



Standardization of the Korean Version of the Acceptance and Action Questionnaire for Obsessions and Compulsions in University Students and Patients With Obsessive–Compulsive Disorder

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Objective The Acceptance and Action Questionnaire for Obsessions and Compulsions (AAQ-OC) is a version of the Acceptance and Action Questionnaire (AAQ) that specifically measures unwanted intrusive thoughts and responses (e.g., experiential avoidance) to them. This study aimed to investigate the reliability and validity of the Korean version of the AAQ-OC in clinical and nonclinical Korean samples.

Methods In this study, 561 university students and 121 patients with obsessive–compulsive disorder (OCD) completed the AAQ-OC and several other psychological scales. Descriptive, correlation, and exploratory and confirmatory factor analyses as well as group comparisons were conducted.

Results The results of the exploratory and confirmatory factor analyses indicated a two-factor structure that best fits the data in the university sample: Factors 1 and 2 matched the original Valued Action and Willingness subscales, respectively. The reliability analyses revealed that the AAQ-OC and its factors had excellent internal consistencies. As regards the concurrent validity, the AAQ-OC and its factors had a positive correlation with the AAQ-II and Cognitive Fusion Questionnaire. Compared with the university students, the OCD patients had higher AAQ-OC scores, and their obsessive–compulsive symptoms, particularly the two symptom dimensions of responsibility for harm and mistakes and unacceptable thoughts, were significantly associated with the AAQ-OC and two subscales.

Conclusion The findings of this study confirm the reliability and validity of the Korean version of the AAQ-OC.

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Keywords Psychological flexibility; Experiential avoidance; Cognitive fusion; Obsessive–compulsive disorder; Psychometric.

INTRODUCTION

Obsessive–compulsive disorder (OCD) is characterized by obsessions (intrusive thoughts, images, impulses experienced as unbearable distress) and compulsions (repetitive overt or mental rituals performed to reduce or prevent anxiety arising from obsessions).¹ Exposure and response prevention (ERP) is currently considered as the most effective psychological treat-

ment for OCD.^{2,3} In recent years, acceptance and commitment therapy (ACT) has emerged as a primary therapy or an augmentation approach to enhance the efficacy of ERP.^{4,6}

With the use of ACT for the treatment of OCD, experiential avoidance (EA), one of the six core processes of psychopathology from the perspective of ACT,⁷ has also been conceptualized in the OCD context.^{6,8-10} For example, a person with OCD who has an intrusive thought that he is likely to harm his daughter with a knife may take the knife away in front of him, not only because the knife is dangerous but also to get rid of his unwanted inner experiences.⁹ Contrary to behavioral avoidance of cognitive-behavioral therapy, which focuses on the avoidance of external fear trigger, EA emphasizes the tendency to avoid inner experiences, such as unpleasant thoughts, emotions, memories, and physical sensations.¹¹ In addition, these time-consuming efforts to avoid invariably lead to un-

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workable actions inconsistent with one's values and interfere life functioning.¹² In this vein, early studies in this field demonstrated that targeting EA may have implications for OCD treatment.^{6,10,13} Empirically, persons with higher levels of obsessive-compulsive (OC) symptoms engage in more EA than those with lower levels,¹⁴ and ACT for patients with OCD lessens EA.¹⁵ Furthermore, in a comparison between EA and distress tolerance, unwillingness to endure (i.e., EA), rather than simple incapacity to tolerate unpleasant internal experiences, best predicts obsessional symptoms.¹³ However, the contribution of EA to OC symptom prediction was found to be less significant. In fact, EA did not significantly contribute to the prediction of OC symptom dimensions over and above obsessive beliefs.¹⁴ Researchers pointed out that the reason for these results is that the EA construct, measured by the Acceptance and Action Questionnaire-II (AAQ-II),¹⁶ is too general (e.g., emotions cause problems in my life) to predict OC symptoms and is limited in capturing more specific and diverse obsessive beliefs.¹²

This limitation and the need for domain-specific measures have been generally recognized across different psychiatric disorders. Diverse disorder-specific versions of the AAQ have been developed, for example, for chronic pain,¹⁷ psychotic symptoms,¹⁸ body image concerns,¹⁹ and hoarding.²⁰ Furthermore, Benoy et al.²¹ observed greater treatment sensitivity of alternative versions with greater wording and context specificity compared with the AAQ-II. A recent review demonstrated that context-specific measures performed better than a generic measure of psychological flexibility in terms of incremental validity and treatment sensitivity.²²

