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The Behavioral Activation for Depression Scale (BADS): Psychometric Properties and Factor Structure

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Abstract In Behavioral Activation (BA) for depression (Martell, C. R., Addis, M. E., & Jacobson, N. S. (2001)), which has recently received empirical support in a large randomized trial, therapists pay close attention to the function of behavior and the role of aversive controlling stimuli and escape and avoidance behavior in depression. A key variable to measure in studies of BA is when and how clients become more activated over the course of treatment. This study sought to develop an initial set of items for the Behavioral Activation for Depression Scale (BADS), submit these items to an exploratory factor analysis in an initial administration (Study 1, $N = 391$), and submit the resulting scale to a confirmatory factor analysis in a second administration (Study 2, $N = 319$). Results indicated four factors (Activation, Avoidance/Rumination, Work/School Impairment, and Social Impairment) with good factor structure, internal consistency, and test-retest reliability. Evidence for construct and predictive validity is presented.

Keywords Behavioral activation · Depression · Scale development · Psychotherapy · Measurement

Interest in behavioral approaches to depression treatment has waxed and waned over the years. Lewinsohn (1974) first

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described depression as characterized primarily by losses of, reductions in, or chronically low levels of response-contingent positive reinforcement (RCPR). His related treatment strategies included pleasant events scheduling to increase rates of RCPR and social skills training to increase the client's ability to obtain and maintain RCPR (Zeiss, Lewinsohn, & Muñoz, 1979). These early behavioral strategies became components of Cognitive Therapy (CT) for depression (Beck, Rush, Shaw, & Emery, 1979), which essentially eclipsed purely behavioral approaches as empirical support for CT grew over the last three decades. However, interest in behavioral activation (BA) was revived with a component analysis that suggested that the BA component of CT alone produced equivalent outcomes to the full CT package at the end of acute treatment (Jacobson et al., 1996) and at a 2-year follow-up (Gortner, Gollan, Dobson, & Jacobson, 1998). This sparked the development of a full BA treatment package (Jacobson, Martell, & Dimidjian, 2001; Martell, Addis, & Jacobson, 2001) based on the work of Ferster (1973) and the philosophy of functional contextualism (Hayes, Hayes, Reese, & Sarbin, 1993), which has its underpinnings in behavior analysis. Simultaneously an alternate abbreviated BA package was developed by Lejuez, Hopko, and Hopko (2002), referred to as Brief Behavioral Activation Treatment for Depression (BATD).

The recent conceptualization of BA (Martell et al., 2001) uses many of the same treatment techniques as its earlier manifestations but important differences exist (Kanter, Callaghan, Landes, Busch, & Brown, 2004). In particular, therapists now pay close attention to the function of behavior and the role of aversive controlling stimuli and escape and avoidance behavior in depression. BA therapists use functional analytic strategies to assess for avoidance behaviors that are conceptualized as producing low rates of RCPR. These avoidance behaviors are targeted for

extinction and alternate behaviors more likely to produce RCPR are activated and shaped. BATD (Lejuez et al., 2002) shares BA's emphasis on activating clients to increase access to RCPR. However, BATD does not explicitly focus on the role of escape and avoidance behavior in reducing such access. Instead, BATD offers a more parsimonious and structured approach to identifying and scheduling activities across a broad range of life areas (see Hopko, Lejuez, Ruggiero, & Eifert, 2003, for a comparison of BA and BATD).

BA has received empirical support in a recently completed randomized clinical trial that compared BA, CT, Paroxetine and a medication placebo in a large sample (Dimidjian et al., 2006). All treatments performed well for mildly depressed clients, but BA performed surprisingly well for the traditionally difficult-to-treat moderately-to-severely depressed clients, outperforming CT and performing equivalently to Paroxetine. In addition, Paroxetine evidenced a large drop-out rate and problems with relapse and recurrence when the medication was discontinued (Dobson et al., 2004), so BA appears to be the superior treatment when all is considered.

