

DAS-SF1

The sentences below describe people's attitudes. Circle the number which best describes how much each sentence describes your attitude. Your answer should describe the way you think most of the time.

	Totally Agree	Agree	Disagree	Totally Disagree
1. If I don't set the highest standards for myself, I am likely to end up a second-rate person.	1	2	3	4
2. My value as a person depends greatly on what others think of me.	1	2	3	4
3. People will probably think less of me if I make a mistake.	1	2	3	4
4. I am nothing if a person I love doesn't love me.	1	2	3	4
5. If other people know what you are really like, they will think less of you.	1	2	3	4
6. If I fail at my work, then I am a failure as a person.	1	2	3	4
7. My happiness depends more on other people than it does me.	1	2	3	4
8. I cannot be happy unless most people I know admire me.	1	2	3	4
9. It is best to give up your own interests in order to please other people.	1	2	3	4

DAS-SF2

The sentences below describe people's attitudes. Circle the number which best describes how much each sentence describes your attitude. Your answer should describe the way you think most of the time.

		Totally Agree	Agree	Disagree	Totally Disagree
1.	If I am to be a worthwhile person, I must be truly outstanding in at least one major respect.	1	2	3	4
2.	If you don't have other people to lean on, you are bound to be sad.	1	2	3	4
3.	I do not need the approval of other people in order to be happy.	1	2	3	4
4.	If you cannot do something well, there is little point in doing it at all.	1	2	3	4
5.	If I do not do well all the time, people will not respect me.	1	2	3	4
6.	If others dislike you, you cannot be happy.	1	2	3	4
7.	People who have good ideas are more worthy than those who do not.	1	2	3	4
8.	If I do not do as well as other people, it means I am an inferior human being.	1	2	3	4
9.	If I fail partly, it is as bad as being a complete failure.	1	2	3	4

Scoring

Items should be scored so that total score reflects greater dysfunctional attitudes. This means that most items will be reverse coded. Subtracting 5 from an item score will reverse score that item.

DAS-SF1 Total = (5-DAS1) + (5-DAS2) + (5-DAS3) + (5-DAS4) + (5-DAS5) + (5-DAS6) + (5-DAS7) + (5-DAS8) + (5-DAS9)

DAS-SF2 Total = (5-DAS1) + (5-DAS2) + (DAS3) + (5-DAS4) + (5-DAS5) + (5-DAS6) + (5-DAS7) + (5-DAS8) + (5-DAS9)

Efficiently Assessing Negative Cognition in Depression: An Item Response Theory Analysis of the Dysfunctional Attitude Scale

Christopher G. Beevers
University of Texas at Austin

David R. Strong
Brown University and Butler Hospital

Björn Meyer
City University, London

Paul A. Pilkonis
University of Pittsburgh Medical Center

Ivan W. Miller
Brown University and Butler Hospital

Despite a central role for dysfunctional attitudes in cognitive theories of depression and the widespread use of the Dysfunctional Attitude Scale, form A (DAS-A; A. Weissman, 1979), the psychometric development of the DAS-A has been relatively limited. The authors used nonparametric item response theory methods to examine the DAS-A items and develop a briefer version of the scale. Using DAS-A data obtained from depressed participants enrolled in 2 large depression treatment studies ($N = 367$), the authors developed a 9-item DAS form (DAS-SF₁). In addition, because 2 versions of the DAS are needed for certain study designs, they also developed a 2nd short version (DAS-SF₂). These short forms were highly correlated with the original 40-item DAS-A (r s ranged from .91 to .93), exhibited change similar to that of the DAS-A over the course of treatment, were moderately correlated with related self-report assessments, predicted concurrent depression severity, and predicted change in depression from before to after treatment. Taken together, the authors believe the DAS-SF₁ and DAS-SF₂ provide an efficient and accurate assessment of dysfunctional attitudes among depressed individuals.

Keywords: cognitive, short form, depression, dysfunctional attitudes, item response theory

A central tenet of cognitive theory of depression is that dysfunctional attitudes have a critical etiologic role for vulnerability to depression (Beck, Rush, Shaw, & Emery, 1979). Individuals who endorse dysfunctional attitudes are thought to be at increased risk for depression onset (e.g., Alloy et al., 2006; Segal, Gemar, & Williams, 1999). Further, elevations in dysfunctional attitudes are thought to maintain an episode and are often central targets of

intervention during cognitive-behavioral treatment. Consistent with these ideas, numerous studies have observed high levels of dysfunctional attitudes among people diagnosed with unipolar depression (e.g., Dent & Teasdale, 1988; Norman, Miller, & Dow, 1988).

Dysfunctional attitudes are often assessed with the Dysfunctional Attitude Scale (DAS; Weissman, 1979). The DAS was

Christopher G. Beevers, Department of Psychology, University of Texas at Austin; David R. Strong, Department of Psychiatry and Human Behavior, Brown University, and Addictions Research, Butler Hospital, Providence, Rhode Island; Björn Meyer, Department of Psychology, City University, London, London, England; Paul A. Pilkonis, Department of Psychiatry, Western Psychiatric Institute and Clinic, University of Pittsburgh Medical Center; and Ivan W. Miller, Department of Psychiatry and Human Behavior, Brown University, and Psychosocial Research Program, Butler Hospital.

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Correspondence concerning this article should be addressed to Christopher G. Beevers, Department of Psychology, University of Texas at Austin, 1 University Station A8000, Austin, TX 78712-0187. E-mail: beevers@psy.utexas.edu

originally a 100-item scale and was subsequently refined into two 40-item forms (Versions A and B) based on factor analyses from a student population. Although Beck and colleagues have recommended using an 80-item version (Beck, Brown, Steer, & Weissman, 1991), the DAS-A is used more frequently. The DAS-A is a self-report questionnaire that measures a variety of rigid, negative, and perfectionist attitudes. Many items also assess dysfunctional contingencies for self-worth (e.g., "If I do not do well all the time, people will not respect me"). Despite the widespread use of the DAS-A, relatively few investigations have examined its psychometric properties. Further, no study has used modern analytic techniques, such as item response theory (IRT), to examine the psychometrics of the DAS-A items.