In this context, Jacoby et al.¹² developed an AAQ version specific to OC symptoms, referred to as the Acceptance and Action Questionnaire for Obsessions and Compulsions (AAQ-OC). The AAQ-OC specifically measures unwanted intrusive thoughts and responses (i.e., EA) to them. Notably, a definition of intrusive thoughts and their examples are provided at the beginning of the measure. This measure comprises 13 items with two factors, namely, Valued Action and Willingness subscales, and generally exhibits good psychometric properties. In particular, the AAQ-OC demonstrates incremental validity in predicting two symptom dimensions of responsibility for harm and unacceptable thoughts. To the best of our knowledge, the Persian version of the AAQ-OC is the only published translation.²³ However, both studies reported the results based on the nonclinical university students. Despite the specificity of the questionnaire to OCD, the lack of study on how patients with OCD may respond to this questionnaire can be an obstacle to the increasing use of the AAQ-OC.

Therefore, this study aimed to evaluate the psychometric properties of the Korean version of the AAQ-OC in nonclin-

ical (university medical students) and clinical (OCD patients) samples. In this study, the factor structure, reliability, as well as concurrent and criterion validities of the Korean version of the AAQ-OC were investigated.

METHODS

Participants

This study recruited undergraduate medical students at the Kyungpook National University School of Medicine as a non-clinical sample from 2021 to 2023. This research coincided with the biannual mental health evaluation conducted at the beginning of each semester across all grades. Before the evaluations, the procedure was explained, and consent was obtained from the students. All assessments were conducted using online self-reported questionnaires, and no compensation was provided to the participants. Data received from the school included demographic information such as sex, age, school grade, responses to medical and psychiatric history questions, and various psychological measures. Specifically, psychological measures such as the Beck Depression Inventory-II (BDI-II), Beck Anxiety Inventory (BAI), and Perceived Stress Scale (PSS) were obtained from regular mental health evaluation, whereas scales related to ACT were unique to this study. The collected data will be securely discarded one year after the completion of the research. Then, individuals with previous or current history of psychiatric or neurological diagnoses, severe medical illness, a BDI-II²⁴ score of 15 or above, or any significant inaccurate or incomplete data were excluded, leading to the removal of 53 individuals from the sample. The final nonclinical sample consisted of 561 medical students (414 male and 147 female; mean±standard deviation [SD] of age=21.2±2.4 years).

Patients with OCD aged 18–55 years were recruited through subway advertisements and psychiatric clinics at Kyungpook National University Hospital as a clinical sample from 2017 to 2023. Psychiatric interviews were conducted by two experienced psychiatrists for differential diagnoses according to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) criteria. Individuals were excluded if they had any current comorbid psychiatric diagnosis (e.g., major depressive disorder, alcohol use disorder, schizophrenia spectrum and other psychotic disorders, and intellectual disability), neurological disorders, or a history of head injury or medical illness with cognitive sequelae. The final clinical sample consisted of 121 patients (71 male and 50 female; mean age±SD=27.2±7.6 years).

All the participants provided written informed consent after being briefed about the research protocol. This study was approved by the Institutional Review Board of Kyungpook National University Hospital (2021-04-032).

Psychological measures

Psychological measures were commonly administered to both nonclinical and clinical samples, except the PSS and Dimensional Obsessive–Compulsive Scale (DOCS), which were administered only to the students and patients, respectively.

AAQ-OC

The AAQ-OC¹² measures EA specific to OC symptoms. Individual items are scored on a 7-point Likert scale ranging from always true (7) to never true (1), with higher scores indicating greater EA (i.e., an elevated level of symptom severity). The AAQ-OC exhibits good psychometric properties and consists of 13 items with two factors: Factor 1 (Valued Action: items 1, 3, 4, 6, 8, 9, 10, and 12) indicates the extent to which the presence of intrusive thoughts impairs valued action, whereas Factor 2 (Willingness: items 2, 5, 7, 11, and 13) indicates the degree to which people with OCD are engaged in a struggle with (or accept less willingly) those intrusions. We translated the AAQ-OC with permission from the original authors. In the present sample, Cronbach's α for all items was 0.93.

AAQ-II

The AAQ-II²⁵ is an 8-item questionnaire for evaluating the psychological inflexibility and EA emphasized in ACT. Each item is rated on a 7-point Likert scale, with higher scores indicating a higher degree of psychological inflexibility.²⁶ This study used the Korean version of the AAQ-II, which had good internal consistency ($\alpha=0.85$).