Several other studies of BA and BATD have been conducted, suggesting a growing interest in these treatments. Regarding BA, a small, wait-list controlled comparison found evidence in support of a group therapy version of BA in a public mental health setting (Porter, Spates, & Smitham, 2004), and an uncontrolled pilot study of a version of BA adapted for Post-Traumatic Stress Disorder (PTSD) found evidence of BA's effectiveness in reducing PTSD symptoms in a veteran sample (Jakupcak et al., 2006). Regarding BATD, a number of successful case studies have been published, including 6 depressed cancer patients (Hopko, Bell, Armento, Hunt, & Lejuez, 2005), 3 community mental health patients (Lejuez, Hopko, LePage, Hopko, & McNeil, 2001), a case of co-morbid anxiety and depression (Hopko, Lejuez, & Hopko, 2004), and a suicidal, depressed patient with Borderline Personality Disorder (Hopko, Sanchez, Hopko, Dvir, & Lejuez, 2003). In addition, BATD has been evaluated through a small randomized controlled trial on an inpatient unit (Hopko, Lejuez, LePage, Hopko, & McNeil, 2003). In this study, BATD produced significantly greater BDI score reductions from pre-treatment to post-treatment compared to general supportive therapy.

Key variables to measure in studies of BA (Martell et al., 2001) are when and how clients become less avoidant and more activated over the course of treatment. Specifically, BA assumes that much of the behavior of depressed people functions as avoidance behavior, specifically avoidance of depressed or otherwise aversive affect, and BA strategies specifically target this avoidance. In this way, BA differs somewhat from past conceptualizations. While early versions of pleasant events scheduling tracked whether

or not clients were engaging in specific activities using the Pleasant Events Schedule (MacPhillamy & Lewinsohn, 1982) and Interpersonal Events Schedule (Youngren & Lewinsohn, 1980), these early measures did not assess activation as a functional response alternative to avoidance. Instead, the simple frequency of occurrence of pleasant and interpersonal events, assumed to be reinforcers, was counted. Functionally, however, engaging in pleasant activity could function as avoidance. For example, going to see a movie is arguably pleasant but for a particular client this behavior could function as escape from aversive schoolwork. Simply scheduling pleasant events may miss this distinction; BA specifically assesses such behavior functionally. The client in BA would be encouraged to schedule engaging in schoolwork rather than seeing a movie.

Thus, there are no existing adequate measures of the purported changes in client behavior that should occur over the course of BA (Martell et al., 2001) for depression. Several existing measures were considered, including the Cognitive-Behavioral Avoidance Scale (CBAS; Ottenbreit & Dobson, 2004), but the constructs measured by these existing measures appeared to have only partial overlap with the constructs of interest to BA. In particular, the CBAS measures avoidance but is designed for use in studies of the psychopathology of depression rather than in studies of treatment. Thus, this study set out to develop an initial set of items for the Behavioral Activation for Depression Scale (BADS), submit these items to an exploratory factor analysis in an initial administration (Study 1), and submit the resulting scale to a confirmatory factor analysis in a second administration (Study 2). Both Study 1 and Study 2 also assessed construct validity through comparisons with existing measures that assess partially-overlapping constructs. Study 2 additionally assessed test-retest reliability. The aim was to create a scale for use by both researchers wishing to study the processes of change in BA and related treatments and by clinicians wishing to assess client progress over the course of BA.

Study 1

This study utilized a non-clinical undergraduate sample to examine the psychometric properties of an initial 55-item pool of potential BADS items. An exploratory factor analysis was conducted to determine the underlying factor structure of the items and to reduce the number of items for further testing. The Beck Depression Inventory (BDI; Beck, Ward, Mendelsohn, Mock, & Erbaugh, 1961), Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988) and the Interpersonal Events Schedule (IES; Youngren & Lewinsohn, 1980) were included to establish construct validity through divergence. It was hypothesized that the BADS would be

highly negatively correlated with the BDI and moderately negatively correlated with the BAI. The IES was included to ensure that the BADS was a markedly different measure of activation than the IES activity subscale. It was hypothesized that the BADS would be moderately positively correlated with the IES activity subscale.

Method

Participants and procedures

Participants were recruited from undergraduate psychology courses at Gonzaga University (GU) and the University of Wisconsin-Milwaukee (UWM). The Institutional Review Boards at both institutions approved this research, and course extra credit points were provided for study participation. Participants first provided informed consent and then completed a short demographic questionnaire, followed by the initial version of the BADS, the BAI, the BDI, and the IES during one of several group testing sessions. No additional instructions were provided to participants other than those of the specific measures.

