important clinical implications: deposit a valid research instrument in multiple sclerosis. Ability to evaluate two style of thinking, negative and positive and study their role in the initiation, maintenance and treatment of depression in multiple sclerosis patients. Automatic Thought Questionnaire-18 item-Multiple Sclerosis-Arabic minimizes the diagnostic false for evaluate the depression in multiple sclerosis patients. Examination of both the positive and negative dimensions of cognition might contribute to a greater understanding of the psychopathology of depression in multiple sclerosis.

**Keywords:** Negative and positive automatic thoughts, Validation, Reliability, Questionnaire, Depression, Multiple sclerosis patients, Cognitive behavioral therapy, Syria.

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### **Introduction**

Depression is frequent and is an important frequent determination of quality of life (QOF), in MS, which

impairs cognitive function seriously and can lead to suicide. Depression also damages relationships and can decrease the treatment adherence (as disease modifying

treatments). Fortunately, depression is a treatable disorder, but it is inadequately treated when it is well detected because depression is overlooked in neurological clinic which is very busy [1-3]. A challenge faced by the clinician is to determine whether certain symptoms relate to depression or to MS. The most widely cited example is fatigue and, in addition, insomnia, altered appetite and impaired memory and concentration. These symptoms can lead to diagnostic false such as diagnostic false positives. According to Feinstein, for minimize this diagnostic false can be assigned to the presence of cognition such as depressive beliefs [3,4].

According to Ingram et al. "cognition is the way we think about ourselves" [5]. Many theories on the psychopathology have explored the automatic thoughts [5,6]. Many theories have indicated the central role of cognition in the etiology, origin, maintenance and treatment of mental disorders and various psychopathologies including depression but also in the psychological well-being [7-13]. Kendall said: "the examination of both negative and positive cognitions could contribute to a better understanding of the health-pathology relationship" [14]. The Automatic Thoughts Questionnaire (ATQ: ATQ-30) [8] and Automatic Thoughts Questionnaire-Revised (ATQ-R) [15] was developed to evaluate negative and non-negative self-statements associated with the depression [16-19]. ATQ have not been validated for patients with multiple sclerosis.

## **Aim**

The validation of the ATQ-18-MS-Ar (Automatic Thoughts Questionnaire-18 item- Multiple Sclerosis-Arabic) that includes negative and positive automatic thought items is lacking in Arabic and Syrian communities. Our study has the intention to validate the short 8-items version of the ATQ-N (Negative Automatic Thoughts Questionnaire) and the positive subscale of the ATQ-R (Automatic Thoughts Questionnaire-Revised; 10-items positive) among Syrian MS patients. In addition, the factor validation of the ATQ-18-MS-Ar (Automatic Thought Questionnaire-18 item- Multiple Sclerosis-Arabic) in the Syria sample was examined by the EFA (exploratory factor analysis).

## **Methods**

### **Participants**

Our cross-sectional study was performed on Syrian MS patients. 65 patients from the Damascus Hospital and Ibn Alnafees Hospital participated in this study. The average age was 35.75 years (SD=12.35). There were 27 (67.5%) females and 13 (32.5 %) males. Participation in this study is completely voluntary and participants' responses are anonymous.

### **Inclusion and Exclusion Criteria**

Male and female patients between 18 and 56 years old were included in the study. All patients were Syrian. We've excluded patients with low educational level who can't read and understand the items. We also have

excluded patients with severe neurological incapacity who have cognition difficulties especially in memory and understanding capacity.

### **Determination of MS Diagnosis**

The patients, who are enrolled in the study, have a confirmed diagnosis of MS. Damascus Hospital and Ibn Alnafees Hospital use the reliable Criteria such as the MRI, VEP and CSF analysis, neural impulses exam, a neurological exam is performed and a thorough medical history is obtained prior to diagnosis.

