

The Anxiety Attitude and Belief Scale-2: Development, measurement model, and initial validity

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Abstract

There is a notable lack of measures of enduring beliefs, which are key etiological factors in Beck's cognitive model of anxiety. The Anxiety Attitude and Belief Scale-2 was developed to address this need. Items from the original AABS (G. P. Brown, Craske, Tata, Rassovsky, & Tsao, 2000) were reviewed and revised and additional items were added to cover the range of constructs identified as reflecting anxiety related expectancies while avoiding the confounding of cognition and affect. Suitability of items was examined using cognitive interviewing (Willis, 2004). The resulting set of 48 items was administered to an index sample of individuals reporting anxiety symptoms and a cross-validation sample of undergraduate students in order to derive a measurement model describing its internal structure. The final, 33-item AABS-2 had a bifactor structure of one general and four specific factors, good fit to the data, common factor content across groups, acceptable precision in measurement and evidence of construct validity.

Key Practitioner Message

- Measures of enduring beliefs related to anxiety disorders are needed to assess etiological factors within cognitive therapy; while there are numerous measures of automatic thoughts, there are few measures of beliefs. The present study sought to address this gap.
- The items that originally appeared on ten rationally derived scales drawn from clinical phenomenology of anxiety disorders were eventually grouped into four group factors and one general factor in the course of psychometric analyses.
- The group factors included ones expected to distinguish groups reporting panic, OCD, and social anxiety symptoms from other anxiety symptom groups, and this prediction was supported. The majority of predictions regarding patterns or correlations were also supported.

- Further validation research is needed to evaluate the validity of the AABS and its subscales in predicting course and outcome of psychotherapy.

According to the most recent estimates in the United States, nearly 30% of the population can expect to develop an anxiety disorder in their lifetime (Kessler, Chiu, Demler, Merikangas, & Walters, 2005), and anxiety disorders constitute the most prevalent mental health problem in the population (Barlow, 2004, p. 22). Therapies for anxiety disorders have developed rapidly in the last few decades, particularly behavioral and cognitive behavioral (CBT) approaches. A recent review identified over 1,000 outcome studies of CBT for different anxiety disorders (Hofmann & Smits, 2008) and found strong support for its efficacy. However, McNally (2007), while characterizing CBT for anxiety disorders as among the indisputable success stories in the mental health field, cautioned against overlooking the failure of many patients to benefit fully from existing CBT interventions or to maintain their gains, seeing this as an indication of the need for greater understanding of etiological mechanisms (p. 750).

Indeed, advances in psychotherapy techniques and methods have substantially outpaced theoretical and conceptual developments in the understanding of anxiety disorders (D. A. Clark & Beck, 2011; D. A. Clark & G.P. Brown, In press), and the extent to which treatment efficacy can be enhanced further without commensurate progress in understanding of etiology and change mechanisms is open to question. Current etiological models differ with regard to the role of cognition, particularly as it relates to the initiation of a fear response. Models emphasizing physiological structures and processes (e.g., Ledoux, 1989; Mataix-Cols & Phillips, 2007; Ohman & Mineka, 2001) as well as those emphasizing learning and behavior (Barlow, 2004; Foa & Kozak, 1986) tend to view initial anxiety responses as virtually reflexive and involving little cognitive mediation. In contrast, models focusing on thoughts and expectancies (e.g., D. A. Clark & Beck, 2011) ascribe at least a contributory role to appraisals in the initial anxiety response. Despite these differing emphases, these theories generally agree about cognitive processing *subsequent to* the initial

fear response, particularly with regard to the role elaborative appraisals play in perpetuating anxiety and contributing to the development of chronic difficulties.

Evidence for the role of these elaborative appraisals in the development and perpetuation of anxiety disorders comes from studies that appear to demonstrate that experimentally manipulating expectancies predicts amplification and attenuation of anxiety responses (e.g., Rapee, Mattick, & Murrell, 1986; Craske & Freed, 1995). However, there are limits on the inferences that can be drawn about the activation of pre-existing cognitive structures from study designs that are confined to demonstrating functional relationships between experimental manipulations and outcomes (see de Houwer, 2011, for a theoretical discussion of these types of inferences). As Foa and Kozak (1986) note, “Invoking a matching explanation to account for fear activation risks circularity in the absence of other ways to assess the structure. To obviate such circularity one must first identify the structure from self-reports, behavioral observations, and so on. Data about responding to matched information can then be used to validate hypotheses about the structure.” (p. 23). Another source of support for the potential etiological role of cognitions comes from treatment outcome research. Therapies that focus on changing expectancies of danger (e.g., Salkovskis, Clark, & Gelder, 1996; Beck, Emery, & Greenberg, 1990) have been central strands of the CBT “success story.” Individuals entering this type of therapy appear to have elevated danger expectancies. When these expectancies are challenged, either through direct disputation or behavioral experiments, fear and anxiety are found to diminish (Hofmann & Smits, 2008). However, moving past anecdotal accounts in order to study reported cognitive content systematically again requires the availability of valid measurement instruments. As was true of the experimental research described above, inferring a cognitive etiology cannot be based solely on observing an outcome (e.g., increase or reduction of fear) consistent with change in a putative underlying cognitive content or structure. As Barlow (2004) notes,