Cognitive Fusion Questionnaire

The Cognitive Fusion Questionnaire (CFQ)²⁷ is a 7-item self-report measure for assessing excessive attachment to the literal content of thoughts. The items evaluate the tendency of thought entanglement and are rated on a scale from 1 (“never true”) to 7 (“always true”). Higher scores indicate higher levels of cognitive fusion. The CFQ has demonstrated excellent internal reliability ($\alpha=0.88$ to 0.93) in both clinical and nonclinical samples.^{27,28}

BDI-II

The BDI-II consists of 21 items that evaluate the cognitive, behavioral, affective, and somatic components of depression.²⁹ Each item is scored on a 4-point Likert scale over the past week. The BDI-II exhibits good psychometric properties. We used the validated Korean version of the BDI-II.²⁴

BAI

The BAI is a 21-item self-report measure that assesses the severity of anxiety symptoms.³⁰ It evaluates the degree of discomfort caused by the symptoms described in each question

over the past week using a 4-point Likert scale. This study used the Korean version of the BAI.³¹

PSS

The PSS assess the level of stress experienced over the past month.³² Its Korean version was used in the present study ($\alpha=0.82$),³³ which consisted of 10 items rated on a scale from 0 (“never”) to 4 (“very often”). The higher the total score, the greater the perceived level of stress.

DOCS

The DOCS³⁴ is a 20-item self-report measure that assesses the severity of the four most consistently replicated OC symptom dimensions: 1) contamination, 2) responsibility for harm and mistakes, 3) unacceptable thoughts, and 4) symmetry and ordering. Each item is rated on a 5-point Likert scale, yielding individual subscale scores ranging from 0 to 20 and a total score from 0 to 80. The DOCS exhibit excellent reliability in clinical samples, and the measure corresponds well with other measures of OC symptoms. The Korean version of the DOCS ($\alpha=0.91$ to 0.95) was used in this study.³⁵

Statistical analysis

The Kolmogorov–Smirnov test was used as the goodness-of-fit index to evaluate the normal distribution of the AAQ-OC. The test results indicated that the total and subscale scores of the AAQ-OC were not normally distributed. Thus, non-parametric statistics were used whenever appropriate. Chi-squared tests were employed for model comparisons, and independent samples t-test was adopted for group comparisons. The internal consistency of the AAQ-OC and its subscales was estimated using Cronbach's α . Regarding test-retest reliability, intraclass correlation coefficient (ICC) estimates were calculated based on a single measurement, absolute-agreement, and 2-way mixed-effects model using data from 37 patients who repeated the AAQ-OC at a 2-month interval. To assess the concurrent validity of the scale, Spearman's correlations between AAQ-OC, AAQ-II, and CFQ were analyzed. To assess its discriminant validity, on the other hand, Spearman's correlations between AAQ-OC, BDI-II, BAI, and PSS were analyzed. In addition, Spearman's correlations between AAQ-OC and DOCS were analyzed in OCD patients to examine the criterion validity. Furthermore, we conducted receiver operating characteristic (ROC) analyses, in which the association between sensitivity and specificity is used to estimate the area under the curve (AUC) to indicate how well scores on a measure distinguish between positive (i.e., a diagnosis of OCD) and negative (i.e., nonclinical students) cases and to establish cutoff scores with optimal diagnostic accuracy for distinguishing between OCD and nonclinical groups. The IBM SPSS Sta-

tistics software for Windows, version 23 (IBM Corp., Armonk, NY, USA), was used to conduct all statistical analyses, and statistical significance was set at $p < 0.05$.

Both explorative factor analysis (EFA) and confirmatory factor analysis (CFA) were conducted to examine the factor structure of the AAQ-OC. The nonclinical sample was divided into two subsamples using a random group generator with participant identifiers (1 to 561). According to the guideline by Anderson and Gerbing,³⁶ subsample 1 was used to conduct an EFA, whereas subsample 2 was used to cross-validate those factors. CFA was conducted using the AMOS 20 software (IBM Corp., Armonk, NY, USA) in the IBM SPSS.³⁷ The maximum likelihood (ML) estimation approach was employed to estimate the parameters. To evaluate the goodness of fit of the CFA models, multiple indices were chosen, including the chi-squared statistic, comparative fit index (CFI),³⁸ standardized root mean square residual (SRMR),³⁹ and root mean square error of approximation (RMSEA),⁴⁰ as each of these indices provides different information. As a general rule, CFI > 0.90 , SRMR < 0.10 , and RMSEA < 0.10 are considered adequate fit.⁴¹