### **Procedure and Measures**

The ATQ-18 [8,15] Beck Depression Inventory (BDI-II) [20-22], Satisfaction with Life Scale (SWLS) [23], Depression Anxiety Stress Scale-21 (DASS-21) [24-26], Rosenberg self-esteem scale (RSES) [27] were used in this study. Before completing the measures, participants were asked to read instructions about filling in the questionnaire. Then, patients have completed the scales. We have chosen the short 8-items of the ATQ-N because these 8-items have an internal consistency and the validity equivalent to the original ATQ-N (ATQ-30) [28]. We used the eight Arabic items from the English ATQ-30 [8] in this study. For assess positive thoughts (PT), our study also used and added the 10-items positive from the ATQ-R [15].

The translation process has been implemented to ATQ-10 [15] and ATQ-8 [8]. The 10-items positive and 8-items negative thoughts have been translated into Arabic using the traditional translation. We have done three original translations. The translation from English into Arabic was conducted by bilingual psychologists. The consensus referred to the synthesis of different translation versions. Then, the unified version had been assessed by three professors in mental health. After back- translating, the new version was commented with native English speaker's experts. Then, we've carried out the comments. This last version was only one version tested.

On a 5-point scale ranging from 1 ("not at all") to 5 ("all the time"), each one of the participant was assessed the rate of the frequency of each thought in the past week. For the scores, higher scores will indicate the greater positive and/or negative thoughts.

### **Statistical Analysis**

Before evaluation the psychometric properties of the ATQ-18-MS-Ar, this study used Cronbach's alpha coefficient and split-half reliability for testing the internal consistency reliability for ATQ-18-MS-Ar. Construct validity, discriminant validity and concurrent validity were estimated by correlating the ATQ-18-MS-Ar score with the BD-II, DASS-21, SWLS and RSES scores. In addition, our study has used the EFA (exploratory factor analysis) to test the factor validation of the ATQ-18-MS-Ar. Finally, three-steps hierarchical multiple regression analyses have been defined for each of the two dependent

variable (depression), while using the same three predictors for gender, positive thinking and negative thinking in this analysis. The statistical analysis was realized using R (programming language) software version. Our study used the level of significance that is  $p \leq 0.05$ .

**Ethical Review**

Our study received authorization from the Damascus Hospital and Ibn Alnafees Hospital, the neurology service. The Ethics and Research Committee of the Damascus Hospitals has accepted this study protocol. The informed consents have been approved from the participants after the study protocol and their objectives have been described. Human ethics committee approval protocol number was 5174/خ- 07/2015/10.

All the persons who take part in this study have given the informed consent.

**Results**

**Cronbach's Alpha (Internal Consistency Reliability)**

Reliability of the ATQ-18-MS-Ar was very good. Alpha was 0.87 for the Negative Thoughts (NT) and 0.85 for the Positive Thoughts (PT). Split-half was 0.86 for the NT; 0.90 for the PT; and 0.81 for the ATQ-18-MS-Ar total score.

Our results indicate that the ATQ-18-MS-Ar have high reliability.

**Convergent and Divergent Validity**

In Table 1, correlations between ATQ-18-MS-Ar and other scales are shown. The NT (negative thought) is negatively related to self-esteem ( $r=-0.39$ ,  $p<0.01$ ) and life satisfaction ( $r=-0.58$ ,  $p<0.001$ ), and positively related to depression ( $r=0.55$ ,  $p<0.001$ ;  $0.34$ ,  $p<0.01$ ), anxiety ( $r=0.50$ ,  $p<0.001$ ), and stress ( $r=0.50$ ,  $p<0.001$ ). The PT (positive thought) is negatively related to depression ( $r=-$

$0.32$ ,  $-0.35$ ,  $p<0.01$ ), anxiety ( $r=-0.19$ ,  $p<0.05$ ) and stress ( $r=-0.15$ ,  $p<0.05$ ) and positively related to self-esteem ( $r=0.36$ ,  $p<0.01$ ) and life satisfaction ( $r=0.56$ ,  $p<0.001$ ). These correlations are consistent with previous results, indicating that the ATQ-18-MS-Ar has very good construct validity (convergent and divergent validity).