Studies that have investigated the psychometric properties of the DAS-A typically used evaluation methods based on traditional, or classical, test theory (Nunnally, 1979). This approach emphasizes the internal consistency reliability, test-retest reliability, and factor structure of an assessment. Past research suggests that the DAS-A has good internal consistency reliability, test-retest reliability, and replicable factor structure (e.g., Dobson & Breiter, 1983). For instance, using Treatment of Depression Collaborative Research Program (TDCRP) data, Imber et al. (1990) reported that the DAS-A has two related factors: perfectionism and need for approval. These factors had good internal consistency reliability ($\alpha = .91$ and $.82$, respectively) and were highly correlated ($r = .59$) with each other. Using structural equation modeling, Zuroff, Blatt, Sanislow, Bondi, and Pilkonis (1999) reported that the Perfectionism and Need for Approval subscales had high factor loadings (.87 and .85, respectively) on a common latent variable. These findings suggest that the DAS-A is sufficiently unidimensional to permit use of a total score to assess dysfunctional attitudes.

Although these studies made important contributions to the development of the DAS-A, classic test theory methods have limitations. Specifically, they do not directly assess the adequacy of the response options used in the DAS-A or how well DAS-A items discriminate individuals who differ in their level of dysfunctional attitudes (for a review of criticisms of classic test theory, see Embretson, 1996). On the basis of these and other limitations, it has been argued that state-of-the-art scale development should use IRT methods to determine the psychometric performance of scale items (Embretson, 1996). Although IRT methods have been used successfully to develop and refine psychopathology-relevant assessments such as gambling attitudes (Strong, Breen, & Lejuez, 2004), alcohol problems (Kahler, Strong, Read, Palfai, & Wood, 2004), personality traits (Gomez, Cooper, & Gomez, 2005), and depressive symptoms (Cole, Rabin, Smith, & Kaufman, 2004), no such study has been conducted with any form of the DAS.

An additional benefit of using IRT to refine the DAS-A is that it could reduce the number of items required to assess dysfunctional attitudes. A shortened assessment of dysfunctional attitudes could be beneficial for a number of reasons. First, a shorter form could ensure greater compliance (i.e., fewer skipped or missing items). Indeed, in one study, more than 10% of respondents terminated a 20-item depression questionnaire before completion (Kohout, Berkman, Evans, & Cornoni-Huntley, 1993). Similarly, faster administration is important in psychotherapy trials, as participants are often required to complete a battery of self-report questionnaires throughout the course of treatment. Reducing the

length of questionnaires could reduce subject burden. Alternatively, if subject burden is already minimal, briefer questionnaires could allow for more frequent assessments during treatment without substantially increasing subject burden. Repeated assessments are often critical for identifying putative mediators (cf. Kraemer, Wilson, Fairburn, & Agras, 2002). Finally, psychopathology research may also benefit from a shorter version of the DAS, as level of dysfunctional attitudes measured following a dysphoric mood induction is linked to depression vulnerability (Segal et al., 2006). As mood states induced in the laboratory tend to be brief (Martin, 1990), a dysfunctional attitude scale that can be completed quickly may provide an assessment that is more uniformly influenced by a mood induction.

Given the widespread influence of cognitive theory on etiologic and treatment studies of depression (Beck, 2005), the prevalent use of the DAS-A, and the general benefit of using brief and efficient assessments to increase compliance and reduce subject burden, we used IRT methods to examine, refine, and shorten the DAS-A. In doing so, our goal was to develop a briefer version of the DAS-A that (a) has an optimal response format, (b) has items that discriminate individuals along the dysfunctional attitudes continuum, (c) is efficient, (d) is highly consistent with the original set of DAS items, (e) has adequate internal and test-retest reliability, and (f) has adequate concurrent and predictive validity. Because parallel forms of the same questionnaire can be useful (e.g., assessing dysfunctional attitudes before and after a mood induction), a final goal was to develop two parallel short forms of the DAS.

To achieve these goals, we pooled data from two treatment studies of unipolar depression: a randomized clinical trial (RCT) comparing the efficacy of several treatments among depressed outpatients (TDCRP; Elkin, 1994) and an RCT comparing the efficacy of several depression treatments in the posthospital care of depressed inpatients (Miller et al., 2005). Using IRT methods, we examined the DAS-A responses prior to treatment to evaluate, refine, and shorten the DAS-A. We then used approaches from traditional test theory to examine the reliability and validity of the short versions of the DAS-A.

Method

Participants

Data were pooled from two RCTs for unipolar depression ($N = 367$). The first RCT was the TDCRP. The design and procedures of the TDCRP have been described in detail elsewhere (e.g., Elkin, 1994). A total of 250 patients met study entry criteria and were randomly assigned to treatment; of these, pre- and posttreatment DAS-A data were obtained from 246 and 191 participants, respectively. Participants were predominantly female (78%), White (89%), and in their 30s ($M = 35.05$, $SD = 8.5$). The design and procedures of the second RCT from which we obtained data have also been described elsewhere (e.g., Miller et al., 2005). A total of 121 patients met study entry criteria and were randomly assigned to treatment; pretreatment and posttreatment DAS-A data were available from 121 and 99 participants, respectively. Participants were predominately female (74%), White (93%), and in their 30s ($M = 37.97$, $SD = 11.83$). Both RCTs required informed written consent and were approved by institutional review boards. Using pretreatment data from depressed outpatients and recently

discharged depressed inpatients should allow us to evaluate the performance of the DAS-A items across a broad range of dysfunctional attitudes typically endorsed by depressed individuals.

Measures

DAS (Weissman, 1979). The DAS-A has 40 statements to which participants respond on a 7-point scale (i.e., *totally agree, agree very much, agree slightly, neutral, disagree slightly, disagree very much, totally disagree*). The DAS-A assesses dysfunctional beliefs that are thought to reflect a person's self-evaluation. DAS-A items measure concerns about approval from others, prerequisites for happiness, and perfectionist standards. The DAS-A has been used widely in depressed and psychiatric control populations (Oliver & Baumgart, 1985). Other studies have documented that the DAS-A has good test-retest reliability (correlation of .84 over an 8-week period; Weissman, 1979). Internal consistency reliability measured before treatment in the present study was very good ($\alpha = .93$).