“...inferring something about the nature of a psychopathological state by observing treatment effects is a very weak experimental approach, subject to a logical fallacy (*post hoc ergo propter hoc*, or “the results implies the cause).” (p. 126)

It is, therefore, reasonable to conclude (1) that additional knowledge of expectancies and appraisals in anxiety stands to further the understanding of the etiology of anxiety disorders required for future advances in psychotherapy efficacy, (2) that this knowledge will need to rely to some extent on self report, and (3) that a central pitfall to be avoided is susceptibility to the circular logic of regarding a particular affective outcome (e.g., fear) as sufficient evidence for a putative cause. With regard to the last point, the problem of circularity is particularly insidious when it comes to self-report scales, as it can be enshrined in the item content. And, because this difficulty is under-recognized, there is no guarantee that so-called “gold standard” scales that appear to have substantial support in the literature are not susceptible to this criticism (see Hawkes & Brown, In press). Indeed, one of the most widely used putative scales of cognitive expectancies, the Anxiety Sensitivity Index (Reiss, Peterson, Gursky, & McNally, 1986), contains items such as “It scares me when my heart beats rapidly” and “It scares me when I am unable to keep my mind on a task” that are premised on the unexamined assumption that a danger-based expectancy (“a rapid heartbeat signals physical catastrophe”) can be inferred on the basis of the reported occurrence of an anxiety response (i.e., being scared) following a threat cue (an unusual body sensation) (Lilienfeld, Turner, & Jacob, 1993; Taylor, 1999). G.P. Brown, Hawkes, and Tata (2009) directly examined this assumption regarding the items of the ASI in a cognitive interviewing (Willis, 2004) study and found that, in fact, respondents most often based their responses to ASI items not, as assumed, on the ongoing appraisal of their experience but rather on recollections of their previous anxiety reactions. Moreover, responses were most often based

on gauging the recalled severity or frequency of past anxiety rather than the strength of the presumed prevailing belief.

The present study describes the development of an updated version of the Anxiety Attitude and Belief Scale (AABS; G. P. Brown, Craske, Tata, Rassovsky, & Tsao, 2000), an instrument developed to address the methodological challenges described in the literature just reviewed. Despite a large volume of measures of anxiety in general and cognitive variables specifically (e.g., Antony, Orsillo, & Roemer, 2001; D.A. Clark & G.P. Brown, in press), there is a notable lack of measures of enduring beliefs (D.A. Clark & Beck, 2011, p. 117). The updated scale was also intended to reflect substantial developments in the field since the appearance of the original scale, during which time the CBT treatment model was extended to the entire range of anxiety disorders. With the item pool from the original AABS as a basis, items were revised and additional items were added in an effort to cover the range of constructs that have been identified as reflecting anxiety promoting expectancies while avoiding the confounding of cognition and affect. The resulting scale was administered to an index and cross-validation sample of individuals reporting anxiety symptoms and undergraduates in order to derive a measurement model describing its internal structure.

2. Method

2.1 Participants

The index sample consisted of 434 participants (322 F, Age $M = 33.5$, $SD = 11.0$) who were members of online anxiety support groups organized around specific problems, such as panic, obsessive-compulsive symptoms, and social anxiety. Those reporting having been diagnosed with a mental health problem were 355 (82%), with 269 (62%) reporting being in treatment or having sought treatment in the past. They were further asked, “If you are experiencing psychological problems, please characterise them by ticking all the following that apply” and were given the following choices: panic symptoms, obsessive

compulsive symptoms (e.g., ritualizing), constant excessive worrying, social anxiety, and depression. The cross-validation sample consisted of 261 participants (148 F, Age $M = 20.8$, $SD = 5.2$) who were undergraduates from Royal Holloway University of London ($N = 146$) and Goldsmiths College University of London. Undergraduates participated for course credit.

2.1.3. Internet administration. Participants completed the study on the Internet.

The survey was hosted on www.surveymonkey.com.

2.2. Measures

2.2.1 Anxiety Attitude and Belief Scale-2 The original AABS (G. P. Brown et al., 2000) was developed to reflect the beliefs of individuals prone to develop anxiety but not to measure anxiety itself or to presuppose the experience of anxiety. The initial step in item development was a broad, inclusive survey of the characteristics of thought content discussed in the literature as capable of triggering, worsening, or perpetuating anxiety in susceptible individuals. The themes identified were: Beliefs in the Adaptiveness of Worry; Probability Inflation; Catastrophizing; Anxious Avoidance; Vigilance for Body Sensations; Insanity and Loss of Control; Information and Reassurance Seeking; Social Rejection; Negative Social Evaluation; Magical Thinking; Emotional Reasoning; and Responsibility. Items were then written to reflect these themes and were for the most part expressions of expectancies regarding the outcome of specific experiences (e.g., vigilance for unusual body sensations based on the belief that they signal a physical or mental catastrophe, reflected transparently in the item: “An unusual physical sensation in your body is likely to be a sign that something is seriously wrong with you.”). Although the constructs represented were ones that had often been proposed as potential etiological factors for specific disorders, they were not necessarily expected to map directly onto diagnostic criteria but rather to be present to varying degrees across individuals at risk for the range of anxiety disorders. Likewise, it was expected that

subsequent psychometric procedures would reduce the number of categories to a smaller set of more general constructs due to the expected high degree of overlap of nominally different constructs.

