

Validation of the Factor Structure of Acceptance and Action Questionnaire-II (AAQ-II) in the Indian Context

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Abstract

Psychological inflexibility, is the rigid dominance of psychological reactions over chosen values, in guiding action. It as a faulty self-regulation process linked to poor mindfulness, avoidance of certain inner experiences, and a lack of clarity and commitment to personal ideals which results in mental health issues. The Acceptance and Action Questionnaire-II (AAQ-II) is a broadly used measure of psychological inflexibility. The present study aims to validate AAQ-II in Indian context and then evaluate its psychometric properties and factor structure. In this study, 7 items of the AAQ-II, developed by Bond et al. (2011), were translated in the Hindi language and adopted in the Indian context A total of 1000 Hindi speaking adults (18 above) from different Hindi speaking states were included in the study. An Exploratory Factor Analysis and a Confirmatory Factor Analysis were performed to test the factorial structure of the AAQ-II, and the internal consistency of the scale was studied. The result supported the scale's unidimensionality. The obtained Cronbach's alpha revealed satisfactory internal consistency with a value of 0.84. Based on the psychometric properties obtained, it is concluded that AAQ-II is a reliable measure to assess psychological inflexibility among adults in India.

Keywords: Acceptance and Action Questionnaire-II (AAQ-II), Indian Adaptation, Exploratory Factor Analysis, Confirmatory factor analysis

There is a large and growing Body of Evidence that the mental health and behavioural performances of an individual depends more on how they deal with their thoughts and feelings. If they have rigidity that is in-flexibility in their thoughts it results in several psychological issues and on the other hand if they are flexible in their thinking pattern it results in less distress.

Psychological flexibility is the ability to be aware of and accept one's actual state without attempting to avoid or manage negative events is referred to as psychological flexibility. (Mc Craacken & Vowels, 2007; Hayes et al., 2006)It is a broad term that encompasses a variety of dynamic processes that take place over time. This can be seen in how a person (1) adjusts to changing situational demands, (2) re-allocate mental energy (3) transforms viewpoint, and (4) manages conflicting interests, desires, and life domains. Rather than focusing on particular content

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(inside a person), psychological flexibility definitions must take into account recurring interactions between people and their environments. (Kashdan 2010)

Psychological flexibility is defined as the ability to monitor an individual's thoughts and feelings in a conscious, non-judgmental manner and, if necessary, adjust behaviour to attain objectives and values (Hayes et al., 1999).

It has been reported to be linked with variety of psychopathologies, including depression, anxiety, and generalised psychological distress (e.g., Bond et al., 2011; Masuda & Tully, 2011; Venta, Sharp, & Hart, 2012).

Psychological inflexibility (PI) is defined as a tendency to respond rigidly, avoiding unpleasant situations and resulting in significant life constraints. (Bond et al, 2011). PI is made up of a number of sub processes, one of which is experiential avoidance, in which people try to avoid, flee, or otherwise control the emergence of unpleasant thoughts and feelings, despite the negative consequences,(Hayes et al, 1996; Hayes 2006). It has been reported to be linked with variety of psychopathologies, including depression, anxiety, and generalised psychological distress (e.g., Bond et al., 2011; Masuda & Tully, 2011; Venta, Sharp, & Hart, 2012).

Acceptance and Action Questionnaire - is a tool for determining psychological flexibility and inflexibility of an individual. The notions of psychological flexibility and inflexibility are very similar to the categories of acceptance and experience avoidance respectively. These concepts have their roots Acceptance and commitment therapy (ACT) model. The foundation of ACT is the belief that the majority of issues that patients confront are caused by experiential avoidance (Hayes, Strosahl, Wilson, Bissett, Pistorello, Toormino, et al., 2004). In ACT model experiential avoidance is described as a person's unwillingness to stay in contact with undesirable personal experiences and instead take steps to avoid or alter them (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). In ACT Problematic thoughts and feelings, do not produce behavioural difficulties directly, but the person's avoidant reaction to those unpleasant experiences does. As a result, the model emphasizes on increase in psychological flexibility as it has been linked to adaptability and the ability to change viewpoints if necessary (Kashdan & Rottenberg, 2010). It has been reported to be linked to a variety of psychopathologies, including depression, anxiety, and generalised psychological distress (e.g., Bond et al., 2011; Masuda & Tully, 2011; Venta, Sharp, & Hart, 2012). There is substantial evidence that anxiety disorders are marked by avoidance of a range of experiences, whether it is bodily arousal in panic disorder (Zvolensky & Eifert, 2000), fear of powerful emotional impulses in generalised anxiety disorder (McLaughlin, Mennin, & Farach, 2007), or worries about expressing and revealing extreme emotional experiences. (Kashdan & Steger, 2006).