Beck Depression Inventory (BDI; Beck & Steer, 1993). The BDI is a widely used self-report questionnaire that assesses depression severity. The BDI consists of 21 items and measures the presence and severity of cognitive, motivational, affective, and somatic symptoms of depression. Past reports indicate that test-retest reliability is adequate (Beck, Steer, & Garbin, 1988). The BDI has been found to be valid among psychiatric inpatient and outpatient samples (Beck et al., 1988). Internal consistency reliability measured before treatment in the present study was good ($\alpha = .84$).

Cognitive Bias Questionnaire (CBQ; Krantz & Hammen, 1979). The CBQ was used to assess negatively biased, self-referent information processing. The CBQ presents four vignettes (8–12 sentences in each vignette) that are ambiguous in outcome (e.g., employer gives potentially negative feedback on employee's work). Participants imagine themselves in each situation and then select one of four response options to four questions per vignette. Options for each question represent depressed-distorted, nondepressed-distorted, depressed-nondistorted, and nondepressed-nondistorted cognitive styles. Consistent with previous studies, the present study focused on the depressed-distorted subscale, which has exhibited good reliability and validity (Krantz & Hammen, 1979; Miller & Norman, 1986; Norman, Miller, & Klee, 1983). Internal consistency reliability measured before treatment in the present sample was adequate ($\alpha = .80$).

Hopelessness Scale (HS; Beck, Weissman, Lester, & Trexler, 1974). The HS is a 20-item true-false self-report questionnaire that assesses participants' negative expectations regarding the future. Scores on the HS range from 0 to 20, with higher scores indicating higher levels of hopelessness. The HS has adequate 1-week and 3-week test-retest reliability (Beck, Steer, & Ranieri, 1988). Internal consistency reliability measured before treatment in the present study was good (Kuder-Richardson 20 = .92).

Statistical Model: Overview of Item Response Theory (IRT) Analyses

IRT methods provide a means of scaling both items and persons along a theorized underlying latent continuum of dysfunctional attitudes. These methods assume that individuals vary along a

single latent continuum. Thus, a common factors analysis was conducted prior to IRT modeling. With support for a primary dimension underlying the DAS, we chose to apply a nonparametric IRT modeling strategy to explore the performance of individual DAS items.

Two broad classes of IRT models include parametric (cf. Birnbaum, 1968; Rasch, 1960) and nonparametric approaches (cf. Mokken & Lewis, 1982; Molenaar, 1997; Ramsay, 1991). We chose to use a nonparametric approach to modeling responses to the DAS-A because we had no a priori expectation about the form of response distributions, and we wanted to allow items with nonmonotonic item response functions to be identified. Nonparametric methods have been recommended prior to choosing and fitting parametric item response models to personality data and when analyzing smaller data sets, as in the present study (Meijer & Baneke, 2004). Further, parametric and nonparametric approaches often lead to similar item selection (Lei, Dunbar, & Kolen, 2004).

Using a nonparametric approach, we constructed item characteristic curves that relate the likelihood of endorsing increasing scores on each item to latent levels of dysfunctional attitudes prior to examining the performance of individual options. We then examined items' option characteristic curves (OCCs). These OCCs relate the likelihood of endorsing each option on each item to latent levels of dysfunctional attitudes. On the basis of examination of the OCC, items with poor discrimination were identified and dropped from further analysis. Items were identified as having good discrimination if the likelihood of choosing higher options (e.g., "agree very much" vs. "disagree very much") increased systematically with increasing levels of dysfunctional attitudes. Poor discrimination was identified when higher item options failed to be observed with higher likelihood than lower options despite increases in levels of dysfunctional attitudes. We required that items provide information (e.g., higher options become more likely than lower options) within ranges of the dysfunctional attitudes that would be observed within a significant number of individuals in the present sample (5th–95th percentiles). Therefore, we decided that a multicategory item should make at least two levels of discrimination to justify inclusion in a shortened version of the DAS-A. Among items making multiple discriminations, response options that did not contribute to the discrimination effectiveness of an item were collapsed.

Finally, to explore whether improvements in the efficiency of the DAS-A could be achieved by identifying the presence of items with similar measurement properties, we graphed the item response functions for the retained items. Using estimates from the item characteristic curves analysis, we identified the region of the continuum (i.e., the item severity) where items provided maximum information and examined how well the items discriminated within this region. From this analysis, items with similar severity and discrimination were considered to provide redundant statistical information about level of dysfunctional attitudes.

We used a nonparametric kernel-smoothing method and software (TESTGRAF) developed by Ramsay (2001). These methods have been used previously in several studies on the performance of scales measuring depression (Santor & Coyne, 1997, 2001), and in-depth reviews of these methods are available (Santor & Ramsay, 1998). This approach estimates OCCs at each evaluation point by using a local average—a method that gives observations increased influence in determining the estimated OCC values if they

fall closer to the specific evaluation point. We considered items to have good response properties if (a) the probability of endorsing increasingly severe response options increased with increasing levels of dysfunctional attitudes and (b) if curves for at least some of the response options intersected more than once between the 5th and 95th percentiles of estimated dysfunctional attitudes.

Results

Unidimensionality

We conducted maximum likelihood common factors analysis of polychoric correlations for the 40 DAS-A items. Results support a primary dimension that was significantly larger than subsequent factors. The primary dimension accounted for 33% of the common variance, with subsequent factors accounting for 4% and 3%, respectively. The eigenvalues for the first three factors were 13.34, 2.41, and 1.71. Thirty-eight out of the 40 items loaded $> .30$ (range = $.31-.79$). Two items (Items 39 and 40) loaded $< .30$ on the primary factor and $> .30$ on the secondary factor. However, with only two items, a secondary dimension was not pursued. These items were retained in the item response analyses for further inspection.

Item Response Analysis

We next submitted all DAS-A items to item response analysis. Analyses are designed to be iterative in that items that fail to meet our criteria for inclusion are dropped and analyses are repeated with the remaining items. In the analysis of the full set of items, inspection of the DAS-A items indicated that 16 items (Items 1, 2, 5, 8, 12, 13, 18, 24, 25, 29, 30, 31, 36, 37, 39, and 40) failed to make multiple discriminations between the 5th and 95th percentiles. To illustrate our criteria for inclusion, Figure 1 displays an example of 2 items: one (Item 7) that met inclusion criteria and one (Item 39) that failed to make the required number of discriminations. As is shown in Figure 1, the probability of endorsing increasingly severe response options for Item 7 increases as level of dysfunctional attitudes also increases. In contrast, the probability of endorsing more severe response options for Item 39 remains relatively stable until approximately the 90th percentile, where the probability of endorsing severe responses quickly increases. Thus, Item 39 discriminates only among participants at the highest end of the dysfunctional attitudes continuum.