The sample consisted of 391 participants (GU $n = 189$, UWM $n = 202$). The mean age was 20.63 ($SD = 6.06$) years and 77.5% of the sample was female. Regarding ethnicity, 84.7% of the sample was Caucasian, 5.9% Asian, 3.3% African American, 3.3% Hispanic, and 2.8% other. Regarding current treatment, 10.7% of the sample was being treated for a psychological disorder (7.3% on medication and 3.4% in individual therapy). 17.2% of the sample had been treated for depression in the past.

Scale development

Items for the initial administration of the BADS were developed through review of the BA treatment manual (Martell et al., 2001) and discussion among the first, second, and last authors. The goal was to develop items that would track changes weekly in the behaviors hypothesized to underlie depression and specifically targeted for change by BA. This process produced an initial pool of 55 items. The following areas of interest, determined to be the primary targets of BA according to the manual, were addressed: Sleeping and staying in bed (4 items), activity (13 items), avoidance (8 items), rumination (4 items), social problems (8 items), work and school problems (5 items), coping skills (5 items), mood dependent behaviors (4 items), and awareness and identification of problems (4 items). The scale began with the instructions, "Please read each statement carefully and then circle the number which best describes how much the statement was true for you during the past week, including today." Respondents were provided a seven-point scale ranging from 0 (*not at all*) to 6 (*completely*).

Measures

Interpersonal events schedule. The IES (Youngren & Lewinsohn, 1980) is a self report measure of the frequency of and pleasure experienced during interpersonal interactions. It lists 160 interpersonal events across a broad array of contexts (e.g., "Talking to a friend" or "Feeling I've failed to please someone"). Participants first rate all 160 items for frequency of the event over the past 30 days on a three-point scale from 1 (*absent*) to 3 (*happened often*). Next participants return to the beginning of the scale and rate each event for comfort/pleasure on a five-point scale from 1 (*I felt very uncomfortable or upset when this happened*) to 5 (*I felt very comfortable or good when this happened*). Only the IES activity subscale was scored and used in analyses because the construct it purportedly measures is most similar to that of the BADS. Higher scores on the IES activity subscale reflect higher frequency of and more pleasure during activities.

Results

Parallel analysis

To determine the number of factors to extract, a parallel analysis (as per Russell, 2002) was conducted. A benefit of parallel analysis is that it eliminates the subjectivity associated with visual inspection of scree plots (Kaiser, 1970). Eigenvalues, factored from a random set of data involving the same number of items and participants as the actual data set, were displayed in a scree-plot and compared to the actual factored data collected for this study. The point at which the eigenvalues for the actual data dropped below the eigenvalues for the random data indicated the number of factors to be extracted. This indicated a five-factor solution to the data.

Factor analysis

Initial data screening indicated departures from a normal distribution with four items having moderate skewness (> 2; West, Finch, & Curran, 1995). The remaining distributions of the 51 items were acceptable in terms of skewness ($M = .74$, $SD = .66$, range $-.58–1.88$) and kurtosis (all < 5; $M = .45$, $SD = 1.24$, range $-.89–3.53$). Based on the suggestions of Russell (2002), exploratory factor analysis was conducted using the correlation matrix, principal axis factoring and promax rotation. Pattern factor loadings of .40 or higher were considered meaningful so items with loadings of less than .40 on all factors were excluded. Items with secondary factor loadings above .30 were considered to have double loadings and were also excluded. Finally, items that diverged in content from other factor items or were redundant with other factor items were also excluded. Using these criteria, 22 items were excluded resulting in 33 total items

across five factors. The first factor was named *Activation* and appeared to represent focused, goal-directed activation and completion of scheduled activities. The second factor was named *Avoidance/Rumination* and appeared to represent avoidance of negative aversive states and engaging in rumination rather than active problem solving. The third factor was named *Work/School Impairment* and appeared to represent the consequences of inactivity and passivity on work and school responsibilities. The fourth factor was named *Social Impairment* and appeared to represent similar social consequences and social isolation. The fifth factor was dropped due to heterogeneity of item content that made it difficult to label the factor. This resulted in 29 items on four factors which accounted for 43.79% of the total variance of the measured variables. Table 1 presents the factor loadings for each item in this 29-item scale. Table 2 presents the eigenvalues and percentage of variance accounted for by each factor initially and upon extraction. Table 3 presents the means and standard deviations for this scale for the total sample and by gender. No significant gender differences were found.