RESULTS

Descriptive statistics

The mean \pm SD of the AAQ-OC total, Valued Action subscale, and Willingness subscale scores in the nonclinical sample were 32.8 \pm 12.2, 17.1 \pm 7.9, and 14.6 \pm 5.7, respectively (Table 1). No significant sex difference was observed in the AAQ-OC total and Willingness subscale scores ($t=1.26$, $df=559$, $p=0.209$; $t=-0.54$, $df=559$, $p=0.591$, respectively), whereas significant sex differences were observed in the Valued Action score (male=17.6 \pm 8.0, female=15.8 \pm 7.3; $t=2.46$, $df=278.8$, $p=0.015$). Age was not associated with the AAQ-OC total and its two subscales.

In the clinical sample, the mean \pm SD of the AAQ-OC total, Valued Action subscale, and Willingness subscale scores were 61.2 \pm 18.2, 38.3 \pm 12.1, and 22.9 \pm 7.0, respectively (Table 1). No significant sex difference and association with age were observed in any AAQ-OC scores.

The AAQ-OC total score showed positively and negatively skewed distributions in the nonclinical and OCD samples, respectively (Table 2). Compared with AAQ-II, AAQ-OC subscale was more negatively skewed in the OCD sample.

Factor structure

Both EFA and CFA were conducted to assess the factor structure of the AAQ-OC in the university student sample. Subsample 1 was used to conduct EFA ($n=279$; 211 male, 68 female; average \pm SD age=21.16 \pm 2.33 years), whereas subsample 2 was used to cross-validate those factors using CFA ($n=282$; 203 male, 79 female; average \pm SD age=21.23 \pm 2.55 years). No

Table 1. Demographic and psychological data

	Students (N=561)	OCD (N=121)	Statistics	
			χ^2/t	p
Male/Female	414/147	71/50	11.1	0.001
Age (yr)	21.2 \pm 2.4	27.2 \pm 7.6	8.6	<0.001
Psychological measures				
AAQ-OC, VA	17.1 \pm 7.9	38.3 \pm 12.1	18.5	<0.001
AAQ-OC, W	14.6 \pm 5.7	22.9 \pm 7.0	10.7	<0.001
AAQ-OC, Total	32.8 \pm 12.2	61.2 \pm 18.2	16.5	<0.001
AAQ-II	16.6 \pm 6.9	35.4 \pm 10.5	18.9	<0.001
CFQ	15.4 \pm 7.7	35.0 \pm 10.4	19.5	<0.001
BDI-II	3.1 \pm 3.5	14.8 \pm 11.3	11.3	<0.001
BAI	0.9 \pm 3.3	17.7 \pm 13.2	13.0	<0.001
PSS*	34.3 \pm 14.2	-	-	-
DOCS-C†	-	6.3 \pm 4.8	-	-
DOCS-R†	-	8.9 \pm 5.6	-	-
DOCS-U†	-	9.7 \pm 5.4	-	-
DOCS-S†	-	5.9 \pm 5.6	-	-
DOCS-Total†	-	30.7 \pm 13.7	-	-

Values are presented as number or mean \pm SD. *measured only for students; †measured only for patients; OCD, obsessive-compulsive disorder; AAQ-OC, Acceptance and Action Questionnaire for Obsessions and Compulsions; VA, Valued Action; W, Willingness; AAQ-II, Acceptance and Action Questionnaire-II; CFQ, Cognitive Fusion Questionnaire; BDI-II, Beck Depression Inventory-II; BAI, Beck Anxiety Inventory; PSS, Perceived Stress Scale; DOCS-C, Dimensional Obsessive-Compulsive Scale-Contamination; -R, -Responsibility for harm; -U, -Unacceptable thoughts; -S, -Symmetry

significant difference was observed between the two subsamples in terms of sex, age, scores of AAQ-OC and its two subscales, and all other psychological measures.

EFA was conducted on subsample 1 using ML estimation and oblique rotation (direct oblimin with delta=0). Inspection of the scree plot revealed a two-factor solution with eigenvalues of 5.84 and 2.25. The explained variances for these two factors were 44.9% and 17.3%, respectively. Factors 1 and 2 well matched the Valued Action and Willingness subscales, respectively (Table 3). However, item 3, originally loaded onto the Valued Action factor, was loaded onto the Willingness factor, whereas item 11, originally loaded onto the Willingness factor, was loaded onto the Valued Action subscale. The correlation between the two factors was 0.37. These results were consistent with those of the original study.¹²

EFA was also conducted on the OCD sample. Inspection of the scree plot revealed a two-factor solution with eigenvalues of 7.68 and 1.39. The explained variances for these two factors were 59.0% and 10.7%, respectively. Item 3 was loaded onto the original Valued Action factor, whereas item 11 was still loaded onto the Valued Action subscale. Compared with the

university student sample, the two-factor model seems to better explain the variances in the patients with OCD (Table 3).