Construct validity shows that the ATQ-18-MS-Ar has the ability to measure and evaluate specifically and only the thinking variable (negative thinking and positive thinking).

**Criterion Validity: Concurrent Validity**

The NT is significantly and positively related to BDI-II,  $\rho=0.57$ ,  $p<0.001$ , the DASS-21,  $\rho=0.53$ ,  $p<0.001$ . The PT is significantly and negatively related to BDI-II,  $\rho=-0.35$ ,  $p<0.05$ , the DASS-21,  $\rho=-0.28$ ,  $p<0.05$  (Table 2). Finally, the results show highly significant correlations between the ATQ-18-MS-Ar and other depression scales (BDI-II and DASS-21), indicating a good concurrent validity.

**Discriminant Validity**

It checks whether the questionnaires of PT and NT have the ability to distinguish between the two extremes of the population or different groups using the "t" test. The result of "t" for two average is very significant (PT:  $t=-12.873$ ,  $df=12$ ,  $p<0.00001$ ; NT:  $t=-6.6789$ ,  $df=12$ ,  $p<0.00001$ ). The questionnaire PT has a good ability to discriminate between subjects who have PT, subjects that do not have PT. Similarly to the PT, questionnaire NT show good ability to discriminate subjects who NT, subjects that do not have NT.

To measure the difference on the total scores of the ATQ-18-MS-Ar (PT and NT) between depressed and non-depressed patients, the BDI-II was used with the cut-off point of 10 to form two groups, which represent non-depressed and depressed patients. The depressed group

**Table 1. Correlation of the ATQ-18-MS-Ar with criterion measurements**

	PT	NT	BDI-II	D-DASS-21	A-DASS-21	S-DASS-21	RSES	SWLS
PT	1.00	-0.39**	-0.32**	-0.35**	-0.19*	-0.15*	0.36**	0.56***
NT		1.00	0.55***	0.34**	0.50***	0.50***	-0.39**	-0.58***
BDI-II			1.00	0.63**	0.29*	0.30**	-0.46**	-0.62***
D-DASS-21				1.00	0.38**	0.55***	-0.71***	-0.52***
A-DASS-21					1.00	0.78**	-0.32**	-0.24*
S-DASS-21						1.00	-0.29*	-0.36**
RSES							1.00	0.20*
SWLS								1.00

NT: Negative Thinking; PT: Positive Thinking. DASS-21: Depression Anxiety Stress Scales-21. D: Depression. A: Anxiety. S: Stress. BDI-II: Beck Depression Inventory-II. RSES: Rosenberg Self-Esteem Scale. SWLS: Satisfaction with Life Scale  
\* $p<0.05$ ; \*\* $p<0.01$ ; \*\*\* $p<0.001$

**Table 2: Spearman correlation**

Criterion variable	Spearman correlation ( $\rho$ ) ATQ-18-MS-Ar					
	NT	p-value	Confidence Interval	PT	p-value	Confidence Interval
Depression-BDI-II	0.57	0.0001	0.289–0.755	-0.35	0.02	-0.617–0.020
Depression-DASS-21	0.53	0.0004	0.217–0.767	-0.28	0.05	-0.567–0.036

Note:  $p<0.001$ \*\*\*;  $p<0.01$ \*\* ;  $p \leq 0.05$ \*

was composed by 27 subjects (20 females and 7 males).

For the BDI-II, differences between these two groups were tested regarding the total score of the ATQ-8 negative and ATQ-10 positive, to see if differences in these scores for depressed and non-depressed groups were found. The ATQ-8 ( $t=3.9095, p<0.001; M=21.777$  vs.  $M=11.153$ ), and ATQ-10 ( $t=-3.4738, p<0.001; M=31.444$  vs.  $M=39.769$ ) successfully discriminated depressed from non-depressed subjects. The depressed subjects obtained significantly higher scores in ATQ-8 and fewer score in ATQ-10 than non-depressed.

So, the questionnaire ATQ-18-MS-Ar (PT and NT) is valid within the MS population.