Reliability

The internal consistencies of the BADS total score and subscales were assessed using Cronbach's α. The total score demonstrated acceptable internal consistency ($\alpha = .79$). The internal consistency for each subscale was also acceptable: Activation $\alpha = .87$, Avoidance/Rumination $\alpha = .83$, Work/School Impairment $\alpha = .78$, and Social Impairment $\alpha = .83$. Table 4 presents the correlations among these subscales and the total scale. Subscale scores were computed as unweighted sums of items comprising each subscale. For the total scale score, items from all scales other than the Activation scale were reverse-coded and then an unweighted sum was computed.

Construct validity. Initial construct validity was established through significant correlations in the expected directions with the BDI ($r = -.70$), BAI ($r = -.19$) and the IES activity subscale ($r = .40$).

Study 2

The purpose of Study 2 was to submit the 29-item BADS to Confirmatory Factor Analysis (CFA) to replicate the original factor structure and determine the goodness of fit based on a variety of indices. Study 2 also examined test-retest reliability and made several construct validity predictions. Specifically, participants were administered the BDI (Beck et al., 1961), the Automatic Thoughts Questionnaire (ATQ; Hollon & Kendall, 1980), the nine-item version of the Acceptance and Action Questionnaire (AAQ; Hayes et al., 2004), the

Cognitive Behavioral Avoidance Scale (CBAS; Ottenbreit & Dobson, 2004), and the Response Styles Questionnaire (RSQ; Nolen-Hoeksema & Morrow, 1991). It was hypothesized that the total BADS score would be strongly negatively correlated with the BDI and ATQ, and moderately negatively correlated with the AAQ, the Rumination Subscale of the RSQ (RSQ-RUM), and the CBAS. It was also expected that the AAQ, the RSQ-RUM, and the CBAS would be highly correlated with the BADS avoidance subscale.

Method

Participants and procedure

Participants were recruited from undergraduate psychology courses at GU and UWM. The Institutional Review Boards at both institutions approved this research, and course extra credit points were provided for study participation. Participants were scheduled for two group testing sessions one week apart. At Time 1, participants first provided informed consent and then completed a short demographic questionnaire, followed by the BADS, BDI, AAQ, ATQ, RSQ, and CBAS. No additional instructions were provided to participants other than those of the specific measures. At Time 2, participants completed the BADS.

The sample for Study 2 consisted of 319 participants (GU $n = 99$, UWM $n = 220$) at Time 1 and 212 participants at Time 2 (GU $n = 46$, UWM $n = 166$). At Time 1, the mean age was 20.53 ($SD = 3.85$) years and 78.4% of the sample was female. Regarding ethnicity, 88.1% of the sample was Caucasian, 3.1% African American, 2.5% Asian, 2.2% Hispanic, and 4.1% other. Regarding current treatment, 12.5% of the sample was being treated for a psychological disorder (4.8% on medication, 7.7% in individual therapy). 16.3% of the sample had been treated for depression in the past. Time 2 demographic variables are discussed below.

Measures

Behavioral activation for depression scale. The BADS for Study 2 consisted of the 29 items listed in Table 1, grouped into four subscales (Activation, Avoidance/Rumination, Work/School Impairment, and Social Impairment). The scale began with the instructions, "Please read each statement carefully and then circle the number which best describes how much the statement was true for you during the past week, including today." Respondents were provided a seven-point scale ranging from 0 (*not at all*) to 6 (*completely*). To score the BADS, items from all scales other than the Activation scale were reverse-coded and then all items were summed. To score the subscales, no items were reverse-coded. This process allowed high scores on the total scale and the subscales to be represented by the scale and subscale names. In

Table 1 Item factor loadings from study 1 ($N = 391$) and means and standard deviations from study 2 ($N = 319$)