After we dropped the 16 items that failed to make multiple discriminations, the remaining 24 items were resubmitted to analyses. Although all 24 items appeared to make adequate discriminations, not

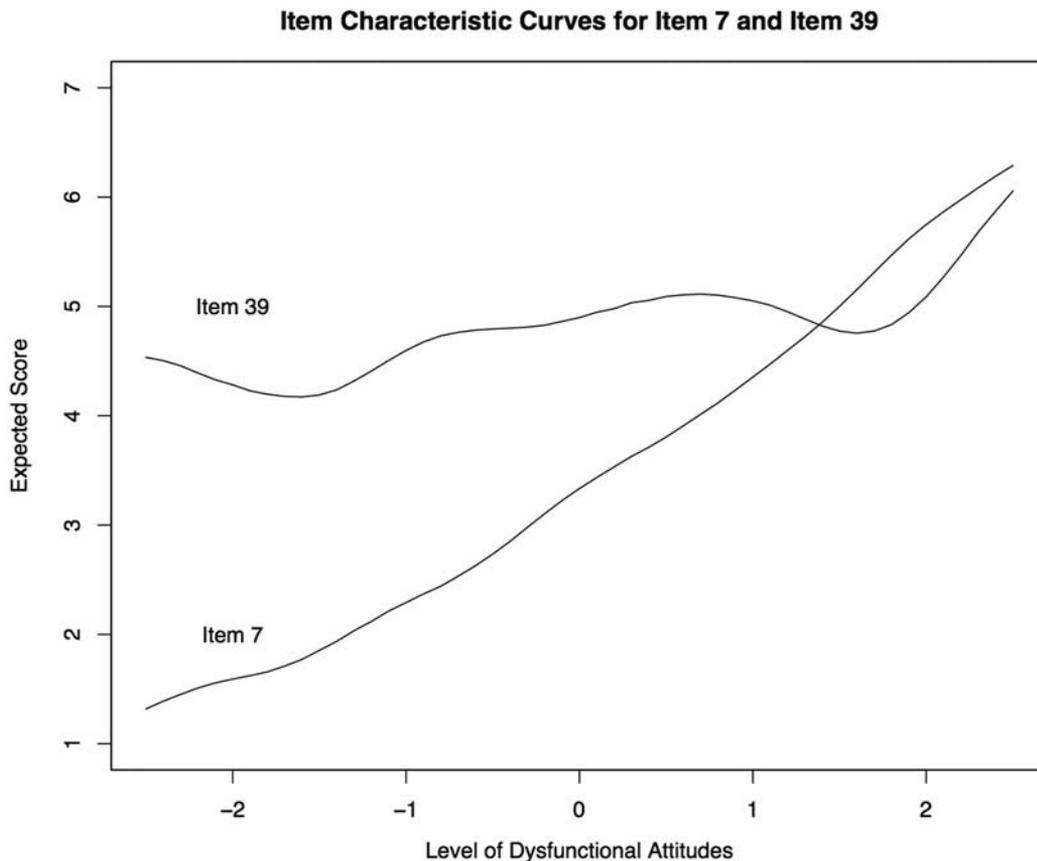


Figure 1. Example of one item (Item 7) that performs well in making discriminations throughout the continuum of dysfunctional attitudes. The second item (Item 39) performs poorly, failing to make multiple discriminations within the 5th to 95th percentiles.

all response options were making discriminations. Poorly functioning response options could contribute to decreased reliability in rank ordering individual levels of dysfunctional attitudes.

Examining Utility of Response Options

We examined the seven response options to determine whether poorly performing options might be collapsed, as several of the response options were rarely used and were never more likely to be observed than were other options. The OCC for Option 1 (“totally agree”) and Option 5 (“agree”) performed consistently across items, made distinct discriminations, and were clearly more likely to be endorsed than were other options within specified ranges of the continuum. However, several other options did not perform consistently. Option 4 (“neutral”) performed quite poorly. It was the least frequently used option (endorsed in 7% of responses), and it was never more likely to be endorsed than was any other option across all ranges of the continuum. Across all items and all levels of dysfunctional attitudes, the probability of endorsing Option 3 (“agree slightly”) was always higher than was Option 4 (“neutral”), suggesting a reversal in the order of these response categories. Further, Option 2 (“agree very much”) was not consistently more likely than was Option 3 (“agree slightly”). Whereas Option 7 (“totally disagree”) did become consistently more likely than Option 6 (“very much disagree”), this option was used infrequently (endorsed in 9% of responses), and the range of discrimination typically was above the 95th percentile. Therefore, on the basis of inspection of OCCs, we collapsed Responses 2–4 (“agree very much,” “agree slightly,” “neutral”) and Responses 6 and 7 (“disagree very much,” “totally disagree”). This resulted in four-level items (i.e., Options 1, 2–4, 5, 6–7).

In line with analyses, we labeled the four response options as “totally agree,” “agree,” “disagree,” “totally disagree.”

After recoding, the 24 items were reanalyzed, and OCCs were inspected. As a result of the reanalysis, 6 of the 24 items (Items 6, 17, 23, 26, 27, and 38) failed to make more than one discrimination between the 5th and 95th percentiles and were dropped. The 18 DAS items were retained and again reanalyzed. All 18 items continued to show improved OCCs and continued to make at least two discriminations between the 5th and 95th percentiles. To illustrate the importance of the response format, Figure 2 displays the OCC for Item 3. When allowing all seven options, several of the lower level options (e.g., Options 2–4) were equally likely within the same range of dysfunctional attitudes and thus could be subsumed within the same option. The OCCs were substantially better when response options were collapsed to form a four-item response format.

