

A Review of AAQ Variants and Other Context-Specific Measures of Psychological Flexibility

### Abstract

Psychological flexibility refers to a way of interacting with internal experiences and the external environment that advances one toward chosen values whereas psychological inflexibility reflects rigid adherence to ineffective responses such that valued living is compromised. Psychological flexibility is a critical variable of interest in acceptance and commitment therapy, thus, accurate assessment of this construct is pertinent to professionals in the field. Numerous measures of psychological flexibility for specific conditions exist and the psychometric validation of each of these measures varies in breadth and depth. To orient professionals to the scope of available measures as well as their psychometric properties, the current review summarizes the existing literature on context-specific measures of psychological flexibility. Most measures demonstrated satisfactory basic psychometric properties, though their clinical utility (e.g., treatment sensitivity) has largely been underexplored. Generally, context-specific measures performed better than a generic measure of psychological flexibility with respect to incremental validity and treatment sensitivity. Still, further research is needed to validate these measures (e.g., discriminant validity) in order to justify their use across settings and study designs.

*Keywords:* psychological flexibility, acceptance and commitment therapy, acceptance and action questionnaire, psychometric, assessment

### A Review of AAQ Variants and Other Context-Specific Measures of Psychological Flexibility

Psychological flexibility is the skill of being open to experiences as they occur in the present moment, while engaging in actions consistent with self-chosen values (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). It is often depicted visually using a hexagon (termed the “hex-a-flex”) with points interconnecting six key theorized processes of change: acceptance, defusion, contact with the present moment, self as context, values, and committed action (Hayes et al., 2006). Psychological inflexibility can be similarly represented by its own hexagon, with corresponding processes at each point: experience avoidance; cognitive fusion; dominance of the conceptualized past and fear future; attachment to the conceptualized self; lack of values clarity; and inaction, impulsivity, or avoidant persistence (Hayes et al., 2006).

Psychological flexibility lies at the core of acceptance and commitment therapy (ACT) (ACT; Hayes et al., 2006). The ultimate goal of ACT is to increase context-sensitive behavior that brings the individual closer to valued living. As such, psychological flexibility is a critical variable of interest in ACT research. Consistent with this, psychological flexibility has been found to mediate clinical outcomes in several ACT randomized controlled trials (e.g., Arch, Wolitzky-Taylor, Eifert, & Craske, 2012; Forman et al., 2012; Twohig, Plumb Vilardaga, Levin, & Hayes, 2015). Furthermore, psychological flexibility is a foundational component of mental health (Kashdan & Rottenberg, 2010), and is thus also relevant to nonclinical populations. However, psychological flexibility is a difficult construct to assess comprehensively with one measure (or seven items in the case of the AAQ-II), given its multifaceted nature and orientation to the function—rather than topography—of internal stimuli and behaviors. Indeed, researchers have developed scales targeting specific processes comprising psychological flexibility such as the Cognitive Fusion Questionnaire (Gillanders et al., 2014) and Valuing Questionnaire (Smout,

Davies, Burns, & Christie, 2014), illustrating a need for more precise measurement tools. To successfully research the role of psychological flexibility in health, it is imperative that we have a reliable and valid measure of this construct because precise and accurate measurement is needed to test the predictions and boundary conditions of the theoretical model.

To date, the most widely used measure of psychological flexibility is the Acceptance and Action Questionnaire – II (AAQ-II; Bond et al., 2011), which is designed to be used across diverse samples. Researchers have also developed domain-specific AAQs that comprise items aimed at assessing psychological flexibility in particular conditions, including body image concerns (Body Image Acceptance and Action Questionnaire [BI-AAQ]; Sandoz, Wilson, Merwin, & Kellum, 2013), chronic pain (Chronic Pain Acceptance Questionnaire [CPAQ]; McCracken, Vowles, & Eccleston, 2004), and diabetes (Acceptance and Action Diabetes Questionnaire; Gregg, Callaghan, Hayes, & Glenn-Lawson, 2007). Because of more specific wording, these measures may be more sensitive to detecting psychological flexibility in the domain of interest (Gregg et al., 2007; Houghton et al., 2014; Vowles & McCracken, 2008), leading to stronger predictive relations and sensitivity to treatment relative to the AAQ-II, which could translate to more precise tests of research hypotheses and predictions.