CFA was conducted on subsample 2 to cross-validate the two-factor model. This confirmatory model was close to an acceptable fit with the data ($\chi^2(64)=530.2$, $p<0.001$; RMSEA=0.161; SRMR=0.139; CFI=0.742). To enhance goodness of fit, the CFA model was respecified with five correlated residuals

Table 2. Normality test of the AAQ-OC

	Skewness	Kurtosis	Kolmogorov-Smirnov*		
			Statistic	df	p
Students (N=561)					
AAQ-OC					
VA	0.97	0.90	0.12	561	<0.001
W	-0.05	-0.62	0.07	561	<0.001
Total	0.42	-0.04	0.06	561	<0.001
AAQ-II	0.91	0.28	0.12	561	<0.001
OCD (N=121)					
AAQ-OC					
VA	-0.56	-0.18	0.08	121	0.073
W	-0.38	-0.16	0.08	121	0.066
Total	-0.56	0.16	0.08	121	0.067
AAQ-II	-0.02	-0.56	0.06	121	0.200

*Lilliefors significance correction. AAQ-OC, Acceptance and Action Questionnaire for Obsessions and Compulsions; VA, Valued Action; W, Willingness; AAQ-II, Acceptance and Action Questionnaire-II; OCD, obsessive-compulsive disorder

based on the EFA. This revised CFA exhibited an improved fit with $\chi^2(59)=242.2$, $p<0.001$; RMSEA=0.105; SRMR=0.107; CFI=0.899 (Table 4).

On the other hand, based on the EFA in subsample 1 and the patient sample, the new model putting item 11 into factor 1 was also evaluated. The CFA results showed an acceptable fit with $\chi^2(64)=265.6$, $p<0.001$; RMSEA=0.106; SRMR=0.089; CFI=0.889. To enhance goodness of fit, the CFA model was respecified with three correlated residuals based on the EFA. This revised CFA exhibited an improved fit with $\chi^2(61)=197.2$, $p<0.001$; RMSEA=0.089; SRMR=0.088; CFI=0.925 (Table 4). However, consistent with the original study,¹² the remaining analyses use the same items to compose the Valued Action subscale (items 1, 3, 4, 6, 8, 9, 10, and 12) and Willingness subscale (items 2, 5, 7, 11, and 13).

Reliability

The AAQ-OC demonstrated a high internal consistency in both samples. In the nonclinical sample, Cronbach's α coefficients were 0.87, 0.86, and 0.72 for AAQ-OC total, Valued Action, and Willingness subscales, respectively. The item-total correlations varied from 0.46 (item 5 for AAQ-OC Willingness) to 0.66 (item 10 for AAQ-OC Valued Action).

For OCD patients, Cronbach's α coefficients were 0.94, 0.93, and 0.84 for AAQ-OC total, Valued Action, and Willingness subscales, respectively. The item-total correlations varied from 0.52 (item 13 for AAQ-OC Willingness) to 0.85 (item 8 for AAQ-OC Valued Action). The ICC of the total

Table 3. Factor structure of the AAQ-OC for the student subsample 1 (N=279) and OCD group (N=121)

Number	AAQ-OC item	Factor for students		Factor for OCD	
		Valued Action	Willingness	Valued Action	Willingness
Item 1	My intrusive thoughts determine the actions that I take.	0.75		0.79	
Item 2	I try hard to avoid having intrusive thoughts.		0.70		0.89
Item 3	Intrusive thoughts get in the way of my success.		0.71	0.85	
Item 4	It seems like other people are handling their unwanted intrusive thoughts better than I am.	0.53		0.54	
Item 5	I need to control my intrusive thoughts in order to handle my life well.		0.69		0.78
Item 6	I stop taking care of my responsibilities when I have intrusive thoughts.	0.64		0.78	
Item 7	If an unpleasant intrusive thought comes into my head, I try to get rid of it.		0.74		0.91
Item 8	Intrusive thoughts cause problems in my life.	0.55		0.92	
Item 9	I'm afraid of my intrusive thoughts.	0.89		0.87	
Item 10	My intrusive thoughts prevent me from leading a fulfilling life.	0.90		0.87	
Item 11	I can't stand having intrusive thoughts.	0.79		0.90	
Item 12	I worry about not being able to control my intrusive thoughts.	0.90		0.83	
Item 13	I try hard to control the physical reactions that I experience in my body when I am having intrusive thoughts (e.g., heart racing, sweating).		0.48		0.67