Flexibility, according to the ACT model, is all about being mindful of feelings and ideas that originate in the current moment without unnecessary resistance, and maintaining or adjusting action to pursue key values and objectives. A meta-analysis of 32 studies found that psychological flexibility was correlated 0.42 with outcomes ranging from job performance and satisfaction, being operationalized with the Acceptance and Action Questionnaire (Hayes, Follette, & Linehan, 2004). Greater flexibility in the early stages of treatment was linked to decreased distress and

impairment in later sessions in a clinical trial of social anxiety disorder (Dalrymple & Herbert, 2007).

Originally The Acceptance and Action Questionnaire (AAQ) has 16 items assess distress and acceptance/rejection. This is a one-factor measure of psychological rigidity, or avoidance of new experiences. Previous studies also suggested that the AAQ suffered from psychometric limitations; its factor structure was unstable and its internal consistency was lower than expected (Bond et al., 2011; Hayes et al., 2006, 2004). Hence a new version of AAQ was formed which had 10 items, three of which were reversed, however factorial analysis revealed that the negatively phrased items had to be removed. Final version of AAQ-II is a 7-item self-reported measure in which participants rate how true each statement is for them on a 7-point Likert scale ranging from 1 (never true) to 7 (always true). The total score ranges from 7 to 49, higher score of an individual indicate to psychological inflexibility and lower score reveals that the person is psychologically flexible.

The AAQ-II is a single-dimensional measure with good internal consistency and test-retest reliability in both clinical and non-clinical samples (Bond et al., 2011; Fledderus, Oude Voshaar, ten Klooster, & Bohlmeijer, 2012). The alpha coefficient for the AAQ-II was 0.88 in the original study (Bond et al., 2011), and test-retest reliability was 0.79 after a year.

Confirmatory factor analysis confirmed the study's uni-factor nature, as well as the invariance of clinical and nonclinical groups (Bond et al., 2011).

The original AAQ-II was also translated and validated in a number of languages, including Spanish, Portuguese, Greek, Italian, Chinese, and Persian, Hungarian to name a few (Abasi, Fti, Molodi, & Zarabi, 2013; Costa, Maroco, Pinto-Gouveia & Galhardo, 2014 ;Karekla & Michaelides, 2017; Pennato, Berrocal, Bernini, & Rivas, 2013; Ruiz, Langer-Herrera, Luciano, Cangas, & Beltran, 2013; Zhang, Chung, Si, & Liu, 2014, Eisenbeck & Szabo-Bartha,2018). The instrument's validity was supported by all foreign language versions. Internal consistency was good, and the questionnaire's uni-factorial model was supported, just as it was in the original edition.

However, there is no data for Hindi speaking population which is most widely spoken language in India. The present study focuses on the community validation of the Hindi adaptation of AAQ-II. The study's specific objectives are to investigate the factorial structure of the Hindi version of the AAQ- II and also to replicate the one-factor structure identified by Bond et al. (2011) in original AAQ- II.

Materials and Methods

Participants

Data was collected on a sample of 1000 adults (18 above) from areas of Hindi speaking states of India.

Instrument

The original questionnaire of AAQ-II was developed by Bond at all. (2011), which tells about psychological inflexibility of an individual. It has 7 items .Cronbach's alpha coefficient of 0.88, which shows high internal consistency of the scale.

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For the Hindi adaptation all 7 items were chosen from the original scale and adopted in Hindi. Items are rated on 7 point response scale the total score ranges between 7 and 49. The adopted AAQ- II indicated good psychometric properties with respect to internal validity and content validity Cronbach alpha of 0.844 was found and item- total correlations ranged between .54 and .63. It is composed of one factorial structure, in which all the seven items covers psychological inflexibility construct.

Methodological Procedure

Participants were recruited from Hindi speaking states of India via WhatsApp, e-mail and social media. The current study was designed to identify psychological inflexibility in adults (18 above) of Hindi speaking state. The purpose of the study was explained and consent was taken informing them about that, their participation is voluntary and anonymous. A total of 1031 responses were obtained. Since the study included people above 18 years of age, 31 responses from the participants were removed based on incomplete information and age (less than 18 years). A total of 1000 people were included in the final sample.