	Subscale/Item	Study 1 Factor					Study 2	
		1	2	3	4	5	M	SD
Activation								
12	I did something that was hard to do but it was worth it	.842	.020	.030	.079	.044	3.86	1.65
11	I did things even though they were hard because they fit in with my long-term goals for myself	.761	−.089	.018	.155	.112	3.65	1.63
7	I was an active person and accomplished the goals I set out to do	.734	.061	−.112	−.047	−.076	3.58	1.52
4	I engaged in a wide and diverse array of activities	.723	.057	.106	−.166	−.008	3.66	1.57
3	I am content with the amount and types of things I did	.674	.040	.000	−.153	−.031	3.58	1.52
	I rewarded myself in some way for doing things that were good for me	.654	.217	.138	−.107	−.046		
5	I made good decisions about what type of activities and/or situations I put myself in	.642	−.124	−.009	.002	.124	4.22	1.37
23	I structured my day's activities	.562	.061	−.198	.113	.169	3.44	1.66
Avoidance/Rumination								
9	I did things to avoid feeling sadness or other painful emotions	.046	.755	.005	−.109	.009	1.13	1.57
24	I only engaged in activities that would distract me from feeling bad	−.031	.751	−.091	.034	−.028	0.81	1.20
10	I tried not to think about certain things	.015	.722	−.051	−.019	.034	2.01	1.70
13	I spent a long time thinking over and over about my problems	.064	.625	.068	.045	.042	1.97	1.76
15	I frequently spent time thinking about my past, people who have hurt me, mistakes I've made, and other bad things in my history	−.036	.613	−.001	.073	.007	1.78	1.72
25	I began to feel badly when others around me expressed negative feelings or experiences	.115	.593	−.070	.035	−.011	1.43	1.53
	My activities were motivated by a desire to feel good rather than a desire to accomplish a goal	.113	.554	−.070	−.184	−.018		
8	Most of what I did was to escape from or avoid something unpleasant	.024	.545	.202	.038	−.020	1.20	1.45
	I avoided others who might feel badly and bring me down	.040	.490	−.125	−.075	.103		
14	I kept trying to think of ways to solve a problem but never tried any of the solutions	−.004	.466	.140	.114	−.045	1.26	1.34
Work/School Impairment								
22	My work/schoolwork/chores/ responsibilities suffered because I was not as active as I needed to be	.078	−.018	.793	.008	−.094	1.02	1.35
	I went to work/school, but spent my time doing other activities than my assigned tasks	.284	.074	.726	−.087	−.214		
2	There were certain things I needed to do that I didn't do	−.113	−.163	.717	−.003	.095	2.12	1.34
21	I took time off of work/school simply because I was too tired or didn't feel like going in	.192	−.157	.692	.042	−.06	0.70	1.34
1	I stayed in bed for too long even though I had things to do	−.151	−.033	.645	−.105	.127	1.59	1.48
6	I was active, but did not accomplish any of my goals for the day	−.234	−.042	.523	−.084	.020	1.58	1.44
Social Impairment								
18	I was not social, even though I had opportunities to be	−.036	−.166	.008	.865	.019	0.89	1.22
17	I was withdrawn and quiet, even around people I know well	.020	−.024	.001	.772	−.010	0.77	1.11
16	I did not see any of my friends	−.042	−.089	−.089	.636	.014	0.74	1.36
20	I did things to cut myself off from other people	.098	.142	.038	.616	−.031	0.64	1.05
19	I pushed people away with my negativity	.044	.060	.082	.588	.014	0.67	1.17

Note. Item numbers reflect numbers for items on final 25-item scale. Items without item numbers were included in the 29-item scale but excluded from the final scale.

Table 2 Eigenvalues and percentage of variance accounted for by the initial five factors ($N = 391$)

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		Rotation Sums of Squared Loadings
	Total	% Variance	Randomly Generated	Total	% Variance	Total
Activation	13.43	24.41	1.84	12.86	23.39	7.74
Avoidance	5.96	10.88	1.76	5.50	10.01	10.46
Work/School	2.54	4.61	1.71	1.98	3.60	10.34
Social	2.13	3.88	1.65	1.60	2.91	8.09
Factor 5	1.80	3.28	1.60	1.26	2.30	3.28

other words, for the total scale, higher scores represented increased activation, while for the Social Impairment subscale, higher scores represented increased social impairment.

Acceptance and action questionnaire. The AAQ (Hayes et al., 2004) consists of nine statements and measures experiential avoidance (avoidance of thoughts, feelings, and other private events) as conceptualized by Acceptance and Commitment Therapy (Hayes, Strosahl, & Wilson, 1999). The participant rates the truth of each statement on a seven-point scale from 1 (*never true*) to 7 (*always true*). AAQ items include "When I evaluate something negatively, I usually recognize that this is just a reaction and not an objective fact" and "Anxiety is bad." High scores on the AAQ reflect higher levels of experiential avoidance and lower levels of acceptance of private events. The reliability and validity of the AAQ has been established (including moderate to strong correlations with measures of depression) and are reported in Hayes et al. (2004).