AAQ-OC, Acceptance and Action Questionnaire for Obsessions and Compulsions; OCD, obsessive-compulsive disorder

Table 4. Confirmatory factor analyses of the AAQ-OC

Model	Goodness of fit indices				
	χ^2 (df, p)	RMSEA	SRMR	CFI	NFI
Student subsample 2 (N=282)					
Two-factor, original	242.2 (59, <0.001)	0.105	0.107	0.899	0.872
Two-factor, revised*	197.2 (61, <0.001)	0.089	0.088	0.925	0.896
OCD (N=121)					
Two-factor, original	161.5 (59, <0.001)	0.119	0.091	0.915	0.876
Two-factor, revised*	164.2 (61, <0.001)	0.119	0.087	0.916	0.874

*based on the explorative factor analysis, the revised model putting item 11 into factor 1 was evaluated. AAQ-OC, Acceptance and Action Questionnaire for Obsessions and Compulsions; RMSEA, root mean square error of approximation; SRMR, standardized root mean square residual; CFI, comparative fit index; NFI, normed fit index; OCD, obsessive-compulsive disorder

scores of the AAQ-OC between test and retest with an 8-weeks interval, was 0.777 with a 95% confidence interval (CI) from 0.609 to 0.878 ($F=7.9, p<0.001$).

Concurrent validity

Regarding the convergent validity of the AAQ-OC factors, both the Valued Action and Willingness subscales were positively correlated with the AAQ-II and CFQ scores in both nonclinical and clinical samples (Table 5). As regards the discriminant validity of the AAQ-OC factors, although both factors were correlated with the BDI-II, BAI, and PSS scores, the associations were relatively weak ($0.12<r<0.31$) in the nonclinical sample. In the OCD group, although both factors were correlated with the BDI-II and BAI scores, the relationships were also weak ($0.33<r<0.59$), relative to their associations with AAQ-II and CFQ ($0.57<r<0.76$) (Table 5).

Criterion validity

The independent t-test indicated that the OCD patients had higher scores of AAQ-OC and its two subscales than the university students (Table 1). Correlational analyses were conducted in the OCD sample to assess the association between AAQ-OC and OCD symptoms. In the OCD patients, the Valued Action and Willingness subscale scores were significantly correlated with the DOCS total scores ($r=0.44, p<0.001$ and $r=0.37, p<0.001$, respectively). Among the DOCS subscales, the two symptom dimensions of responsibility for harm and mistakes and unacceptable thoughts were consistently associated with both the Valued Action and Willingness subscales (Table 6). Finally, we determined whether the AAQ-OC exhibited incremental validity in predicting OC symptoms above and beyond the AAQ-II (Table 7). Hierarchical multiple regression analyses revealed that the amount of variance in the DOCS unacceptable thought scores significantly increased ($\Delta R^2=0.025$ for Step 2, $p<0.001$) when the AAQ-OC was added in Step 2. However, no incremental validity was observed in the other

Table 5. Spearman’s correlations between the AAQ-OC and other measures for the student (N=561) and OCD (N=121) group

	1	2	3	4	5	6	7
1. AAQ-OC, VA		0.73	0.96	0.76	0.73	0.47	0.59
2. AAQ-OC, W	0.65		0.83	0.57	0.60	0.33	0.47
3. AAQ-OC, Total	0.93	0.88		0.72	0.73	0.44	0.59
4. AAQ-II	0.68	0.36	0.60		0.70	0.50	0.65
5. CFQ	0.65	0.30	0.55	0.67		0.43	0.55
6. BDI-II	0.31	0.08*	0.23	0.40	0.42		0.75
7. BAI	0.30	0.16	0.27	0.38	0.41	0.49	
8. PSS [‡]	0.29	0.12 [†]	0.24	0.30	0.33	0.25	0.23

Bottom-left off-diagonal correlations: medical students, top-right off-diagonal correlations: OCD patients. All p-values <0.001 except *($p=0.066$) and [†]($p=0.003$); [‡]measured only for students; AAQ-OC, Acceptance and Action Questionnaire for Obsessions and Compulsions; OCD, obsessive-compulsive disorder; VA, Valued Action; W, Willingness; AAQ-II, Acceptance and Action Questionnaire-II; CFQ, Cognitive Fusion Questionnaire; BDI-II, Beck Depression Inventory-II; BAI, Beck Anxiety Inventory; PSS, Perceived Stress Scale

three domains in the OCD sample.