The instructions for the AABS were adapted from those of the Dysfunctional Attitude Scale, a similar scale of beliefs related to depression (Weissman & Beck, 1978). The instructions were: "This inventory lists different attitudes or beliefs which people sometimes hold. Read each statement carefully and decide how much you agree or disagree with the statement. For each of the attitudes, choose the number matching the answer that best describes how you think. Because people are different, there is no right answer or wrong answer to these statements. To decide whether a given attitude is typical of your way of looking at things, simply keep in mind what you are like *most of the time*." Items were rated by respondents on a seven-point Likert scale ranging from 0 to 100, with anchor points at 20, 40, 50, 60 and 80 percent. AABS responses are scored from 1 to 7, with higher scores indicating greater belief in anxiety promoting attitudes.

Using an undergraduate sample, G.P. Brown et al. (2000) found three underlying dimensions of the AABS: Vigilance-Avoidance, Catastrophizing, and Imagination. Evidence for the construct validity of the AABS was provided by a cross-lagged panel analysis over a span of two weeks that included the AABS, the DAS, and measures of anxiety and depression. Whereas the AABS was correlated with the DAS and with both depression and anxiety, AABS score predicted anxiety over time but not depression, and Time 1 anxiety did not predict AABS scores, suggesting that the AABS measured constructs that were specific to anxiety and not to depression and that these constructs were antecedents rather than consequences of anxiety.

Prior to developing potential items for the AABS-2, the existing AABS items were first evaluated in terms of whether they appeared to assess appraisals. Information on the

original 58 AABS items was available from the G.P. Brown et al. (2009) cognitive interviewing study evaluating the ASI, within which they served as a logical comparison for the ASI items with respect to the issue of measuring danger-based expectancies explicitly rather than imputing their operation from the report of a corresponding anxiety response. Verbal protocols for the items were examined closely following Green and Gilhooly's (1996) recommendations for carrying out protocol analyses, and items were retained if they were judged by two raters using a standardized coding system to be based upon appraisals and expectancies (please refer to G.P. Brown et al. [2009] for details of the procedure). Certain items were rewritten based on the cognitive interviewing responses.

The retained and rewritten items were grouped into four rational scales loosely related to the three factors found by Brown et al. (2000); these were: Imagination, Caution, Body Vigilance, and Social Sensitivity. A second comprehensive review of the literature was then carried out to identify constructs described as representing susceptibilities to anxiety disorders which were not reflected in the existing rational scales, either because they had been overlooked for the original AABS or because they had been introduced into the literature subsequently. Five additional constructs were identified: Emotional Reasoning, Loss of Control, Risk Avoidance, Catastrophizing Beliefs, and Certainty. Additional items were generated aimed at fully capturing these ten dimensions. The list of rational scales and example items are shown in Table 1. Finally, an additional cognitive interviewing study was conducted of the new item pool with four anxiety outpatients using the exact procedure and interview schedule employed by G.P. Brown et al. (2009). Each participant completed 53 prospective AABS-2 items while thinking aloud. As a result of this analysis, five of the 53 revised items were removed from the pool and several other items were reworded. The remaining 48 items were examined for duplicative wording, and nine additional items were

removed on this basis. The remaining 39 items were administered to the current samples of participants.

2.2.2. Symptom measure: The Depression Anxiety Stress Scales - 21 (DASS-21). The DASS-21 (Lovibond & Lovibond, 1995) is a short form of the original 42-item self-report measure developed by the same authors to assess current emotional states of anxiety, depression and stress (the last scale assessing a symptom cluster closest to the tension and preoccupation that characterizes generalized anxiety disorder [GAD]; (T. A. Brown, Chorpita, Korotitsch, & Barlow, 1997). The scales have been validated against other relevant measures and have been found to possess good reliability in both clinical and community samples (e.g., Henry & Crawford, 2005). Applying Henry and Crawford's United Kingdom norms, mean scores on all three subscales in the support group samples were in the severe range.

2.2.3. Criterion measures. A battery of well-established anxiety-related criterion measures was administered to the support group samples. General information regarding each scale is provided; refer to the listed references for further information about their applications and psychometric properties. Cronbach's α 's for the current study are shown in Table 3.

Anxiety Sensitivity Index-3 (ASI-3). The ASI-3 (Taylor et al., 2007) is an 18-item self-report measure assessing fear of anxiety symptoms. It has three subscales: physical, cognitive, and social concerns. The ASI-3 was devised to improve on the psychometric properties of previous versions of the scale and has demonstrated evidence for convergent, discriminant, and criterion validity.

Brief Fear of Negative Evaluation scale (BFNE-S). The Brief Fear of Negative Evaluation scale is a unidimensional measure of reactions to possible negative evaluations by others. Following the recommendations of Rodebaugh, Woods, et al. (2004), a shortened

form was used employing only the eight non-reverse-scored items from the original 12-item BFNE.