### Exploratory Factor Analysis (EFA)

The EFA is realized on the 18 items. The Kaiser-Meyer-Olkin is 0.61 and Bartlett's test is statistically significant,  $\chi^2=721.915, p<0.0001$ , which confirm the appropriateness for realization the EFA on ATQ-18-MS-Ar.

Parallel analysis has given three eigenvalues which are higher than 1 (6.49, 3.63 and 2.87, respectively) and which accounts for 72.28% of the total variance for the ATQ-18-MS-Ar.

According to Table 3, Factor 1 contains 8 items of negative thought; and was appointed "negative thought". Factor 2

contains 6 items related to the emotional component of positive thought and was appointed "(emotional-positive thought)"; and Factor 3 contains 4 items pertaining to the cognitive component of positive thought and was appointed "(cognitive-positive thought)."

### ATQ-18 as a Predictor of Depression and Depressive Symptomatology

Kendal et al. indicate that adding the score of positive self-statements to the score of negative automatic thoughts, evidenced increasing predictiveness of depression, supporting that depressive mood is linked not only to the presence of negative automatic thoughts but also to the absence of positive markers [15].

A hierarchical multiple regression is computed to investigate if addition of the positive items of this questionnaire (ATQ-10 positive items) to the total of the negative items of the ATQ-18-MS-Ar (ATQ-8 negative items), led to a significant increase in the variance accounted for when using a measure of depression (BDI) as a dependent variable.

Results suggested that addition of the score for the positive items to the model led to a significant increase in the ability to predict depression (ATQ-negative (Model 2),  $R^2=0.31, F(36)=5.68, p<0.01$ ; (Model 3),  $R^2=0.33, F(35)=4.265, p<0.01$ ) (Table 4).

Gender and age accounted for 0.9% of variability in the dependent variable (BDI). When negative items of the ATQ-18 were added to the model in Model 2, the model accounted for 31% of the variance and when adding the positive items composing factor 2 and 3, the percentage of variability accounted for went up significantly from 31% to 33%. Thus, by controlling sex and age, results indicate that the ATQ-negative items predict depression and addition of the score for positive items leads to a significant increase in the prediction of depression (BDI).

### Discussion

The main aim of this study was to study the Arabic version

Table 3: Results of the EFA of the ATQ-18-MS-Ar

PT and NT items	Factor 1: Negative thought	Factor 2: Positive thought (emotional)	Factor 3: Positive thought (cognitive)
q1		0.82	
q2		0.77	
q3		0.73	
q4		0.85	
q5		0.89	
q10		0.76	
q11	0.58		
q13	0.67		
q14	0.67		
q15	0.92		
q17	0.82		
q18	0.87		
q6			0.74
q7			0.83
q8			0.66
q9			0.83
q12	0.32		
q16	0.38		
Eigenvalues	6.49	3.63	2.87
Variance	36.10%	20.20%	15.97%
Alpha	0.87	0.92	0.83

Note. EFA=Exploratory Factor Analysis; ATQ=Automatic Thought Questionnaire. Extraction Method: Principal Axis Factoring. Rotation Method: VARIMAX with Kaiser Normalization  
q: question

Table 4: Model summary of the three-steps hierarchical multiple regression

Predictors	B	R <sup>2</sup>	F	Beta	p
<b>Model 1</b>		0.009	0.169		0.844
Age	0.061			0.092	
Sex	1.663			0.096	
<b>Model 2</b>		<b>0.311</b>	5.68		<b>0.002*</b>
Age	0.085			0.129	
Sex	0.222			0.012	
ATQ-negative	0.492			0.568	
<b>Model 3</b>		<b>0.331</b>	4.265		<b>0.006*</b>
Age	0.064			0.097	
Sex	0.273			0.015	
ATQ-negative	0.456			0.527	
ATQ-positive	-0.095			-0.094	

\*p<0.01

of the ATQ in a sample of 65 MS patients and present its psychometric properties. The overall MS prevalence in Arab countries has been increased in recent years [29], with a greater need to validate psychological instruments, such as ATQ, which can be useful in clinical practice, especially for substitute conventional measurement of depressive symptoms in MS patients. Furthermore, this instrument had never been studied in MS patients in Syria. In this study, we also explore the link between cognitions evaluated by the ATQ-18-MS-Ar and depressive symptomatology.

