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## Psychometric properties of Arabic version of online test anxiety inventory (A-OTAI) among Saudi nursing students

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Nearly all students experience exam anxiety, however the degree of anxiety varies from one student to the next. There were many tools used to measure the levels of test anxiety for the conventional exams, almost, these tools were valid and reliable in English form. Therefore, it is crucial to have Arabic-language tool that accurately quantify Online Test Anxiety. This study was conducted to assess the validity, reliability, and psychometric properties of A-OTAI. A descriptive cross-sectional design was used to investigate the psychometric properties of the Arabic version of online test anxiety inventory. 142 nursing students invited through convenience sample. Data from participants were mainly collected through an online test anxiety scale with 18 items that was translated into Arabic. About 50% of participants reported that they almost always seem to become mentally confused and agitated when taking difficult online tests. The findings of this study showed a significant difference between students' class levels and score of test anxiety, that mean the anxiety level will reduce with increase in higher level of academic. Three strong factors emerged from the results of exploratory factor analysis F1; psychological, F2; online and F3; physiological component. All fit indices of confirmatory factor analysis indicate that the model is well-fitting. The Cronbach's Alfa reliability of Arabic version of the 18-item scale is 0.914. Consequently, the Arabic version of Online Test Anxiety Inventory has a high degree of validity and reliability.

**Keywords:** Arabic version, test anxiety, online exam, psychometric, nursing students.

### INTRODUCTION

Online exam anxiety affects almost every student; however, the degree of anxiety varies from student to student. At the level of the globe, almost universities and colleges were shifted to online education and remote examination during COVID-19 pandemic (Alsaady et al. 2020 and Jaap et al.2021). This emergency shifting associated with some concerns especially in developing countries such as sudden power off the computer, weak internet signals and other fears. These troubles put some students at risk for online exam anxiety. As cited in the literature there are many definitions of exam anxiety, these definitions can be concluded as test anxiety is referred to phenomenological, physiological, and psychological reactions associated with physical, emotional, behavioural, and cognitive responses. (Stankovska et al.2018 and Donati et al.2020). Many authors mentioned that exam anxiety is the greatest form of anxiety among higher academic students in general and nursing students in specific. (Poorman et al. 2019; Donati et al. and Cornine 2020). The prevalence of test anxiety is a relatively varied, what was found in the literature estimate the incidences were between 14% and 50% of

faculty students. (Donati et al.2020). Test anxiety is also varied in its severity some researchers estimated that 15 to 22% of students have high levels of test anxiety (Doherty et al. 2017 and von der Embse et al. 2018). In comparison to other types of anxiety, (Arora et al. 2021) discovered that online exam anxiety was higher than COVID-19 induced anxiety. The exam anxiety has great effects of students' academic performance and achievement. (Doherty et al.2017; Son et al.2019; Cornine 2020 and Brodersen 2021). Up to date, there is no present measurement available to determine the level of test anxiety in Arabic language. Therefore, this study was conducted to assess the validity, reliability, and psychometric properties of Saudi version of online test anxiety inventory (A-OTAI).

### MATERIALS AND METHODS

#### Methodology Design

A descriptive cross-sectional design was used to investigate the psychometric properties of the Arabic version of online test anxiety inventory.

**Settings**

The study was conducted among Saudi nursing students who studying in governmental or private universities or colleges and exposed to online tests or examinations.

**Sampling**

The study used non-probability sampling, specifically convenience sampling. The reasons for selection this sample technique is the simplicity of sampling, the ease of researcher and data collection can be facilitated in short duration of time. Furthermore, the economical to implement alternative sampling methods.

**Measurement**

In this study, the researcher translated the online test anxiety inventory (OTAI) which was created by (Alibak at el.2019) to Arabic language using the forward/backward translation procedure. The OTAI scale consists of 18 items classified into three subscales. Psychological six items 0.90 internal consistency, physiological five items, 0.84 internal consistency and online seven items with 0.89 internal consistencies. The overall internal consistency of OTAI scale is 0.91(alpha Cronbach) and 0.83 concurrent validity. The OTAI is four points Likert scale range from zero (almost never), one (sometimes), two (most of the time) to three (always).The scale's overall score ranging between 0 and 54. Higher test anxiety is indicated by higher scores.

**Data CollectionProcedure:**

Data collection was commenced upon ethics clearance from Taif university research ethics committee has been obtained. A pilot test was used to assess the applicability of the A-OTAI, the data collected from pilot study was not included in the results. The final version of A-OTAI was designed electronically in Google forms and

the link was shared in social media to enhance nursing students` participation.

**Data analysis**

The collected analysed by SPSS program version 27.0. Factor analyses were employed to assess the validity of the A-OTAI scale, particularly Confirmatory Factor Analysis (CFA) was used to test the structure of the factors of the scale. AMOS version 24 software was used in the designation of this structure. The following indices were used to check the model's fit. The Chi-square (X<sup>2</sup> /df), the comparative fit index (CFI), and the root mean square error of approximation (RMSEA). Cronbach's alpha and Guttman Split-Half Coefficient values were used to determine the reliability for A-OTAI scale and subscales.