Penn State Worry Questionnaire (PSWQ). The PSWQ (T. J. Meyer, Miller, Metzger, & Borkovec, 1990) is a 16-item self-report unidimensional measure of propensity to worry and has been used to discriminate between those with a diagnosis of GAD and other anxiety disorders.

Thought-Action Fusion Scale-Revised (TAFS-R). The TAFS-R is a bidimensional 19-item self-report scale designed to measure thought-action fusion, the conflation of a thought of something happening with the possibility of its actual occurrence. The two subscales of the TAFS-R are Likelihood TAF (“If I think of myself being injured in a fall, this increases the risk that I will have a fall and be injured”) and Morality TAF (“If I wish harm on someone, it is almost as bad as doing harm”). The TAFS generally discriminates OCD from other anxiety disorders and depression (e.g., J. F. Meyer & Brown, 2012).

2.3. Data Analysis

The exploratory and confirmatory factor analyses were conducted using the MPlus 7 software program (Muthén & Muthén, 2008). Factors were extracted from the sample correlation matrix using maximum likelihood estimation robust to non-normality in the data. Model fit for the factor analyses was ascertained using the minimum fit function χ^2 . As χ^2 values are potentially inflated by large sample sizes, fit was also examined using two global model fit indices: root mean square error of approximation (RMSEA; Steiger, 1990) and the comparative fit index (CFI; Bentler, 1990). The RMSEA provides a measure of model fit relative to the population covariance matrix when the complexity of the model is also taken into account. It had been suggested that RMSEA values of $< .05$ indicate good fit, values of $.05$ to $.08$ indicate moderate fit, and values above 0.1 indicate poor fit (Browne & Cudeck, 1993), but more recent simulation studies caution against the use of fixed cutoff points for

making decisions about goodness-of-fit (Chen, Curran, Bollen, Kirby, & Paxton, 2008). The CFI provides a measure of the fit of the hypothesized model relative to the baseline or independent model, with values usually ranging from 0.00 to 1.00. For the CFI, values above .95 are suggestive of good model fit, and values above 0.90 are suggestive of acceptable model fit.

3. Results

3.1. Exploratory and confirmatory structural equation modeling

An initial exploratory factor analysis (EFA) using an oblique GEOMIN rotation was carried out to identify weak items and help determine an appropriate number of factors to extract. For this analysis, there were seven eigenvalues over one; the first eight eigenvalues were 15.60, 2.80, 2.09, 2.00, 1.66, 1.27, 1.02 and 0.90. A parallel analysis was next carried out that suggested five factors should be extracted; the sixth eigenvalue (1.27) was the first one below the respective random eigenvalue from the parallel analysis (1.37). The factor content approximated the rationally derived scales; however, four items failed to load saliently on any factor (loading $\geq .40$), and so these were dropped from further analysis.

A further EFA model was then tested on the remaining 35 items. A parallel analysis on this set of items also suggested five factors should be extracted from the data, and the global model fit indices from a one factor model of the data did not indicate good model fit, $\chi^2(560) = 3803.673$, $p < .0001$; RMSEA = 0.116, CFI = 0.62. Given the apparent multidimensionality in the data, a plausible alternative factor model of the data was a bifactor model; in this case, a bifactor model with one general factor and four specific factors. We tested an exploratory bifactor model with all items free to load on the general and specific factors and using a BI-GEOMIN orthogonal rotation. The model had an acceptable fit, $\chi^2(430) = 1229.406$, $p < .0001$; RMSEA = 0.065, CFI = 0.91), but modification indices indicated that adding two correlated residual terms would improve the fit. These were among

items with related content having to do with losing control (“It is possible to instantly lose control of your mind” and “It is possible to suddenly completely lose control of your behavior”) and two other items also related by theme (“Minor difficulties can easily get out of control and grow into major ones” and “Even with small problems, one thing can lead to another and quickly turn into something huge”). Both of these are theoretically important areas of content. Including these residual terms increased the model fit, but the two “loss of control” items then no longer had any salient loadings ($\geq .40$), and so were removed and a final model fit with 33 items. A final exploratory bifactor analysis was carried out with these remaining items, with the indices indicating very good global fit, $\chi^2(372) = 781.217$, $p < .0001$; RMSEA = 0.050, CFI = 0.95. The results appear in Table 2. Of the 33 items included, 19 had salient loadings ($\geq .40$) on the general factor as well as on one of the group factors, and 14 items loaded only on the general factor. Based on the item content, names were assigned to group Factors 1 through 4, respectively, as follows: Thought Manifestation, Exposure to Judgment, Body Vigilance, and Anxiety Based Reasoning. Further information on the rationales for the names chosen is included in the Discussion. A composite model-based reliability coefficient was calculated using the above 33-item bifactor model; the reliability value was 0.97, indicating good reliability for the model.