DAS-A Item Characteristics

Figure 3 presents the ICC for the 18 remaining DAS-A items with the 4-item response format. Although each of the 18 items adequately discriminated along the dysfunctional attitudes continuum, we explored whether efficiency of the DAS-A could be improved by identifying items with similar measurement properties. When two items appeared to provide similar points of discrimination along the dysfunctional attitudes continuum, they were considered to be potentially redundant. Although several items did index different levels of the latent trait, there were many redundancies among items that operated within adjacent levels of the trait. To evaluate the impact of eliminating items, we rank ordered

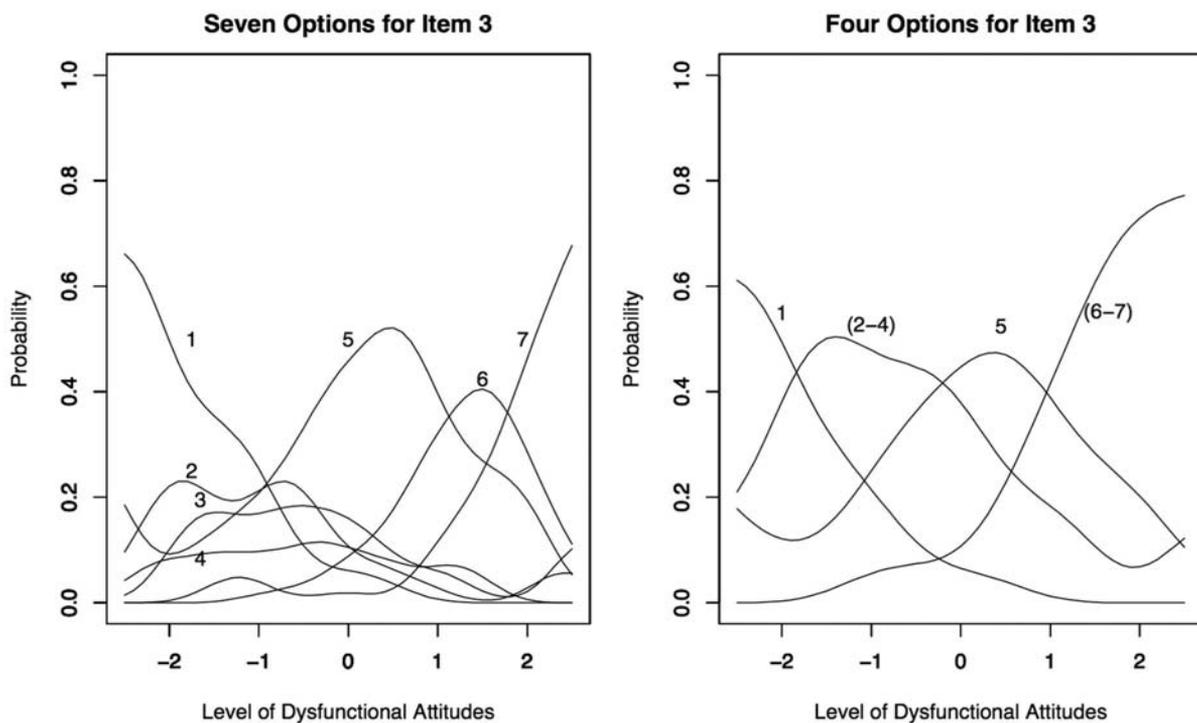


Figure 2. Improvement in scaling response options for Item 3 with a seven-level response option (left) and a four-level response option (right).