Cognitive-behavioral avoidance scale. The CBAS (Ottenbreit & Dobson, 2004) is a self report measure consisting of 31 statements regarding avoidance in four domains. Participants rate the truth of each statement on a five-point scale from 1 (*not at all true for me*) to 5 (*extremely true for me*). Example items include, "I avoid attending social activities" and "I try not to think about problems in my personal relationships." Higher total scores on the CBAS reflect more avoidance behavior. Reliability and validity of the CBAS has been established and are reported in Ottenbreit and Dobson.

Response styles questionnaire. The RSQ (Nolen-Hoeksema & Morrow, 1991) measures rumination, pleasant distraction and problem solving, and risk taking behaviors as responses to feelings of depression. The Reponses Styles Questionnaire asks participants to indicate how often ("almost never," "sometimes," "often," and "almost always") they engage in activities when they are feeling "down, sad, or depressed." The RSQ-RUM is made up of 21 activities listed on the Response Styles Questionnaire and includes activities like "analyze recent events and try to understand why you are depressed" and "go away by yourself and think about why you feel this way." High scores on the RSQ-RUM reflect higher levels of rumination in response to feelings of depression.

Results

Confirmatory factor analyses

An important assumption to satisfy for use of CFA is that the measured variables have a multivariate normal distribution. Initial data screening indicated departures from a normal distribution with three items (items 20, 21, and 22) having moderate skewness (>2) and kurtosis (>5; West et al., 1995). The remaining distributions of the 26 items were acceptable in terms of skewness ($M = .66$, $SD = .73$, range $-.46$–1.95) and kurtosis ($M = .35$, $SD = 1.05$, range $-.72$–2.90). Given these data characteristics, CFA using a robust maximum-likelihood estimation method in LISREL 8.54 (Jöreskog & Sörbom, 2003) was employed to evaluate the second order factor structure of the BADS. This

Table 3 Means and standard deviations for BADS subscales by gender for Study 1

	Total ($N = 391$)		Men ($n = 88$)		Women ($n = 303$)	
	M	SD	M	SD	M	SD
BADS Total	122.07	20.65	121.85	20.34	122.13	20.77
Activation	23.47	9.64	24.03	9.79	23.30	9.60
Avoidance	14.16	8.56	14.29	8.05	14.13	8.71
Work/School	8.08	5.34	8.77	5.47	7.89	5.30
Social	3.42	4.32	3.48	3.84	3.41	4.46

Table 4 Correlations among scales in study 1 using 29-Item scale ($N = 391$)

	BAS Total	Activation	Avoidance	Work/School	Social
BADS Total	1				
Activation	.66	1			
Avoidance	−.77	−.14	1		
Work/School	−.70	−.24	.52	1	
Social	−.67	−.28	.47	.37	1

Note. All correlations significant at $p < .01$.

method allowed for the computation of a Satorra-Bentler Scaled χ^2 (SB χ^2) and robust standard errors which adjust for multivariate kurtosis (Satorra & Bentler, 1994). The interpretation of the SB χ^2 is the same as the traditional χ^2 in that it describes the fit between the pattern of covariation in the data and the hypothesized factor structure scaled for non-normality. Lower values indicate a better fit. Additional fit indices were used, including the Non-Normed Fit Index (NNFI) and the Comparative Fit Index (CFI). NNFI and CFI values range from 0 to 1 and values above .90 represent a good model fit (Bollen, 1989; Hoyle, 1995). The Root Mean Square Error of Approximation (RMSEA; MacCallum, Browne, & Sugawara, 1996) statistic and confidence interval were computed as an indication of the population error variance (Browne & Cudeck, 1993). Values less than .08 demonstrate an acceptable model fit according to Hu and Bentler (1999).

Analyses indicated that the proposed model provided a good fit to the data according to Bollen's (1989) and Hoyle's (1995) standards, SB χ^2 ($df = 373$) = 917.70, $p < .01$; RMSEA = 0.069, 90% Confidence Interval = 0.063–0.075; NNFI = 0.92; CFI = 0.93.