A confirmatory factor analysis model of the 33 AABS items was tested in the cross-validation sample to confirm the overall fit of the bi-factor structure (including the remaining single correlated residual term) in a separate sample drawn from a different (undergraduate) population. The global model fit indices indicated slightly poorer model fit, but were still comparable to those found in the index sample, $\chi^2(444) = 1030.30$, $p < .0001$; RMSEA = 0.059, CFI = 0.88. All items had their highest loadings on the same group factors as in the support group sample; however, four group factor loadings were $< .40$ but $\geq .30$ and one item loading was $< .40$ on the general factor. There were no substantial modification indices. The

composite model-based reliability in this sample was 0.94, indicating good reliability for the model in this sample.

3.2. Construct Validity

Predictions regarding the pattern of associations of the AABS-2 subscales with relevant criterion measures within the index sample were based on (1) predominant associated symptom cluster (i.e., anxiety); (2) common content area with criterion measures (e.g., Body Vigilance and ASI-3 Physical Concerns); and (3) known comorbidities, particularly for worry and social anxiety with depression. These comorbidities are typically reflected in higher correlations with depression using comparable measures. As shown in Table 3, the pattern of the magnitudes of correlations were mostly consistent with predictions (shown boldfaced). The pattern of mean differences on the AABS-2 subscales between criterion symptom groups was also largely as predicted. Symptom groups were formed based on the self-reported presence or absence of a symptom category (e.g., obsessive-compulsive symptoms; please refer to the Method for details). Because more than one symptom group could be reported, a given individual might be part of the “symptom present” group for more than one category. Mean differences (see Table 4) were analyzed using independent sample t-tests.

4. Discussion

The AABS-2 was developed to address the need for a valid measure of beliefs and expectancies representing potential etiological factors for anxiety problems and to reflect substantial developments in the field since the appearance of the original AABS. There are few existing measures of this type, and these often suffer from shortcomings already discussed that limit the inferences that can be drawn from research in which they are employed. The development of the AABS-2 described in the present study capitalized on advances in the field, both conceptual and technical, since the time that many of the available

measures were developed. In particular, increasing emphasis is now being placed on valid construct representation (Bornstein, 2011; Embretson & Hershberger, 1996) in conjunction with the traditional multi-trait, multi-method approach of the last 60 years (Strauss & Smith, 2009). The development of the AABS-2 also benefited from analytic techniques that have been developed to implement these evolving conceptions of validity, such as cognitive interviewing (Willis, 2004) and other techniques drawn from the cognitive aspects of survey methodology approach (Schwarz & Sudman, 1996). Finally, the measurement structure of the AABS-2 was evaluated using the most current approaches to exploratory and confirmatory latent variable and item response analyses. The final five AABS-2 factors reflected a simple factor structure, a good fit to the covariance matrix in both the index and cross-validation samples, consistency of factor content across anxiety support group and undergraduate samples, and acceptable precision in measurement of the final factors. Preliminary validity analyses in terms of associations with theoretically related criterion variables and predicted mean differences between symptom groups provided support for the validity of the AABS-2 subscales.

The approach taken to developing the AABS and AABS-2, in contrast to previous similar efforts, de-emphasized operationalizing *a priori* theory in favor of a bottom-up, neutral, and inclusive survey of potential content. This approach is similar in many respects to the one adopted within the Five Factor Model tradition in personality research (McCrae & John, 1992), which took as a starting point the entire lexicon of personal trait adjectives. This approach particularly emphasizes care in the naming of factors. As McCrae and John (1992) note, "Factor names reflect historical accidents, conceptual positions, and the entrenchment that comes from a published body of literature and from published instruments." (p. 177). Although a number of the factors identified had clear links to previously identified constructs (e.g., intolerance of uncertainty, anxiety sensitivity, thought action fusion), these terms were

avoided as they implied mechanisms (sensitivity, intolerance, fusion) that have not been established empirically. Thus, as a starting point for understanding what the factors appeared to measure, high level inferences (Goldfried & Kent, 1972) were avoided if these moved beyond the behaviors described by the items loading on the factor.

Items loading only on the general factor were drawn from two of the original rationally derived scales, “Anticipation” and “Intolerance of Uncertainty.” The items are all concerned with uncertainty about the future and appear to relate to Barlow’s characterization of anxiety as a reaction to a perceived lack of control: “a state of helplessness, because of a perceived inability to predict, control, or obtain desired results or outcome in certain upcoming personally salient situations or contexts” (Barlow, 2004, p. 64). Other theories have also highlighted heightened vigilance as a central component of anxiety-proneness (e.g., Eysenck, 1992). Interestingly, this construct appears to be separate from the fear of loss of personal control that is central to Beck’s (Beck et al., 1990) formulation of particular anxiety states, such as panic. Indeed, items relevant to the latter construct (e.g., “It is possible to suddenly lose control of your mind”) were eliminated in the course of the item analysis due to low factor loadings. Other scales have been devised to reflect related constructs, but generally suffer from the pervasive shortcoming previously discussed of measuring beliefs in a manner that is confounded by affect. For example, the Anxiety Control Scale (Rapee, Craske, Brown, & Barlow, 1996), which was devised to operationalize perceived lack of control as a psychological vulnerability to anxiety in line with Barlow’s formulation, discussed above, includes items which, similar to the items of the ASI, seek to measure beliefs by way of experiences of affect (e.g., “When I am frightened by something, there is generally nothing I can do” and “Most events that make me anxious are outside my control”).