However, researchers and clinicians may not be aware of the differences between context-specific measures and the AAQ-II, the psychometric properties of available context-specific measures, or even of their existence. Moreover, because many of these measures have been independently developed by various research groups (in terms of validation sample, item generation, psychometric properties emphasized, etc.), they are not equivalently reliable or valid, even though they have the same purported purpose—to assess psychological flexibility in a specific domain. This means that there is a need to identify relevant measures and evaluate them

on their own merit. The overarching objective of the present review is to organize the current literature on these context-specific measures of psychological flexibility and orient professionals to available measures as well as areas for further measurement development and validation.

The specific goals of the present review are to: (1) provide a list of domain-specific measures of psychological flexibility to orient professionals to available measures, (2) summarize the existing psychometric literature related to reliability and validity, (3) summarize the existing literature on treatment sensitivity or clinical utility, and (4) identify areas of future research.

### **Method**

Our review consisted of three broad steps. First, we collated a comprehensive list of context-specific measures of psychological flexibility. Second, we examined the primary psychometric article for each measure. Third, we reviewed articles that cited each primary psychometric article to determine if they provided further psychometric information on the context-specific measures. For the first step, we identified measures of psychological flexibility from the website for the Association for Contextual Behavioral Science (ACBS). ACBS maintains a repository for measures of psychological flexibility, which is regularly reviewed and edited by its membership and administrators ([https://contextualscience.org/disease\\_and\\_disorder\\_specific\\_aaq\\_variations](https://contextualscience.org/disease_and_disorder_specific_aaq_variations)). A total of 16 AAQ variants were identified from this list. Measures of psychological flexibility were included if they met the following criteria: (1) examined in at least one peer-reviewed article; (2) developed and administered in English; (3) validated in an adult sample; and (4) based on the AAQ or AAQ-II or explicitly purports to assess psychological flexibility in a specific domain. The reason for only including published measures was to instill rigor in terms of the quality of measures reviewed.

Three additional measures were not included in the review because no published information could be found: the Acceptance and Action Questionnaire for Interpersonal Interactions (Chin), The Acceptance and Action Questionnaire for Exercise (AAQ-Ex; Staats), and the Acceptance and Action Questionnaire-Trauma Specific (AAQ-TS; mentioned in development of Portuguese version, see Pinto-Gouveia, Carvalho, Cunha, Duarte, & Walser, 2015). The systematic literature search was conducted from September 2018 to November 2018 and all articles published to date were screened. We also posted the list of AAQ variants on the ACBS ACT listserv asking if other variants existed—none were noted.

Next, we screened articles that cited the primary validation paper for each of the 16 AAQ variants using Google Scholar. In addition, developers of each of the AAQ variants were contacted to solicit relevant articles or measures that might have been missed in the literature review, given that data on less commonly used AAQs are sparse and developers may have easier access to these data. No additional articles were identified. The inclusion criteria for articles were: (1) collected empirical data on the specific variant (i.e., administered measure to a sample) and (2) reported at least one psychometric property (i.e., factor structure, internal consistency, test-retest reliability, convergent validity, divergent validity, treatment sensitivity, predictive validity, incremental validity) of the variant.

Twelve additional measures of context-specific psychological flexibility not included on the ACBS website were identified during this screening process. These included the Parental Acceptance Questionnaire (6-PAQ), Acceptance and Action Questionnaire for Trichotillomania (AAQ-TTM), Brief Social Anxiety Acceptance and Action Questionnaire (B-SA-AAQ), Body Image Acceptance and Action Questionnaire-5 (BI-AAQ-5), Body Image Psychological Inflexibility Scale (BIPIS), Chronic Illness Acceptance Questionnaire (CIAQ), Chronic Pain

Acceptance Questionnaire-8 (CPAQ-8), Experiential Avoidance in Caregiving Questionnaire (EACQ), Parental Acceptance and Action Questionnaire (PAAQ), Parental Psychological Flexibility (PPF), Parenting-Specific Psychological Flexibility (PSPF), and Voices Acceptance and Action Scale (VAAS-9). These additional measures were subject to the same review process.

## **Results**

### **Literature Search**

A summary of the systematic literature search process is presented in Figure 1. In total, 3,389 articles covering 28 AAQ variants were screened and 237 articles were ultimately included in the current review.

### **Measures of Context-Specific Psychological Flexibility**

In total, 28 measures of context-specific psychological flexibility were identified and included in the current review (see Table 1). The measures cover a broad range of problem areas including auditory hallucinations, body image, diabetes, parenting, and social anxiety. The AAQ has been translated into, and in many cases validated in, at least 23 languages beyond the English version that were beyond the scope of this review (for an updated list, see [https://contextualscience.org/act\\_measures\\_in\\_languages\\_other\\_than\\_english](https://contextualscience.org/act_measures_in_languages_other_than_english)). AAQ variants validated in languages other than English were not included in the current review (e.g., Acceptance and Action Questionnaire for Weight-Related Difficulties-Revised, Cardiovascular Disease Acceptance and Action Questionnaire, Psychological Inflexibility in Pain Scale, Tinnitus Acceptance Questionnaire, Willingness and Acceptance of Delusions Scale).