To determine whether items with minimal shared variance could be culled from the BADS, items with squared multiple correlations below .20 and standardized factor loading below .40 were examined. Three items met these criteria and diverged conceptually from the content of other subscale items. Another item was removed given interpretational difficulties; specifically, respondents who scored high on item 21 ("I took time off of work/school simply because I was too tired or didn't feel like going in") would have been arbitrarily forced into low scores on this item ("I went to work/school, but spent my time doing other activities than my assigned tasks"). An additional CFA was conducted removing these four items and resulted in the following fit statistics: SB χ^2 ($df = 271$) = 677.54, $p < .01$; RMSEA = 0.070, 90% Confidence Interval = 0.063–0.077; NNFI = 0.93;

CFI = 0.94. These indicated a modestly improved fit to the data. Thus, removing these four items to produce a final 25 item scale is recommended. Figure 1 presents the completely standardized factor solution of this final CFA. The correlation matrix of the four subscales and total scores can be found in Table 5. The final two columns of Table 1 present the means and standard deviations of the 25 items used in the final scale. Table 6 presents the means and standard deviations for total score and each subscale for all participants and by gender. Independent samples t-tests, using listwise deletion to handle missing data, revealed significant gender differences on the Avoidance subscale, $t(317) = 2.10$, $p = .04$, $d = .24$, and the Social Impairment subscale, $t(311) = 2.71$, $p < .01$, $d = .31$.

Reliability

Internal consistency was assessed using Cronbach's α. The 25-item BADS had an overall α of .87 in Study 2. The internal consistencies of the subscales were: Activation, (7 items, $\alpha = .85$); Avoidance/Rumination (8 items, $\alpha = .86$); Work/School Impairment (5 items, $\alpha = .76$); Social Impairment (5 items, $\alpha = .82$). Test-retest reliability, assessed with a Pearson correlation coefficient, was established on 212 participants who returned for the second administration one week after the first ($r = .74$). BADS subscales also demonstrated sufficient test-retest reliability (Activation $r = .60$, Avoidance/Rumination $r = .76$, Work/School Impairment $r = .64$, Social Impairment $r = .64$).

Predictive validity

Because of high attrition rates at the follow-up assessment, post-hoc analyses of predictive validity were conducted to explore relationships between demographic variables, depression, BADS subscales, and attrition. First, a Fisher exact

Table 5 Correlations among scales in Study 2 using 25-item scale ($N = 319$)

	BAS Total	Activation	Avoidance	Work/School	Social
BADS Total	1				
Activation	.69	1			
Avoidance	−.71	−.27	1		
Work/School	−.67	−.41	.52	1	
Social	−.74	−.41	.55	.44	1

Note. All correlations significant at $p < .01$.

Table 6 Means and standard deviations for BADS subscales by gender in Study 2

	Total (N = 319)		Women (n = 250)		Men (n = 69)	
	M	SD	M	SD	M	SD
BADS Total	110.51	21.04	111.48	19.94	107.00	24.48
Activation	25.89	7.87	25.97	7.85	25.59	8.00
Avoidance*	11.28	8.74	10.94	8.25	13.42	10.18
Work/School*	6.98	4.97	6.67	4.67	8.10	5.84
Social	3.70	4.51	3.34	4.12	4.99	5.52