The first group factor of the AABS-2 contained beliefs clearly related to social anxiety. D. M. Clark and McManus (2002) list the following aspects of social anxiety that are supported by empirical findings and are common to different degrees to a group of similar cognitive behavioral theories of social anxiety (see Rodebaugh, Holaway, & Heimberg, 2004, for a review): “interpretation of external social events; detection of negative responses from other people; the balance of attention between external and self-processing; the use of internal information to make inferences about how one appears to others; recall of negative information about one’s perceived, observable self; and ... problematic anticipatory and post-event types of processing.” (p. 92). This factor contains beliefs logically related to a number of these features, particularly those concerned with appearing anxious to others and being judged in this regard. As such, it is conceptually related to and was found to correlate with the ASI “Social Concerns” factor, which, in common with the rest of the ASI, suffers from confounding with affect (e.g., “When I tremble in the presence of others, I fear what people might think of me” and “I worry that other people will notice my anxiety”). The thrust of the items center on concealing signs of discomfort to avoid being evaluated; as such, it was named “Exposure to Judgment.” Aside from the Social Concerns factor of the ASI, measures related to social anxiety in CBT research have generally not focused on enduring beliefs that promote social anxiety. An exception is the Social Attitudes Questionnaire-Revised (D. M. Clark, 2001), which seems to measure a more comprehensive set of dimensions than either the AABS or ASI and not to be overly confounded with anxiety. However, this scale is unpublished.

The second group factor extracted included beliefs about the capacity for subjective thought to influence external events. In keeping with the aim of naming factors descriptively, the label chosen for this factor was “Thought Manifestation”. There is a clear link between this factor and the construct of thought-action fusion (TAF; Shafran, Thordarson, &

Rachman, September), and a large correlation was found with the TAF-S Likelihood Scale. Although the Thought Manifestation subscale measures beliefs connected to Likelihood TAF, it is not confined to OCD themes; it is therefore potentially suitable for exploring this variable transdiagnostically, in line with evidence that TAF is also likely to play a role in other anxiety disorders (Abramowitz, Whiteside, Lynam, & Kalsy, 2003; Hazlett-Stevens, Zucker, & Craske, 2002)

The third group factor was labeled “Body Vigilance” and bears the closest apparent relationship to the content of the ASI Physical Concerns subscale, with which it was correlated, potentially offering an alternative measure of the construct of interest largely free of confounding with affect. This factor also differs from the ASI subscale in not linking the misinterpretation of particular anxiety symptoms to a particular adverse outcome, whether imminent or remote. As such, it may be seen as potentially related to both panic and health anxiety. It is not difficult to envisage both advantages and disadvantages to employing such a scale to help explain these anxiety problems. A respondent inclined to endorse a specific sensation-fear correspondence (e.g., as in the ASI item, “When I feel pain in my chest, I worry that I’m going to have a heart attack”) might not see fit to endorse the more general statement from the AABS (“An unusual physical sensation in your body is likely to be a sign that something is seriously wrong with you”). On the other hand, a scale less tied to specific symptoms might better capture idiosyncratic or simply alternative interpretations (e.g., shortness of breath rather than palpitations interpreted as a precursor to a heart attack) better than one like the ASI in which the correspondence is pre-specified (“When I feel like I’m not getting enough air, I get scared that I might suffocate”). Instances in which participants modified their responses because they did not endorse the precise correspondence between the predicate and consequent of an ASI item were commonly found in the G.P. Brown et al. (2009) cognitive interviewing study of the ASI, which is likely in practice to result in

idiosyncratic responding and ambiguity regarding how to understand the meaning of a particular rating.

The items of the last group factor all relate to the inference of danger based on the occurrence of anxiety. It was named “Anxiety Based Reasoning.” The general concept is frequently cited in the literature. Beck and Emery (1990) noted “Many anxious patients use their feelings to validate their thoughts” (p. 198). Arntz, Rauner, and van den Hout (1995) called this “ex consequentia reasoning” because it implied the proposition “If there is danger I will be anxious, therefore if I feel anxious, there must be danger.” In their study, both anxious patients and controls were influenced in their assessment of danger by objective indicators of danger within scenarios they read, but only patients were also influenced by information regarding anxiety responses. Further investigation of this construct is warranted in order to determine whether respondents are basing their responses on inference (something identifiable that is not specified in the AABS items must be wrong, otherwise, why would I be anxious?) or whether anxiety is being afforded an unconscious signaling function (if I’m anxious, there must be something wrong, even if I can’t identify what it is). In the latter case, Anxiety Based Reasoning, like Thought Manifestation, may operationalize so-called magical thinking. In addition, it might represent a susceptibility to perseverative behavior in line with Davey’s (e.g., Meeten & Davey, 2011) mood-as-information hypothesis. To our knowledge, there are no previous measures of this construct, despite the importance it has been accorded in amplifying anxiety reactions. A caveat is also in order for this factor, as it was the last factor extracted and explained the least variance. The items are somewhat repetitive, raising the possibility that it might be a “bloated specific” (Kline, 1994)—a factor that emerges due to artifactually inflated covariance among the items (e.g., due to high content overlap) that does not meaningfully predict criterion variables.