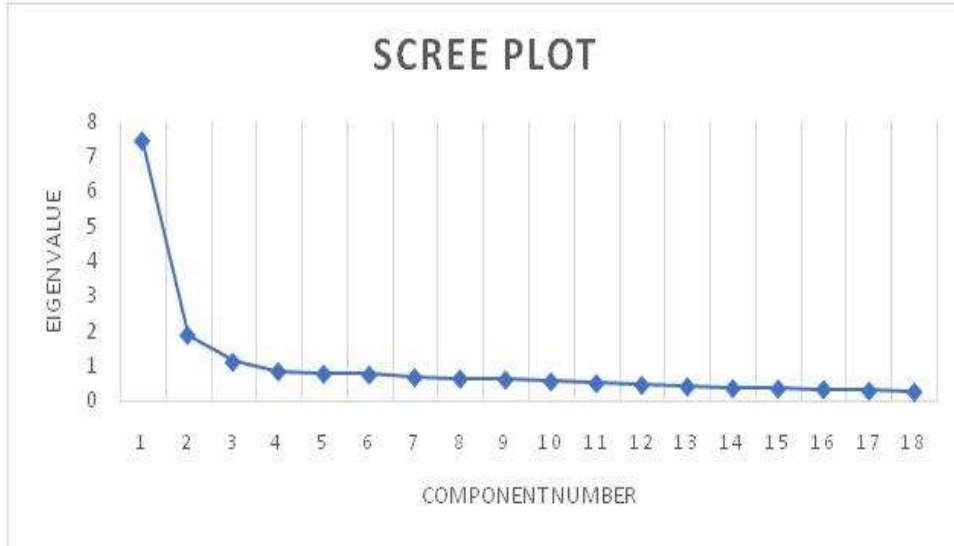
**Ethical Consideration**

An ethical approval was obtained from the Research Ethics Committee of Taif University. After being provided details on the purpose of the study, participants were informed, and data was taken from the target population. They were advised that participation in the study is entirely optional therefore they are free to leave at any time with no repercussions. Furthermore, they were informed that their data is coded and the information they provide is kept anonymous.

**RESULTS**

**Validity**

A tool is said to be valid if it measures exactly what it claims to measure. (Souza at el.2017).To assess the factorial validity of the 18 items of A-OTAI scale, an exploratory factor analysis (EFA) and orthogonal Varimax rotations technique were used. After analysis, 18 items were distributed under 3 factors. As shown in figure1.



**Figure 1: The three components shown Scree plot.**

According to this figure, the first three components experienced a significant decrease. They made a significant contribution to variance explanation.

In order to determine whether this sample was suitable for factor analysis, the Kaiser-Meyer-Olkin (KMO) test was performed. In this study, the KMO value was 0.914, signifying that each factor predicted enough items with a significant Barlett's test ( $\chi^2 = 1201.294, p = 0.01$ ).

As shown in table 1, the result of factor analysis reveals three strong factors. F1; psychological, F2; *online* and F3; physiological component. The Eigen value of F1, F2, and F3 are 4.038, 3.565, and 2.798 respectively and the total variance of these three factors is 57.78%. The highest mean of these three factors was in item number 9, 4, & 1 respectively and the lowest standard deviation was

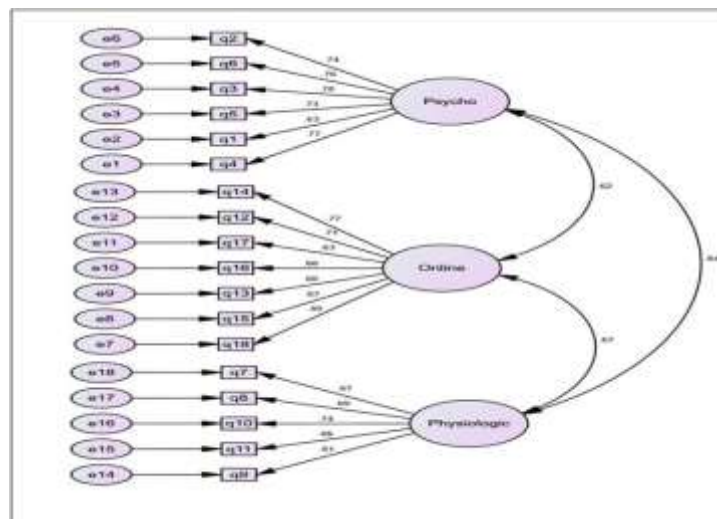
in item number 17.

**Confirmatory factor analysis (CFA)**

CFA was conducted to ensure that the items fit the three-component model and, as a result, to determine the construct validity of the A-OTAI scale. According to (Abbasi and Ghosh 2020), a model is deemed to be well-fitting if the  $\chi^2 / df$  is 2. The results of the confirmatory factor analysis indicated that the exact fit assumption has been granted as the  $\chi^2 / df$  ratio is 1.122 and the p value is 0.022. The root means square error of approximation (RMSEA). value is 0.042. Goodness of fit index (GFI) value is 0.895, Adjusted goodness of fit index (AGFI) value is 0.864, Normal fit index (NFI) value is 0.867, and Comparative fit index (CFI) value is 0.890.