Statistical Procedure

A sample of 1000 adults were included and Exploratory Factor Analysis (EFA) was carried out; with respect to descriptive analysis the minimum values as well as means and standard deviations were calculated for the total sample using SPSS (Statistical Package for the Social Sciences-Version 22.0 for windows).

Further Principal components analysis followed by a varimax rotation were carried out. Items were kept based on the values of factorial weights, commonalities, item –total correlations and

alpha values. To ensure the adequacy of the data the Kaiser-Meyer-Olkin (KMO) test was carried out, which ranges between 0 and 1. The minimum value to consider the analysis as good is .60 (Tabachnick & Fidell, 2011). Values above .90 are considered as very good, between .80-.90 is considered as good, between .70 and .80 as medium and between .60 and .70 as acceptable below .60 values are considered as bad and unacceptable. In order to perform factor analysis Bartlett's Test of Sphericity was also used to check adequacy of the data .

The internal consistency of the scale was calculated using Cronbach's alpha, 0.82 is considered as reliable.(Pestana & Gageiro, 2003). If item total correlation is below .30, it is suitable to eliminate the item (Osborne & Castello, 2005).

In order to carry out Confirmatory Factor Analysis AMOS version 18 for windows was used. After introducing the data in order to assess the quality of the adjustment of the model, multiple measures were evaluated in order to determine the data's fit: The Chi-Square (χ^2/df), Goodness of fit index, Normed Fit Index (NFI), Comparative Fit Index (CFI), Tucker-Lewin Index (TLI), Parsimony comparative fit Index (PCFI), Parsimony Goodness of Fit Index (PGFI) and Root Mean Square of Approximation (RMSEA). The Chi-Square (χ^2/df) inferior to 2 is considered good, while CFI and TLI values of more than 0.90 as good (Kline, 2005; Maroco, 2010). A reasonable fit is defined by RMSEA values below 0.08, a mediocre fit by RMSEA values between 0.08 and 0.10, and a bad fit by RMSEA values over 0.10. (Browne & Cudeck, 1993). GFI varies between 0 and 1, closer the value to 1 indicate better adjustment to the model(Maroco,2010).PNFI , PGFI AND PCFI

indexes are considered as good if value is superior to .60 and very good if the value is above .80 (Maroco , 2010).

After CFA the adjustment indices, factorial weights ($(\lambda \geq .50)$), and individual reliabilities ($R^2 \geq 0.25$) were examined (Maroco, 2010).

Results

Exploratory Factor Analysis (EFA)

The objective of the exploratory factor analysis (EFA) was to verify and confirm the factorial structure presented by the original authors, Bond et al. (2012), for adults in Hindi-speaking states of India. We employed a sample of 1000 adults for this study.

The robustness of EFA was ensured in the first principal component analysis using the KMO test (.884), which was declared acceptable, and Bartlett's Sphericity Test [$\chi^2(1000) = 2289.253$; $p < .001$], which proved to be significant. According to Kline (2005), the values of all individual items reported do not differ from the levels considered suitable, indicating that normalcy standards were not violated.

Principal component factor analysis was performed on a set of 7 items of AAQ-II using a varimax rotation, and total variance of 51.82% was found. The factor loading and commonalities on the psychological inflexibility dimension in Hindi adaption of AAQ-II are shown in the table below.

Table 1: Factorial Weights and Commonalities (h^2)

Items No	Items	Dimension	Factors	h^2
1	My painful experiences and memories make it difficult for me to live a life that I would value. मेरे दर्दनाक अनुभव और यादें मेरे लिए एक ऐसी जिंदगी जीना मुश्किल बना देती हैं जिसे मैं महत्व देता/देती हूँ।	Psychological in-flexibility	.749	.491
2	I'm afraid of my feelings. मुझे अपने एहसासों से डर लगता है।	Psychological in-flexibility	.748	.543
3	I worry about not being able to control my worries and feelings. मैं अपनी चिंताओं और भावनाओं को नियंत्रित करने में सक्षम नहीं होने को लेकर चिंतित रहता/रहती हूँ।	Psychological in-flexibility	.747	.560
4	My painful memories prevent me from having a fulfilling life. मेरी दर्दनाक यादें मुझे एक भरी पूरी जिंदगी जीने(होने) से रोकती हैं।	Psychological in-flexibility	.737	.561

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5	Emotions cause problems in my life. मेरी भावनाएँ ही मेरी जिंदगी में समस्या का कारण हैं।	Psychological in-flexibility	.701	.559
6	It seems like most people are handling their lives better than I am. ऐसा लगता है की अधिकांश लोग अपने जीवन को मुझसे बेहतर ढंग से संभाल रहे हैं।	Psychological in-flexibility	.692	.479
7	Worries get in the way of my success. मेरी सफलता की राह में चिंताएँ हैं।	Psychological in-flexibility	.659	.435

With the analysis of means (M), standard deviations (SD), item total correlations (r) and Cronbach's Alpha (α) value if the item was to be deleted the properties and internal consistency of the items in Hindi adaptation of AAQ-II . The values for the above mention properties can be seen in the table below.