### **Psychometric Properties of Context-Specific Measures**

The psychometric properties of each psychological flexibility measure were examined (see Table 2). The factor structure indicates any subscales derived from factor analysis, with 25%

of the measures having a single factor, 64% including at least one subscale beyond a total score, and 11% with untested factor structures. For example, the AAQ-SA includes two factors: values commitment and defused acceptance. These can be examined separately as individual measures of a subset of psychological flexibility or combined into a total score of overall psychological flexibility. Internal consistency, as measured by Cronbach's alpha was generally very good, with 61% of measures demonstrating scores of .80 or higher across the full scale and subscales. Of note, the denial and active acceptance subscales of the Acceptance and Action Questionnaire – Acquired Brain Injury (AAQ-ABI; Whiting, Deane, Ciarrochi, McLeod, & Simpson, 2015) demonstrated very poor internal consistency, due to consisting of only two items each. The developers of the measure recommend using only the reactive avoidance subscale in clinical settings. Test-retest reliability findings were generally good, indicating that scores are relatively stable over time, which would be expected given the trait-like quality of psychological inflexibility in the absence of an intervention. However, only 43% of the domain-specific measures reported test-retest reliability findings.

Convergent validity is established when a measure correlates with another measure in a theoretically consistent manner (e.g., a measure of anxiety correlating with a measure of worry). Conversely, divergent validity is established when a measure does not correlate with another measure and allows discrimination between dissimilar constructs (e.g., a measure of anxiety not highly correlating with a measure of body mass index). The degree to which these types of validity were established varied significantly from measure to measure. Unsurprisingly, most context-specific measures correlated highly with the AAQ or AAQ-II. Yet, there was still a great deal of variability with bivariate associations ranging from .14 to .86. In addition, most measures

correlated highly with measures of quality of life, well-being, and life satisfaction. Many measures also correlated highly with measures of psychological distress, depression, and anxiety.

The few variants that examined divergent validity have demonstrated low correlations with measures that theoretically are unrelated to psychological flexibility. For example, the VAAS successfully discriminates between the ability to cope with auditory command hallucinations ( $r = .40$ ) and psychotic symptoms in general ( $r = .02$ ) (Shawyer et al., 2007). Similarly, the AIS discriminates between nicotine dependence ( $r = .25$ ) and alcohol and marijuana use problems ( $r_s = .04$  and  $-.02$ , respectively; Gifford et al., 2004). Finally, the AAQ-TTM successfully discriminates between hair pulling behavior that is related to unwanted internal events (i.e., focused;  $r = -.46$ ) and pulling that is habitual (i.e., automatic;  $r = -.03$ ; Woods & Twohig, 2008).

We also reported the nature of participant samples in which each AAQ variant was validated. Just three of the measures were validated using only student samples (AAQ-S, BIPIS, and SA-AAQ). All others utilized community and/or clinical samples when appropriate. This is an overall strength of the AAQ variants as they target specific populations and therefore should be validated with matching samples.

Finally, we examined psychometric properties that relate more directly to clinical utility. First, treatment sensitivity is demonstrated when scores on a measure change as a result of an intervention. Eleven measures (39%) had been tested in treatment settings and demonstrated significant changes from pre-treatment to post-treatment and/or follow-up. Second, predictive validity is demonstrated when scores on a measure reliably predict relevant outcomes over time. Fourteen measures (50%) demonstrated some ability to predict treatment outcomes. Third, incremental validity is demonstrated when a measure is able to predict relevant outcomes above

and beyond another predictor measure. Sixteen measures (57%) demonstrated some form of incremental validity over other relevant measures. However only eleven measures (39%) examined and demonstrated incremental validity over the AAQ-II. With regard to these more “functional” psychometric properties, 24 (89%) of the context-specific measures have demonstrated some utility in at least one of these areas; however, there is still much work to be done to more comprehensively validate these measures.

### **Discussion**

The current review reported on multiple domain-specific measures that examine psychological flexibility across problem areas ranging from irritable bowel syndrome to trichotillomania. Most of these measures were based on the original measure of psychological flexibility, the AAQ-II, and have generally demonstrated incremental measurement specificity and better prediction of treatment outcomes compared to the AAQ-II. That is, many context-specific measures appear to capture psychological inflexibility as it relates to the problem area of interest when the AAQ-II does not. The question as to which measure of psychological flexibility should be utilized in a given situation is complicated by the number of available options, the differing levels of psychometric validation, and the context in which the measure is used (e.g., research aims, sample characteristics).