As stated in the introduction, the central aim of the AABS-2 was to tap directly into ongoing anxiety related beliefs and expectancies rather than relying on inferring the operation of such beliefs from putatively corresponding affective outcomes (e.g., becoming scared following rapid heartbeat implying an expectancy regarding a heart attack). The latter, more usual approach flows from the understandable inclination within clinical research to focus on clinical phenomena within the populations in which they occur, where such correspondences are commonplace. However, making progress in finding out about etiology requires extending the scope of measurement further along the continuum to encompass vulnerable but not yet symptomatic individuals, and to measure phenomena in a way that makes sense to respondents in this population. The failure to do so is particularly evident in certain ASI items. For example, the item “When my thoughts seem to speed up, I worry that I might be going crazy” presupposes experience of thoughts speeding up, reacting with worry, and making the specific conclusion of developing insanity, none of which might be endorsed by an otherwise vulnerable respondent who does not or has not yet had these experiences. In recognition of this gap, the ASI instructs respondents to answer hypothetically, which results in different individuals effectively responding to items based on their differing previous experiences and ability to construct hypotheticals. Waller (1989) demonstrated that such irregularities of applicability are likely to lead to anomalous psychometric results evident in unstable measurement structures that vary across populations. This has been borne out with regard to the ASI (Deacon, Abramowitz, Woods, & Tolin, 2003) and the Intolerance of Uncertainty Scale (Sexton & Dugas, 2009; Norton, 2005). In comparison, the AABS-2 measurement structure was found to be comparable across symptomatic and non-symptomatic groups.

This last point bears on what might be considered a limitation of the study, namely the composition of the symptomatic group being members of internet support groups who had

self-identified as having an anxiety problem and not necessarily having received a clinical diagnosis. It should first of all be noted that, whereas development of item content typically focuses on clinical phenomena, as just discussed, actual validation of scales in this area is frequently not carried out within the ultimate target population of those diagnosed with anxiety disorders, with relevant support groups (e.g., Shafran et al., 1996) and undergraduates (Freeston, Rhéaume, Letarte, Dugas, & Ladouceur, 1994; Reiss et al., 1986) frequently comprising the validation sample. More substantively, there are grounds for arguing that sample heterogeneity and a greater continuity with non-clinical manifestations of anxiety could rather be seen as a strength of the study insofar as it affords a basis for avoiding the inclusion of content peculiar to clinical populations.

In conclusion, the present study describes the development of an updated scale of anxiety-related beliefs and attitudes. The scale was specifically constructed to address measurement pitfalls that have impeded progress in the identification and remediation of etiological factors in anxiety disorders. Further research will be required to determine the extent to which AABS-2 represents an advance over the available body of measurement instruments in the field.

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Table 1.

Initial rational subscales and sample items

Rational subscale	Sample Item
Imagination*	Thinking about bad things that have happened to other people could cause the same thing to happen to you.
Caution*	To avoid disasters, you need to be prepared for anything.
Body Vigilance*	It is important to be on the lookout for the first, small signs of an illness.
Social sensitivity*	It is important to always appear fully at ease.
Emotional reasoning	Anxiety is generally a sign that something is wrong.
Loss of Control	It is possible to suddenly lose control of your mind.
Risk avoidance	The way to avoid problems is not to take any risks.
Catastrophizing	Minor difficulties can easily get out of control and grow into major ones.
Certainty	It is unwise to proceed with something unless you have all of the possible information you might need.

*Scales derived from factor analyses of the original AABS.

Table 2

Factor loadings for the five factor bifactor model of the AABS in the anxiety support group and cross-validation samples

Item	Index					Cross-validation	
	G	1	2	3	4	G	Gr
If you imagine something bad happening, it can help make that thing come true.	.49	.75				.47	.75
Picturing something happening might cause it to really happen.	.48	.74				.34	.82
Imagining things that might happen can help bring those things about.	.45	.67				.34	.63
Thinking about bad things that have happened to other people could cause the same thing to happen to you.	.61	.44				.44	.57
You should avoid being seen acting awkwardly.	.60		.64			.48	.61
It would be difficult to ever live down the embarrassment of losing control of yourself or acting strangely in public.	.58		.59			.45	.57
It is best not to let on if you are in public and feel that something is wrong with you.	.59		.57			.44	.60
You should not allow yourself to be seen losing control of yourself in any way	.56		.51			.64	.39

People will make negative judgments if they think something is wrong with you.	.54	.50	.41	.44
It is important to always appear fully at ease.	.42	.49	.37	.35
It is essential to avoid being disapproved of by other people.	.58	.44	.63	.34
It is important to be on the lookout for the first, small signs of an illness.	.54	.59	.50	.52
It is necessary to continually be aware of signs that a health problem is developing.	.70	.53	.57	.52
You should be constantly looking out for things happening within your body so that you can detect things going wrong.	.71	.51	.61	.59
There is no such thing as being too careful when it comes to your health.	.63	.47	.49	.41
Anxiety does not happen without there being a reason for it.	.39	.73	.37	.72
People don't experience anxiety unless there is actually something they should be concerned about	.50	.66	.45	.64
If someone is feeling anxious, there must be something for them to be concerned about.	.54	.63	.46	.67
Anxiety is generally a sign that something is wrong.	.53	.43	.42	.30
One should always be on the lookout for trouble that might be developing.	.79	.75		
It is crucial to anticipate potential difficulties so that you have a better chance of avoiding them.	.78	.68		