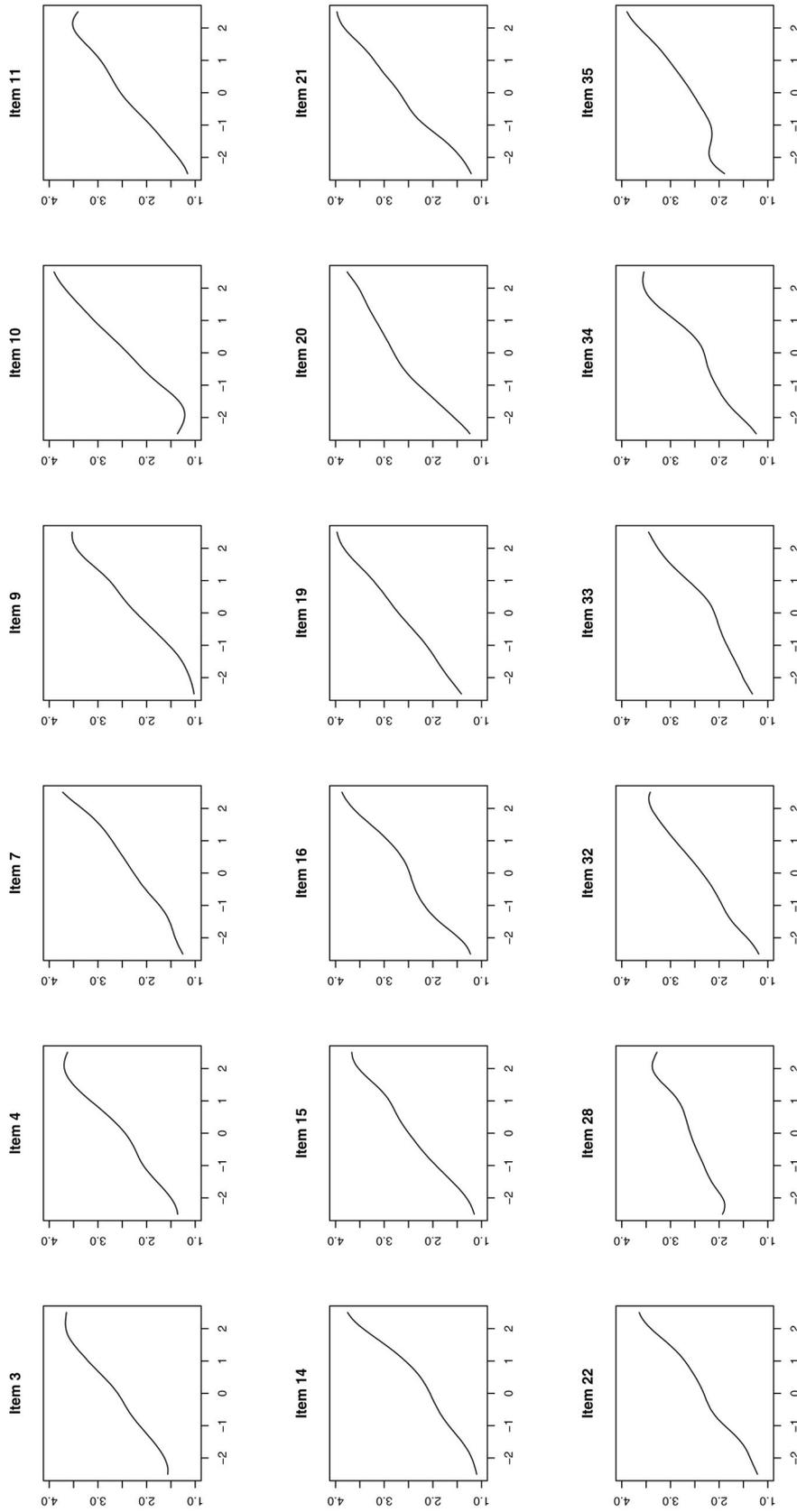


Figure 3. Item characteristic curves from the 18 DAS-A items retained for the short forms of the Dysfunctional Attitude Scale.

Table 1
Items Selected for the Short Forms of the DAS Using IRT Methods

DAS-A item no.	DAS-SF item no.	Item
DAS-SF ₁		
20	1	If I don't set the highest standard for myself, I am likely to end up a second-rate person.
19	2	My value as a person depends greatly on what others think of me.
3	3	People will probably think less of me if I make a mistake.
16	4	I am nothing if a person I love doesn't love me.
15	5	If other people know what you are really like, they will think less of you.
10	6	If I fail at my work, then I am a failure as a person.
34	7	My happiness depends more on other people than it does on me.
7	8	I cannot be happy unless most people I know admire me.
33	9	It is best to give up your own interests in order to please other people.
DAS-SF ₂		
21	1	If I am to be a worthwhile person, I must be truly outstanding in at least one major respect.
28	2	If you don't have other people to lean on, you are bound to be sad.
35	3	I do not need the approval of other people in order to be happy.
11	4	If you cannot do something well, there is little point in doing it at all.
4	5	If I do not do well all the time, people will not respect me.
32	6	If others dislike you, you cannot be happy.
22	7	People who have good ideas are more worthy than those who do not.
9	8	If I do not do as well as other people, it means I am an inferior human being.
14	9	If I fail partly, it is as bad as being a complete failure.

Note. Analyses indicated that a four-level response option was optimal for the DAS-SF₁ and DAS-SF₂: *totally agree, agree, disagree, totally disagree*. DAS = Dysfunctional Attitude Scale; IRT = item response theory; SF = short form. The above DAS items are reproduced with the permission of Aaron T. Beck. All rights reserved.

the items on the basis of the level within which the item was most discriminating. We then split the 18 items by sorting every other item into a separate 9-item scale. The DAS-SF₁ contained DAS-A Items 20, 19, 3, 16, 15, 10, 34, 7, and 33. The DAS-SF₂ contained DAS-A Items 21, 28, 35, 11, 4, 32, 22, 9, and 14. The items for each scale are presented in Table 1.

Consistency Within and Between DAS Short Forms

We first examined internal consistency reliability (coefficient alpha) for each short form of the DAS. The alphas were .84 and .83, respectively, for the DAS-SF₁ and DAS-SF₂. We also used the continuous estimates of the standard errors to generate reliability estimates across levels of the continuum (see Figure 4) for the DAS-A, DAS-SF₁, and DAS-SF₂. Although overall internal consistency reliability estimates are > .80, adopting the shortened DAS forms decreases reliability slightly in the middle ranges of the continuum.

We next examined correlations among these newly formed DAS scales and the original DAS-A scale at two time points: prior to treatment and following treatment. At pretreatment, the original DAS-A was correlated .91 with DAS-SF₁ and .92 with DAS-SF₂. Both short forms were also highly correlated with each other ($r = .85$). At posttreatment, similarly high correlations were observed. The DAS-A was correlated .91 with the DAS-SF₁ and .93 with the DAS-SF₂. The short forms of the DAS were highly correlated ($r = .87$) with each other at posttreatment.

We also examined whether the means of the short forms were significantly different from each other at each assessment period. At pretreatment, the DAS-SF₁ score was significantly higher than the

DAS-SF₂ ($M = 22.37$, $SD = 6.06$ vs. $M = 21.99$, $SD = 5.88$), $t(362) = 2.17$, $p = .03$, $d = .06$. Although this mean difference of 0.38 points between DAS short forms was statistically significant (in part due to a large sample size), the effect size indicates that this difference was small. At posttreatment, the DAS-SF₁ score was significantly lower than the DAS-SF₂ score ($M = 18.30$, $SD = 5.68$ vs. $M = 18.67$, $SD = 5.62$), $t(289) = -2.17$, $p = .03$, $d = .06$. As before, the effect size for this mean difference was quite small.

Change in Dysfunctional Attitudes

We next examined change in dysfunctional attitudes, as assessed by the DAS-A, DAS-SF₁, and DAS-SF₂, from pretreatment to posttreatment. Significant reductions in dysfunctional attitudes were observed for each of the DAS forms (all $t_s > 9.5$, $p < .001$). To determine whether reductions in dysfunctional attitudes differed significantly across forms, we created standardized residualized change scores using pretreatment scores to predict its reassessment at posttreatment for the DAS-SF₁, DAS-SF₂, and DAS-A. There were no significant differences in pre- to posttreatment residualized change when comparing the DAS-SF₁ and DAS-SF₂, $t(286) = .13$, $p = .90$, $d = .00$; DAS-A and DAS-SF₁, $t(288) = .09$, $p = .93$, $d = .00$; and DAS-A and DAS-SF₂, $t(287) = -.26$, $p = .79$, $d = .01$.¹ In addition, these change scores were highly correlated with each other (r_s ranged from .84 to .91). This suggests that change in dysfunctional attitudes did not significantly differ across the DAS forms.

¹ Degrees of freedom vary slightly due to missing data.