Based on the data presented in this review, we offer some general considerations for measure selection. Our findings lend support to usage of context-specific AAQs when they exist and have been empirically validated along psychometric dimensions relevant to the study design (e.g., established treatment sensitivity for a clinical trial). Furthermore, although the AAQ-II is thought to be a psychometrically solid measure of general psychological flexibility, limitations with respect to item sensitivity, measurement invariance across samples, and discriminant

validity have been noted (Ong, Pierce, Woods, Twohig, & Levin, 2018; Tyndall et al., 2018; Wolgast, 2014). The extent to which the context-specific AAQs share these limitations is unclear and further psychometric investigation is needed to fully evaluate their utility. For example, the AAQ-ABI and AAEPQ were both highly correlated with depression and anxiety, whereas the B-SA-AAQ and PAAQ were not (Cheron, Ehrenreich, & Pincus, 2009; Lundgren, Dahl, & Hayes, 2008; MacKenzie et al., 2017; Whiting et al., 2015). Thus, it appears that the context-specific AAQs do not automatically suffer from poor discriminant validity. Moreover, based on our review, the context-specific AAQs at least have the advantage of providing a more sensitive measurement of psychological inflexibility with respect to problem areas of interest. At the same time, the original AAQ-II is easy to recommend in many situations because it is brief (seven items) and has been well validated across clinical and nonclinical samples (Bond et al., 2011). Using the same measure also allows for more direct comparisons of effect sizes across different studies because it provides a common yardstick against which effect sizes are evaluated. Given these points, when working with a specific problem area that has a validated, corresponding measure of psychological flexibility, we generally recommend using the specific measure, either alone, or more optimally alongside the AAQ-II or another general measure of psychological flexibility.

Nonetheless, the quality of measures reviewed varied and readers are advised to consult Tables 2 and 3 for specific information on each measure to appropriately evaluate their psychometric merit. For example, the BI-AAQ has demonstrated excellent internal consistency, good test-retest reliability, concurrent validity, treatment sensitivity, predictive validity, and incremental validity over the AAQ-II whereas the AAQ-ABI has unacceptable to good internal consistency, questionable to excellent test-retest reliability, and has not been evaluated in a

treatment setting (Berman, Morton, & Hegel, 2016; Bluett et al., 2016; Lee, Smith, Twohig, Lensegrav-Benson, & Quakenbush-Roberts, 2017; Sandoz et al., 2013; Whiting et al., 2015).

To err on the conservative side, we recommend having both measures to provide a test of convergent validity of outcomes and permit greater confidence in the reliability of findings. Furthermore, collecting such data adds to the existing literature and elaborates on the relative utility of the AAQ-II and context-specific AAQs, which will better allow us to empirically determine the contexts in which each type of measure is most appropriate. In addition, when using a context-specific measure that is less psychometrically established, including other measures of psychological flexibility and applicable measures to evaluate convergent and divergent validity is prudent. Examining factor structure and subscale reliability would provide an additional evaluation of the theoretical and internal coherence of measures.

Despite these tentative strengths, the state of context-specific measures is still somewhat formative. In general, designers of the measures have employed sound development strategies using appropriate samples, resulting in quality psychometric properties. However, the applied utility of many of these measures remains underexplored. Few measures have established the types of validity needed for clinical utility so it is difficult to determine their absolute value in clinical settings—not simply relative to the AAQ-II. It is important that context-specific AAQs function as independently strong measures that can be used in research and practice instead of merely improvements over an existing measure. Our review indicates the foundation is set to build a diverse collection of psychological flexibility measures that are psychometrically sound and clinically useful. Further work is needed to better examine the utility of these measures in clinical populations or to revise existing measures that have consistently demonstrated poor psychometric properties.