To avoid disasters, you need to be prepared for anything.	.78	.66
Planning every detail in advance is the only way to avoid unpleasant surprises.	.77	.73
When making a decision, it is better to play it safe rather than risk making the wrong choice.	.77	.67
The way to avoid problems is not to take any risks.	.74	.53
It is better not to rock the boat than to make changes.	.72	.58
Anticipating the worst outcome prepares you for the worst.	.69	.49
Even with small problems, one thing can lead to another and quickly turn into something huge.	.68	.52
In general, it is better to keep things the way they are than to take the risk of making things worse	.68	.62
An unusual physical sensation in your body is likely to be a sign that something is seriously wrong with you.	.65	.59
It is unwise to proceed with something unless you have all of the possible information you might need.	.64	.58
Minor difficulties can easily get out of control and grow into major ones.	.62	.52
Insanity can develop without warning.	.43	.32

Note. All factor loadings and correlations are significant at $p < .0001$. G = General factor. Factor names for Factors 1 through 4, respectively: Thought Manifestation, Exposure to Judgment, Body Vigilance, and Anxiety Based Reasoning. Gr = Cross validation group factor

Table 3

Concurrent correlations of AABS-2 subscales with theoretically related criterion measures

Criterion measure	α	General Factor	Thought Manifestation	Exposure to Judgment	Body Vigilance	Anxiety Based Reasoning
<u>Depression Anxiety Stress Scale</u>						
Anxiety	.93	.52	.36	.38	.39	.27
Depression	.89	.46	.29	.46	.19	.24
Stress	.89	.50	.29	.41	.27	.35
<u>PSWQ</u>	.92	.50	.33	.45	.35	.30
<u>BFNE-II</u>	.96	.43	.27	.62	.15	.18
<u>ASI-3 Subscales</u>						
Physical concerns	.88	.56	.31	.37	.52	.36
Cognitive concerns	.90	.54	.36	.49	.35	.36
Social concerns	.86	.55	.32	.78	.24	.21
<u>TAFS Subscales</u>						
Likelihood	.96	.55	.70	.33	.45	.45
Morality	.94	.44	.42	.27	.31	.41

Notes. Predicted correlations are boldfaced

Table 4

Means differences [M (SD)]between groups on AABS-2 factors based on self-reported presence or absence of type of symptoms

<u>Symptoms</u>	<u>Group</u>	<u>N</u>	<u>General</u>	<u>Thought manifestation</u>	<u>Exposure to Judgment</u>	<u>Body Vigilance</u>	<u>Anxiety Based Reasoning</u>
Panic	Absent	111	59.3 (18.4)	12.2 (6.5)	23.2 (7.9)	15.2 (5.8)	16.5 (6.3)
	Present	107	68.9 (19.6)	13.6 (6.9)	25.6 (7.7)	17.4 (6.2)	17.8 (6.2)
	<i>t</i> (216), Cohen's <i>d</i>		3.7, .50	1.6, .22	2.2, .30	2.7, .37	1.5, .20
Obsessive- Compulsive	Absent	140	61.7 (18.2)	12.3 (6.1)	24.2 (8.0)	15.7 (5.9)	16.7 (6.0)
	Present	78	68.2 (21.2)	13.9 (7.6)	24.7 (7.6)	17.4 (6.4)	17.9 (6.7)
	<i>t</i> (216), Cohen's <i>d</i>		2.4, .33	1.7, .23	0.5, .07	1.9, .26	1.3, .18
Worrying	Absent	89	56.5 (16.4)	11.0 (5.7)	22.4 (8.1)	15.0 (5.9)	15.6 (5.9)
	Present	129	70.0 (19.8)	14.4 (7.0)	25.9 (7.4)	17.4 (6.1)	18.4 (6.3)
	<i>t</i> (216), Cohen's <i>d</i>		5.4, .73	3.9, .53	3.3, .45	2.9, .40	3.3, .45
Social Anxiety	Absent	89	57.5 (20.0)	11.3 (6.5)	20.2 (8.2)	15.9 (6.2)	17.0 (6.0)
	Present	129	68.5 (18.0)	14.0 (6.7)	27.2 (6.2)	16.6 (6.0)	17.2 (6.5)

	<i>t</i> (216), Cohen's <i>d</i>		4.2, .57	2.9, .40	7.1, .97	0.9, .12	0.2, .03
Depression	Absent	110	61.0 (18.2)	12.3 (6.3)	23.0 (8.2)	15.8 (6.0)	16.9 (6.2)
	Present	108	67.1(20.4)	13.4 (7.1)	25.7 (7.3)	16.8 (6.2)	17.4 (6.4)
			2.4, .33	1.1, .15	2.5, .34	1.2, .16	0.6, .08

Notes. N = 218. One-tailed *t* significance = 1.7 (p = .05), 2.4 (p = .01). Predicted differences are in bold type.