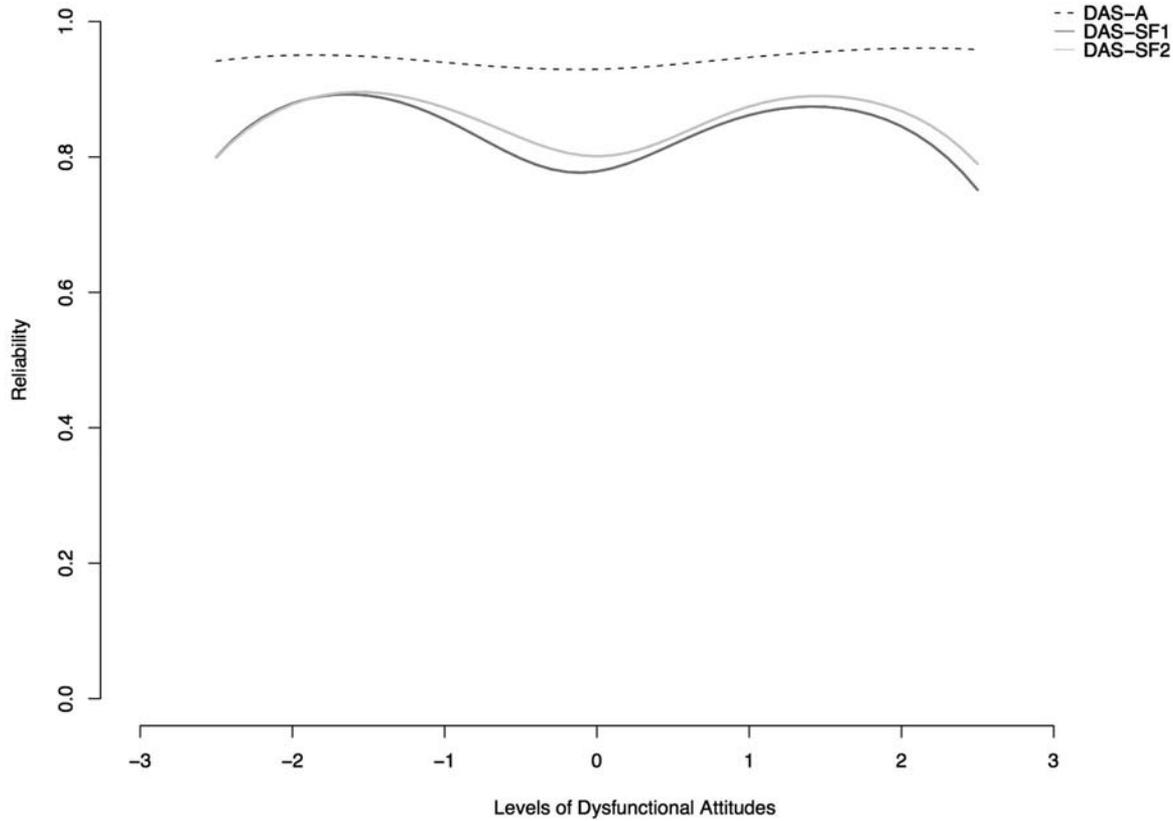


Figure 4. Estimated reliability of the DAS-A, DAS-SF₁, and DAS-SF₂ across the latent dysfunctional attitudes continuum.

Convergent Validity

We examined convergent validity by examining correlations among constructs related to dysfunctional attitudes. Specifically, within one of the RCTs (Miller et al., 2005), the CBQ and the HS were also administered prior to treatment. We examined associations between the short forms of the DAS, DAS-A, CBQ, and HS. As is shown in Table 2, each of the short DAS scales was moderately correlated with the CBQ (*r*s ranged from .53 to .57) and the HS (*r*s ranged from .25 to .30). This suggests good

convergent validity across measures. Further, associations between the short forms of the DAS, HS, and CBQ did not significantly differ from associations between the DAS-A and the CBQ and HS (*p*s > .50).

Predictive Validity

We next examined whether the short forms of the DAS were concurrently associated with the BDI and whether they prospectively predicted change in depression from pretreatment to post-treatment. To provide a point of comparison, we also conducted identical analyses with the original DAS-A.

Cross-sectional correlational analyses revealed that pretreatment DAS-A and pretreatment BDI were modestly correlated (*r* = .36). Pretreatment DAS-SF₁ and pretreatment DAS-SF₂ had similar correlations (*r*s = .30 and .34, respectively) with pretreatment BDI. The strength of association between the DAS-A and BDI was not significantly different than the association between the BDI and the two short forms of the DAS (*p*s > .50).

For depression change analyses, we used multiple regression with posttreatment BDI score as the dependent variable, pretreatment BDI as a covariate, and pretreatment DAS as the predictor. In each analysis, pretreatment BDI was a significant predictor of posttreatment BDI, $\beta = .36, t(287) = 6.37, p < .05$. After controlling for pretreatment BDI, pretreatment DAS-A significantly predicted posttreatment BDI, $\beta = .18, t(287) = 3.19, p =$

Table 2
Correlations Among Theoretically Associated Constructs Prior to Outpatient Treatment Among Depressed Inpatients From the Miller et al. (2005) Study

Measure	DAS-SF ₁	DAS-SF ₂	DAS-A	CBQ	HS
DAS-SF ₁	—	.89	.92	.53	.25
DAS-SF ₂		—	.93	.53	.28
DAS-A			—	.55	.30
CBQ				—	.38
HS					—
<i>M</i>	23.80	23.54	158.99	3.39	15.06
<i>SD</i>	6.99	6.33	43.25	3.24	4.76

Note. *r*s > .17 are statistically significant (*p* < .05). DAS = Dysfunctional Attitude Scale; CBQ = Cognitive Bias Questionnaire; HS = Hopelessness Scale.

.002. Similarly, in a separate analysis, pretreatment DAS-SF₁ approached significance for predicting change in BDI, $\beta = .10$, $t(287) = 1.90$, $p = .08$, and pretreatment DAS-SF₂ significantly predicted change in BDI, $\beta = .14$, $t(287) = 2.37$, $p = .02$. In each case, greater levels of dysfunctional attitudes prior to treatment predicted less change in depression at posttreatment.