### **Future Research**

Little research has been done on the discriminant validity of context-specific measures of psychological flexibility, which would provide information on their precision. The AAQ-II—on which most measures reviewed in this article were based—has at times been shown to correlate highly with measures of negative affect, distress, and mindfulness (Tyndall et al., 2018; Wolgast, 2014). While some association between these variables is to be expected, researchers have argued that the AAQ-II does not demonstrate strong enough discriminant validity to reliably measure psychological flexibility and that other measures should be considered (Rocheffort, Baldwin, & Chmielewski, 2017). The extent to which the various context-specific measures reliably and validly measure the process of psychological flexibility likely varies and research is needed to empirically test which ones offer users greater precision of measurement. For example, using a multimethod-multitrait matrix approach with multiple measures of psychological flexibility can be used to provide a direct psychometric comparison of measures. Besides classical test theory, item response theory is another way to evaluate the performance of measures in terms of their ability to assess a latent trait and to assess the same construct equivalently across different populations (measurement invariance). The Multidimensional Experiential Avoidance Questionnaire (MEAQ; Gámez, Chmielewski, Kotov, Ruggero, & Watson, 2011); its revision, the Brief Experiential Avoidance Questionnaire (BEAQ; Gámez et al., 2014); and the Comprehensive Assessment of Acceptance and Commitment Therapy Processes (CompACT; Francis, Dawson, & Golijani-Moghaddam, 2016) are recent examples of instruments that appear to better discriminate between the process of psychological flexibility and the outcome of psychological distress. As such, considering items from measures such as the

MEAQ and BEAQ, alongside the AAQ-II, could be helpful when developing new context-specific psychological flexibility measures.

Many AAQ variants were derived from the original AAQ items with minor contextual changes in wording. For example, the AAQ-TTM modified the AAQ-II item “I’m afraid of my feelings” to “I’m not afraid of my urges to pull.” This simple modification and others like it resulted in the AAQ-TTM correlating more strongly with measures of trichotillomania severity than the AAQ-II (Houghton et al., 2014), suggesting that it has greater criterion validity in the context of trichotillomania. Moreover, the AAQ-II was more highly correlated with measures of depression and anxiety than the AAQ-TTM (Houghton et al., 2014), showing stronger discriminant validity of the AAQ-TTM. The AAQ-TTM also mediated the relationship between both depression and anxiety and trichotillomania severity whereas the AAQ-II did not (Houghton et al., 2014). In other words, it appears that the AAQ-TTM—but not the AAQ-II—measures a process that potentially explains how psychological distress leads to hair pulling. The AAQ-TTM provides an example of the effect that simple, contextual changes (e.g., in wording) can have on the measurement of psychological flexibility with respect to a specific presentation. Therefore, domain-specific psychological flexibility measures may be strengthened by the incorporation of similar contextually relevant cues. Psychometric tests of reworded scales (e.g., correlations with theoretically related measures, confirmatory factor analysis) need to be conducted to confirm the utility of this suggestion.

### **Limitations**

We did not assess for publication bias in the current review given that we considered multiple measures of psychometric quality and there was not a primary variable on which to base criteria for publication bias. Furthermore, most of the data reported tended to be secondary rather

than primary outcomes. Thus, they are likely less subject to publication bias. However, it is possible that measures with poorer psychometric properties (e.g., unacceptable internal reliability, lack of treatment sensitivity) were not included in the present review so readers should note that the information included here may not be representative of all available research. The present review also excluded child and adolescent measures of psychological inflexibility, thus, conclusions gleaned from this review may not be generalizable to child and adolescent measures. In addition, this review does not provide a quantitative synthesis of extant data, which might have yielded a more objective picture of the current status of research. We elected to conduct a systematic narrative review rather than a quantitative synthesis to provide breadth of coverage rather than depth. The small number of studies for specific measures rendered a meta-analytic approach impractical and only focusing on the measures that did permit meta-analytic methods would have greatly reduced the scope of our review.

### **Conclusion**

Psychological flexibility has become established in psychological research as a key process underlying mental wellbeing and psychopathology (Hayes et al., 2006; Kashdan & Rottenberg, 2010). Despite this progress, there is still much work to be done in this area in terms of assessment. Many of these domain-specific measures of psychological flexibility have only recently been developed and, despite demonstrating quality basic psychometric properties, have not been established in clinical trials that are costly and time-intensive. This chasm in the psychometric literature may limit the strength of interpretations drawn from studies utilizing longitudinal data. Further validation of existing measures and development of additional variants of psychological flexibility measurement are needed. These steps can increase confidence that

findings obtained from such methods of assessment will inform theory and directions for future research.

Given that psychological flexibility may be influenced by context, modern tools, such as ecological momentary assessment, should be examined as potential ways to improve the precision of psychological flexibility measurement in addition to traditional pen-and-paper measures. Indeed, the emphasis on behavioral change over time in applied research means that we need appropriate, validated tools that can meet these assessment demands, not just measures that have satisfactory cross-sectional psychometric properties. As a community dedicated to the improvement of human wellbeing and alleviation of human suffering, we should strive to produce more precise, reliable, and valid measures of psychological flexibility across all applicable settings in order to advance the quality of research and development of interventions that will bring us closer to this goal.

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