Table-2: Properties of the items and internal consistency of the final factorial scale

Item No	Items	M	SD	r	α
1	My painful experiences and memories make it difficult for me to live a life that I would value. मेरे दर्दनाक अनुभव और यादें मेरे लिए एक ऐसी जिंदगी जीना मुश्किल बना देती हैं जिसे मैं महत्व देता/देती हूँ।	3.29	1.818	.576	.826
2	I'm afraid of my feelings. मुझे अपने एहसासों से डर लगता है।	3.05	1.835	.617	.821
3	I worry about not being able to control my worries and feelings. मैं अपनी चिंताओं और भावनाओं को नियंत्रित करने में सक्षम नहीं होने को लेकर चिंतित रहता/रहती हूँ	3.49	1.979	.632	.818
4	My painful memories prevent me from having a fulfilling life. मेरी दर्दनाक यादें मुझे एक भरी पूरी जिंदगी जीने(होने) से रोकती हैं।	2.83	1.972	.631	.818
5	Emotions cause problems in my life. मेरी भावनाएँ ही मेरी जिंदगी में समस्या का कारण हैं।	3.44	2.073	.633	.818
6	It seems like most people are handling their lives better than I am.	3.63	1.910	.574	.827

	ऐसा लगता है की अधिकांश लोग अपने जीवन को मुझसे बेहतर ढंग से संभाल रहे हैं।				
7	Worries get in the way of my success. मेरी सफलता की राह में चिंताएँ हैं।	4.00	1.957	.539	.832

Confirmatory Factor Analysis (CFA)

Confirmatory Factorial Analysis (CFAs) was used to investigate the factor structure underlying the AAQ-II items (Bond et al., 2011). For evaluating the uni-factor model, we used the AMOS 18 statistical programme to perform CFA based on the variance – covariance matrix. The maximum likelihood approach (also known as path analysis) was used to estimate parameters for the Confirmatory Factor Analysis model, which involved fitting the variance and covariance among observed scores. As a result, AMOS generated a covariance matrix which included variances and covariance of observed scores.

The one-component model was identified using factor loadings, variances and co-variances among the errors.

Following the identification of the one-factor model, we investigated the assessment of universal fit associated to the model's quality in AMOS to determine its suitability for the population under consideration. The next step was to visualise the hypothesised model's observed (items) and unobserved (factors) (Figure 1). The measurement model consist one construct, i.e. Psychological In-flexibility. Rectangles represent observed variables, ellipse represent unobserved variable, and circles represent measurement error in the figure below. In the diagram, the arrow connecting the unobserved and observed variables represents a regression path, and its number reflects the standardised regression weight.