Potential diagnostic value of the AAQ-OC

In distinguishing the OCD group from the nonclinical group, the ROC analysis of the AAQ-OC total score showed an AUC estimate of 0.90 (95% CI=0.86–0.94). Thus, the AAQ-OC total score appears to have great diagnostic accuracy. A cutoff score of 46 or higher provided the best balance between sensitivity and specificity, correctly classifying about 84% of OCD patients (sensitivity) and 84% of nonclinical participants (specificity).

DISCUSSION

This study examined the psychometric properties of the Korean version of the AAQ-OC, and the results showed its cross-cultural validity in Korean samples.

Table 6. Spearman's correlations between AAQ-OC and DOCS within the OCD group (N=121)

	DOCS-total	DOCS-C	DOCS-R	DOCS-U	DOCS-S
AAQ-OC, VA	0.44**	0.06	0.33**	0.52**	0.08
AAQ-OC, W	0.37**	-0.01	0.27*	0.40**	0.19
AAQ-OC, Total	0.44**	0.05	0.34**	0.51**	0.13

* $p < 0.01$; ** $p < 0.001$. AAQ-OC, Acceptance and Action Questionnaire for Obsessions and Compulsions, VA, Valued Action; W, Willingness; DOCS, Dimensional Obsessive-Compulsive Scale; -C, -Contamination; -R, -Responsibility for harm; -U, -Unacceptable thoughts; -S, -Symmetry

Table 7. Multiple regression analyses (enter method) for predicting four obsessive-compulsive dimensions within the OCD group (N=121)

Variable	Contamination [†]			Responsibility for harm [‡]			Unacceptable thoughts [§]			Symmetry		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Step 1												
Constant	3.307	1.679		-0.131	1.672		-1.110	1.471		3.306	1.649	
AAQ-II	0.069	0.045	0.137	0.228	0.045	0.419**	0.283	0.040	0.546**	0.052	0.045	0.107
Step 2												
Constant	3.764	1.792		-0.152	1.788		-2.224	1.544		2.508	1.751	
AAQ-II	0.107	0.068	0.213	0.226	0.068	0.416**	0.191	0.059	0.368**	-0.014	0.067	-0.028
AAQ-OC	-0.029	0.040	-0.101	0.001	0.040	0.004	0.072	0.034	0.238*	0.051	0.038	0.181

* $p < 0.05$; ** $p < 0.01$; [†] $R^2 = 0.019$ for Step 1, $\Delta R^2 = 0.004$ for Step 2 ($p = 0.13$, $p = 0.25$); [‡] $R^2 = 0.176$ for Step 1, $\Delta R^2 = 0$ for Step 2 ($p < 0.001$, $p < 0.001$); [§] $R^2 = 0.298$ for Step 1, $\Delta R^2 = 0.025$ for Step 2 ($p < 0.001$, $p < 0.001$); ^{||} $R^2 = 0.011$ for Step 1, $\Delta R^2 = 0.015$ for Step 2 ($p = 0.24$, $p = 0.21$)

The findings of this study suggest that the results from our nonclinical AAQ-OC data were consistent with those of previous studies that reported 36.9 ± 14.8 ¹² and 44.3 ± 13.5 ²³ as the average of the AAQ-OC total scores. Notably, the AAQ-OC subscale was more negatively skewed than the AAQ-II particularly in the OCD sample, indicating that more individuals were distributed in the high-score band in the AAQ-OC than the AAQ-II.

In this study, no significant sex difference and relationship with age were observed in any AAQ-OC scores, but there was a sex difference in the AAQ-OC-VA in the nonclinical sample. A previous study also reported no gender differences in the AAQ-OC.¹² However, previous studies did not report a relationship with age, which has no significance in this study.^{12,23}

Factor analyses revealed that a two-factor structure of the Korean version of the AAQ-OC provided an acceptable fit to the data in the nonclinical sample. The items loaded on each factor well matched the Valued Action and Willingness subscales in the original scale;¹² however, items 3 and 11 were loaded onto the other factor in this study. On the other hand, the OCD group exhibited better match with the two original subscales. That is, item 3 was loaded onto the Valued Action subscale, where this item was originally assigned. Moreover, the explained variances of two factors showed an additional 10% increase in the OCD group. However, item 11 was still loaded onto Valued Action, not the original Willingness factor. We assumed that item 11 is less clear, unlike other items in the