This study provided the evidences for the psychometric properties of the ATQ-18-MS-Ar in a sample of MS patients in Damascus, Syria. 18 items were retained for the Syrian ATQ-18-MS-Ar after an item analysis was conducted by combining the ATQ-8 (Automatic Thoughts Questionnaire-8 items Negative) and the ATQ-RP (Automatic Thoughts Questionnaire-Revised-10 items Positive). The 18-item ATQ-MS-Ar has demonstrated a satisfactory reliability and good validity.

The ATQ-18-MS-Ar shows a good reliability, such as various studies [4,16,17]. These results indicate that ATQ-18-MS-Ar measures the same construct (PT and NT). The validity of the Syrian ATQ-18-MS-Ar has been demonstrated by its good construct validity (convergent and divergent validity). The ATQ-8 items (Factor 1) was negatively related to self-esteem and life satisfaction and positively related to depression, anxiety and stress. Our results are consistent with Burgess, Haaga on ATQ-30; Netemeyer et al. on ATQ-8 and Alsaleh on ATQ-18-Fr (Thoughts Questionnaire-18 questions- French) [19,28,30].

Similarly, consistent with Burgess, Haaga in 1994 on ATQ-RP and PATQ, and Alsaleh in 2016 on ATQ-18-Fr, the ATQ-10 items (Factors 2 and Factors 3) is positively associated with self-esteem and life satisfaction, and a negatively associated with depression, anxiety and stress. Thus, ATQ-18-MS-Ar is a reliable and valid instrument for evaluation positive and negative automatic thoughts in a Syrian population, as MS patients [4,30].

Our study is the first to validate the ATQ in a MS patient's sample. EFA indicates three factors for ATQ-18-MS-Ar with 72.28% cumulative percentage for explaining variance in this ATQ-18-MS-Ar. It is meaningful and interpretable among Arabic and Syrian communities.

Overall, these results of our study indicate that the ATQ-18-MS-Ar can be completed by MS patients and has good psychometric characteristics.

### Limitations

Our study was based on the number of participants which is not high, so further researches on the ATQ-18-MS-Ar would be worthwhile. Furthermore, there were difficulties in extending both the number and the age range of the sample because of the bad circumstances due to war. Some

of the important data such as EDDS (Expanded Disability Status Scale) and the course of MS were missed. Further studies will be conducted in other MS samples with larger size.

### Conclusion

The purpose of the research that we conducted was to present a validated Arabic version of a questionnaire of PT and NT (ATQ-18-MS-Ar) adapted to the MS population.

The evaluation of psychometric properties shows that the transverse properties of PT and NT are reliable. The reliability of the questionnaire is excellent, the majority of the variables used for validity are good, the results of this study suggest that the ATQ-18-MS-Ar is a valid assessment tool and may be useful in assessing patients. The ATQ-18-MS-Ar is a reliable and valid tool for evaluation automatic thought for sick population, as MS patients, because ATQ-18-MS-Ar has high internal consistency and good validity. Exploratory factor analysis indicates and confirms factor validity for this scale.

In conclusion, this study is the first research that confirms the internal and external validity of the questionnaire and attests to its relevance in Arabic language. The application of ATQ-18-MS-Ar, among MS, showed its quality and usefulness to measure positive and negative thoughts. ATQ-18-MS-Ar appears as a reliable and valid instrument.

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**Correspondence to:**

Muaweah Ahmad Alsaleh,  
PhD, Neuropsychologist, Psychotherapist,  
Center for Research on Risks and Vulnerabilities,  
University of Caen Normandy & CHU de Caen,  
France.  
E-mail: moaouiya87@yahoo.com