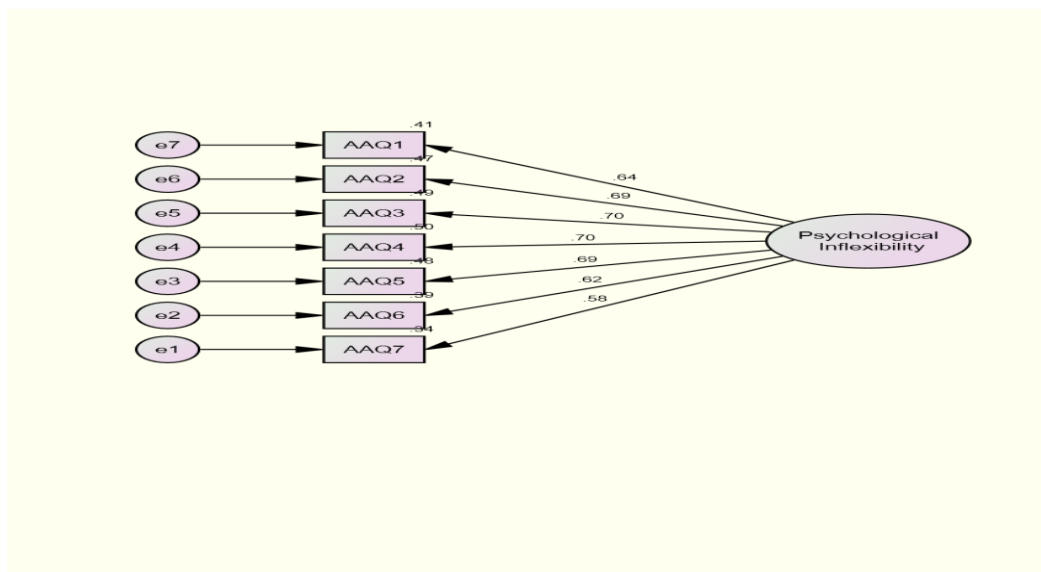


Figure 1-Hypothesized 7 item model of factorial structure of AAQ II

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Table 3:- Goodness-of-fit indices for the one-factor model of the AAQ-II (N=1000)

Model	χ^2	Df	P	χ^2/df	GFI	CFI	RMSEA
N	107.289	14	.000	7.664	.969	.959	.082

The AAQ-II has a $\chi^2/df = 7.664$ percentile. (The power of the statistical test underpinning the SEM technique is particularly strong in the case of big samples, according to Robert Ho 2006.) Even if the difference between the sample covariance matrix and the one replicated by the parameter estimates of the suggested model is minor from a practical standpoint, an approach model can easily fail to match the data statistically. Given these restrictions, the researcher should supplement chi-square measures with additional goodness-of-fit measures.) & $p < .000$, which are both acceptable. GFI.969 (varies between 0 and 1, with the closer to 1, the better the model adjustment); CFI.959 (good when more than .90); and RMSEA.082 (values between .05 and .10 were good, and values less than .05 were regarded very good) (Maroco, 2010).

Discussion

The primary aim of the study was to investigate the psychometric features of the 7 questions of the AAQ-II created by Bond et al. (2011) on adults from Hindi-speaking Indian states.

The AAQ-II is designed to evaluate the Psychological inflexibility in an individual. The psychological inflexibility is the rigid dominance of psychological reactions over chosen values and conditions in guiding action. (p. 678, Bond et al. 2011). In Attention and commitment Therapy (ACT) psychological inflexibility is regarded as a trans diagnostic process that appears in numerous forms of psychopathology like anxiety, depression etc and is a basic reason to work upon for the change (e.g., Bond et al., 2011; Hayes et al., 2006; Kashdan & Rottenberg, 2010; Levin et al., 2014). On the other hand Psychological Flexibility, according to the ACT model, is about being aware of thoughts and emotions that arise in the present moment without unnecessary resistance, and enduring or adjusting action to pursue primary interests and goals, depending on the situation. (Kashdan & Rottenberg, 2010). In the present investigation, a one dimensional factorial structure was found, consisting of 7 items, which is consistent with the original AAQ-II scale by Bond et al (2011). This scale is composed of one factor that explain 51.82% of the total variance. The obtained factorial structure revealed appropriate values for item-total correlations and their respective Cronbach's alpha values. Item-total correlations were more than .30, and Cronbach's alpha was than 0.82, which was regarded reliable (Pestana and Gageiro, 2003).

We used Varimax rotation to create a single-factor model based on the data. The CFA approach was used to analyse the fit between the model and the observed variables (items) in order to identify the psychometric properties of the AAQ-II. The measurement model consists of Psychological Inflexibility as the construct. (Kashdan, 2010)

The AAQ-II presented good quality adjustment indices, i.e., GFI .969; CFI .959, and RMSEA .082 (Maroco, 2010). As a result, we can infer that the AAQ-II questions provide a valid and reliable scale for assessing psychological inflexibility which governs or guide an individual thoughts and feelings and has significant contribution in several mental illnesses like anxiety, depression etc. inflexibility leads to rigidity or less flexibility and hence result in several contradictory thoughts and emotions which eventually leads to several psychological and behavioural issues. (Bond et al., 2011).

Limitation

It's vital to recognize the study's limitations. It was only administered in Hindi-speaking states of India; hence, it is recommended that the psychometric features of this scale be reassessed in other Indian states. Effect of culture, religion and gender is not studied in this study which can further be explored.

Conclusion

The findings of this study validated the AAQ-II utility as a short, reliable, and psychometrically sound scale for assessing psychological inflexibility in an adult. To measure psychological inflexibility we recommend that the scale be adapted and tested with diverse populations and regions other than Hindi-speaking states.

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Conflict of interest

There are no conflicts of interest declared by Annu Tyagi and Alpna Agarwal.

Informed Consent

All individuals who took part in the research gave their informed consent.

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