**Table 1: The loading of the 18 items after varimax rotation and extracted communalities and with means and standard deviation.**

Items	Factor 1 Psychological	Factor 2 Online	Factor 3 Physiological	Mean	SD
q2	0.753			2.52	1.500
q6	0.725			2.85	1.541
q3	0.703			2.07	1.638
q5	0.698			2.87	1.398
q1	0.664			2.87	1.369
q4	0.655			2.91	1.372
q14		0.758		1.27	1.554
q12		0.687		1.11	1.480
q17		0.687		.81	1.362
q16		0.673		1.30	1.654
q13		0.661		1.26	1.596
q15		0.632		1.77	1.611
q18		0.541		.87	1.393
q7			0.684	1.75	1.627
q8			0.652	1.65	1.676
q10			0.629	2.32	1.556
q11			0.535	2.23	1.636
q9			0.535	2.99	1.518



**Figure 2: CFA; the model of the three -factors of the A-OTAI.**

**Table2: Internal consistency of A-OTAI scale and subscales:**

<b>Correlation</b>	<b>Factor 1Psychological -6items</b>	<b>Factor 2Online-7items</b>	<b>Factor 3Physiological -5item</b>
<b>Cronbach's <math>\alpha</math></b>	0.877	0.839	0.805
	0.914		
<b>Split-Half</b>	0.806		

All fit indices show that the model fits well. As a result, the A-OTAI scale model provides an excellent fit. Figure 2 depicts a confirmatory factorial analysis with standardized results.

The researcher employed split-half coefficient and Cronbach's alpha to assess the A-OTAI's reliability. The 18-item scale has a reliability of 0.914 using the Cronbach's Alfa technique and 0.806 using the split-half method. Consequently, the Arabic version of Online Test Anxiety Inventory has a high degree of reliability. Table 2 explained more details.

## DISCUSSION

The purpose of this study was to evaluate the validity, reliability, and psychometric features of the Arabic version of the online test anxiety inventory (A-OTAI). The results of the current study indicated that the A-OTAI is valid and reliable. As compared to Alibak's OATI, the internal consistency of translated A-OTAI scale in this study was 0.91 same as Alibak's 18-Items. However, the reliability of this study's subscales was different from that of Alibak's subscale; this discrepancy could be the result of the sample size's variability. More addition, there result of this study reveals adequate structure and model fit in confirmatory factor analysis (CFA) compared to original scale developed by (Alibak's et al. 2019). In this study, the CFA shows *CFI*; 0. 895, *AGFI*; 0.864, *RMSEA*; 0.042, and a statistically significant chi-square  $\chi^2/df$ ; 1.122 with p value of 0.022 while in Alibak's study these indices were 0.942, 0.828, 0.069 and  $\chi^2/df$  1.738 respectively. All model fits indices reveal significant differences in this current studies. (Cangur and Ercan.2015) stated that RMSEA values less than 0.05 propose a convergence fit to the model's examined data. Many studies have been conducted on the effects of test anxiety on academic achievement, mental health, and physical health of students. In this regard, (Putwain et al.2020) were cited that test anxiety was associated with a higher risk of mental health issues and had a detrimental impact on academic achievement and school climate. In this study, around 50% of participants reported that they almost always seem to become mentally confused and agitated when taking difficult online tests. The results of this study and other studies assessing the effect of test anxiety on academic achievement are in agreement. For example, (Fitzgerald et al.2021) and Sung et al.2016) reported that test anxiety will lead to students' distraction or induces irrelevant thoughts thus resulting in worse performance.

However, 55.7%. of nurse students participated in this study reported that exams/tests make they feel ineffectiveness about their performance. According to a literature review study by (Hamzah et al. 2018), there is a link between academic achievement (grade point average GPA) and test anxiety. They found that students with higher GPAs have more anxiety predictors than those with lower GPAs. This can be interpreted that students who have a high GPA may have eustress towards tests compare to low GPA students. The findings of this study show a significant difference between students' class levels and score of test anxiety p.value 0.008, that mean the anxiety level will reduce with increase in higher level of academic, this is coincide with (Dawood et al. 2016) and contradicts with (Mastour et al.2021), they found no significant relationship between students' experiences of exam anxiety in pre-clinical and basic sciences students and students. Regarding comparison between online and conventional exam, participants of the present study reported the online test is less stressful than traditional one. These findings are in line with the result of (Potu et al. 2022) in which they cited that their responders reported lower tension of online test compared to traditional. This can be explained by the fact that today's learners are more accustomed to technology than their predecessors.

## CONCLUSION

This study produced a valid and reliable Arabic version of online test anxiety with 18 items, resulting in three components (A-OTAI), and verifying the instrument's multidimensionality (CFA), These findings corroborate (Alibak et al.2019) suggestion to assess the original online test anxiety inventory scale's validity and reliability in a variety of academic settings, cultures, and ages. Moreover, about 50% of nursing students reported that they almost always seem to become mentally confused and agitated when taking difficult online tests.

## CONFLICT OF INTEREST

The authors declared that the present study was performed in absence of any conflict of interest.

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