Valued Action subscale which have a more specific wording, i.e., including the word "avoid" or "control," and may be misinterpreted as measuring affective intolerance or general distress. In fact, the loading of this item (0.5) was also low in the Persian translation.²³

The results of the present study indicated that the Korean version of the AAQ-OC and its factors had excellent internal consistencies in both the nonclinical (0.72 to 0.87 of α s) and clinical (0.84 to 0.94 of α s) samples in comparison with the original (0.82 to 0.93 of α s) and Persian (0.73 to 0.91 of α s) versions.^{12,23}

As regards convergent validity, the AAQ-OC total score was highly correlated with AAQ-II and CFQ in the nonclinical sample. In terms of the two subscales, Valued Action showed higher correlation with AAQ-II than Willingness in the nonclinical samples. These findings were consistent with those in the original study. Furthermore, Soltani et al.²³ reported that the Willingness subscale was not correlated with AAQ-II and other depression, anxiety, and stress scores. These tendencies were also observed in the OCD group, although the correlation coefficients generally tended to be higher in the OCD than the student group.

In terms of discriminant validity, the scores of AAQ-OC and its two subscales exhibited weak correlations ($r_s < 0.31$) with general depression anxiety and stress, although their relationships were statistically significant partially due to the large sample size in the nonclinical sample. Consistent with

our findings, previous studies demonstrated that the AAQ-OC total score showed weak correlations with anxiety, depression, and stress in the nonclinical sample. In this study, the patients with OCD tended to represent moderate correlations between AAQ-OC and depression or anxiety. These findings suggest that AAQ-OC may be related not only to OC symptoms but to general negative affect (e.g., depression and anxiety).

The criterion validity of the AAQ-OC was examined by assessing the relationships between the AAQ-OC scores and OC symptoms in the OCD patients. First, the OCD patients had higher scores of AAQ-OC and its two subscales than the university students. Second, all AAQ-OC scores were significantly correlated with the DOCS total scores. This demonstrates the conceptual connection between AAQ and OC symptoms. Third, in terms of the specificity of the OC symptoms, the total and subscale scores of the AAQ-OC were correlated with only the two symptom dimensions in DOCS, namely, responsibility for harm and mistakes and unacceptable thoughts. Although the original study reported significant correlations between AAQ-OC and all four OC symptom dimensions, the correlation coefficients tended to be higher in the same two symptom dimensions (0.40 and 0.64 of *as*) than the other contamination and symmetry dimensions (0.23 to 0.28 of *as*) in the student sample. Wetterneck et al.⁴² suggested that EA, as measured by the AAQ-II, is more related to autogenous obsessions (i.e., thoughts of being responsible for harm to others) than reactive obsessions (i.e., thoughts of contamination). This connection is thought to be more pronounced in the AAQ-OC, which focuses on intrusive thoughts and was rated by patients with OCD in this study.

This study has some limitations that need to be acknowledged. First, considering that our subjects were medical students, caution is needed when generalizing our findings. Specifically, it should be noted that medical students as non-clinical participants were included solely on the basis of students' self-reports, without conducting direct interviews using diagnostic tools. It is also possible that medical students possess psychological characteristics themselves (e.g., higher level of OC symptoms) that differ from those of the general population.⁴³ Further research with a higher number of representative samples including various age groups is warranted. Another limitation is that the sample size of the OCD patients is insufficient to confirm the factor structures. Further studies with greater statistical power may be able to more affirmatively explore them. Finally, the translation process of the AAQ-OC has few limitations. It did not involve any back-translation or cross-verification. Although two experienced psychologists and one psychiatrist independently translated and arrived at a final version through consensus, there was no opportunity to compare preliminary test results or validate the readability of the translat-

ed Korean expression with a Korean language expert.

In conclusion, the AAQ-OC is considered a reliable and valid instrument for a Korean sample. Future studies are warranted to further investigate the efficacy of this measure in ACT.

Availability of Data and Material

The datasets generated or analyzed during the study are available from the corresponding author on reasonable request.

Conflicts of Interest

Seung Jae Lee, a contributing editor of the *Psychiatry Investigation*, was not involved in the editorial evaluation or decision to publish this article. All remaining authors have declared no conflicts of interest.

Author Contributions

Conceptualization: Seung Jae Lee. Data acquisition: all authors. Formal analysis: Seung Jae Lee. Funding acquisition: Seung Jae Lee. Writing—original draft: all authors. Writing—review & editing: Seung Jae Lee.

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