Discussion

With IRT methods, we sought to refine and shorten the 40-item DAS-A (Weissman, 1979) using data pooled from two large depression treatment clinical trials (Elkin et al., 1989; Miller et al., 2005). Our IRT analyses indicated that 24 of the original DAS-A items discriminated individuals between the 5th and 95th percentiles along the continuum of dysfunctional attitudes. However, the seven-option response format was not optimal, as many response options were rarely used. Further examination of item properties led us to adopt a four-option response format. Although this response format improved item characteristics in general, an additional six items discriminated poorly with this improved response format. Deletion of these 6 items left 18 original DAS-A items that discriminated well using the four-option response format. Several of these 18 items provided discriminations in similar regions of the dysfunctional attitudes continuum, so we rank ordered items on the basis of where each item discriminated on the continuum of dysfunctional attitudes. We then assigned every other item to a separate scale and created two 9-item short forms of the DAS-A: the DAS-SF₁ and the DAS-SF₂.

Using traditional test theory methods, we found that both the DAS-SF₁ and the DAS-SF₂ were highly correlated with the original DAS (r s ranged from .91 to .93), showed similar change over time during treatment, moderately converged with self-report assessments in other cognitive domains (i.e., cognitive bias, hopelessness), predicted concurrent self-reported depression, and prospectively predicted change in depression from before treatment to after treatment (although the DAS-SF₁ fell just short of statistical significance). In general, the psychometric properties of the DAS-SF₁ and DAS-SF₂ were quite similar; however, the DAS-SF₂ had slightly better predictive validity. Despite this difference, additional research is needed to further investigate the psychometric properties of these scales before we can conclude whether one form should be preferred over the other when only one dysfunctional attitude scale is needed. Nevertheless, we believe that both the DAS-SF₁ and DAS-SF₂ provide an efficient and accurate assessment of dysfunctional attitudes (see Table 1 for items), which is a central component of cognitive theory of depression (Beck et al., 1979).

One surprising finding is that 22 of the 40 DAS-A items did not have strong psychometric properties. There appeared to be two primary reasons why these DAS-A items did not perform well. First, several items elicited a narrow range of responses (i.e., many of the response options were not utilized). For example, the vast majority of participants very much or totally disagreed with Item 1 ("It is difficult to be happy unless one is good looking, intelligent, rich, and creative"). A similar pattern was observed for Item 36 ("If a person avoids problems, the problems tend to go away"). As a result, these items were not able to efficiently discriminate people across a broad range of dysfunctional attitudes.

A second reason is that several items appeared to pull for dichotomous (agree or disagree) responses. For instance, for Item 8 ("If a person asks for help it is a sign of weakness"), 48% of the participants endorsed the lowest option (totally disagree). It was not until the 90th percentile that another option (agree slightly) became more likely. As a result, only two gradations are achieved for this item: totally disagree or agree slightly. Because we required multiple thresholds, we may have eliminated items that might be useful if rescaled dichotomously. As a result, by focusing on the psychometric efficiency of items, we risk eliminating items with unique contents that may be meaningful clinically. Indeed, research suggests that the tendency to respond dichotomously to the DAS-A predicts depression vulnerability (Beevers, Keitner, Ryan, & Miller, 2003; Teasdale et al., 2001). Nevertheless, item content of the DAS-SF₁ and DAS-SF₂ reflects themes of perfectionism and need for approval, which is consistent with the original DAS-A. Thus, we believe that the primary domains are represented.

Several limitations of this study should be noted. Data from the TDCRP study have previously been used to examine the psychometric properties of the DAS-A (Imber et al., 1990). Given that a portion of our data was also obtained from the TDCRP, our results should not be viewed as independent from previous psychometric investigations of the DAS. However, our study is the first to use modern IRT methods to examine the psychometric properties of the DAS-A. Nevertheless, an independent replication of our findings is needed in a large sample of depressed individuals whose responses have not previously been used to assess the DAS-A. Indeed, replication will be particularly important, as our analyses have suggested significant changes to the DAS-A in terms of item number and response format. Further, the DAS-SF items spread throughout a longer test may perform well in the context of the other items but may not perform as well when given in isolation. It will thus be important to establish whether the psychometric properties of the short DAS forms function similarly in other depressed samples or whether they are sample dependent. In addition, it will be important to examine whether the short forms of the DAS-A predict clinically meaningful reductions in symptoms rather than statistical symptom change, as in the present study.

Although the DAS-A was intended to measure dysfunctional attitudes among depressed individuals, dysfunctional attitudes may be important across a range of depression severity that begins before clinically significant levels of distress. We obtained DAS-A data from currently depressed individuals. However, DAS-SF₁ and DAS-SF₂ items may not adequately assess dysfunctional attitudes among people who are not currently depressed. Researchers interested in assessing dysfunctional attitudes among nondepressed individuals may be better served by a DAS form developed specifically for a nonclinical sample.

A further limitation is that the internal consistency reliability of the DAS-SF₁ and DAS-SF₂ is somewhat smaller than that of the DAS-A (i.e., .84 and .83, respectively, vs. .93). Reliability of the DAS-SF₁ and DAS-SF₂ remained acceptable across dysfunctional attitudes severity, although there were narrow parts of the continuum where internal consistency reliability dropped just below .80 (see Figure 3). Further, associations between the BDI and the short versions of the DAS were slightly smaller than were associations between the DAS-A and the BDI. It may be that a gain in

efficiency with the short forms is associated with a small loss in performance.

Another possible limitation is our reliance on self-report assessments of cognitive functioning to assess the convergent validity of the DAS-SF₁ and DAS-SF₂. Common method variance might have inflated the associations between the short forms of the DAS and the other cognitive assessments (i.e., HS, CBQ). Future research should examine whether cognitive vulnerabilities not measured with a questionnaire, such as implicit cognition (Gemar, Segal, Sagrati, & Kennedy, 2001) or biased information processing (Beevers & Carver, 2003), are also associated with self-reported dysfunctional attitudes.

In conclusion, we developed two short versions of the DAS-A that are efficient, discriminate individuals along the continuum of dysfunctional attitudes, have adequate internal consistency reliability, are strongly associated with each other, and have good concurrent, convergent, and predictive validity. Given the current interest in cognitive factors in depression, we believe that the short forms of the DAS-A will be a useful tool for helping researchers and clinicians assess dysfunctional attitudes in depression.

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