*Gender difference significant at $p < .05$.
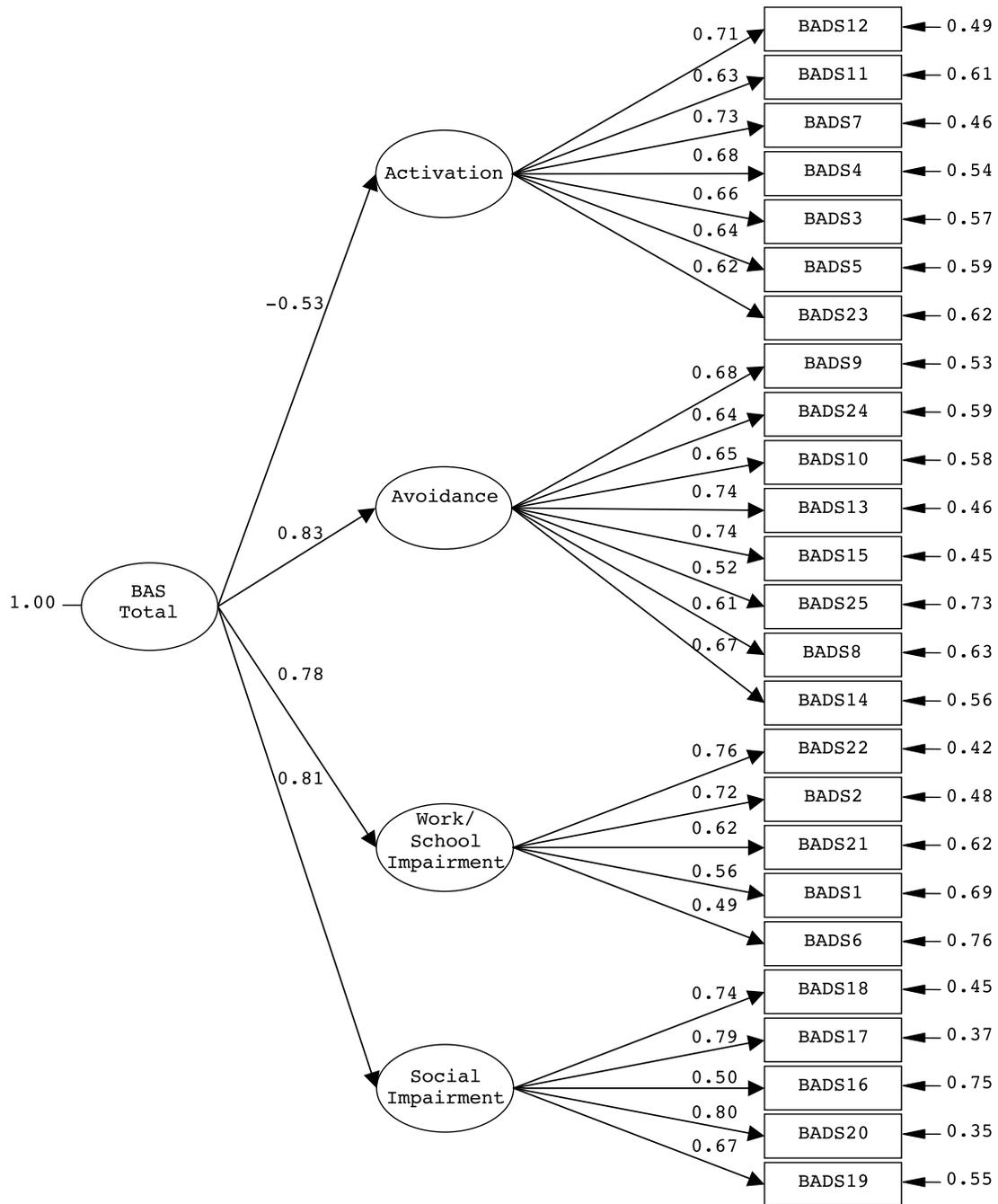
Fig. 1 Completely standardized factor solution of final CFA

test revealed that those who returned for follow-up were more likely to be female (82.55%) than those who did not return for follow-up (70.10%; $p = .014$), but these groups did not differ on any other demographic variable. Independent samples t-tests, using listwise deletion to handle missing data, indicated that those participants who did not return for follow-up had higher scores on the BADS Avoidance/Rumination subscale, $t(317) = 2.93, p = .004, d = .33$; the Work/School Impairment subscale, $t(317) = 3.31, p = .001, d = .38$; and the Social Impairment subscale, $t(311) = 2.15, p = .032$, $d = .24$. No differences were found on Activation subscale or the BDI. A post-hoc logistic regression, with each BADS subscale and the BDI entered simultaneously, revealed that the Work/School Impairment subscale was the only significant predictor of not returning for follow-up ($OR = .93$, $CI = 88–.99, p = .025$).

Construct validity

Initial construct validity was established through significant correlations in the expected directions with the BDI ($r = -.67$), ATQ ($r = -.62$), the AAQ ($r = -.51$), CBAS ($r = -.37$) and RSQ-RUM ($r = -.56$). Correlations between these measures and the BAS subscales are reported in Table 7.

Discussion

The present study provides preliminary support for a 25-item scale that specifically assesses the behaviors believed to be responsible for change (i.e., behaviors that should lead to increased contact with RCPR) according to the BA treatment model (Martell et al., 2001). Exploratory analyses resulted in four subscales which provided a good fit with the data across several indices in a confirmatory analysis. The internal consistency of the total scale was high and test-retest reliability, one week later, was acceptable. The first subscale of the BADS, Activation, consists of seven items that assess goal-directed activation and demonstrated high internal consistency. Assisting individuals to be more active in their lives is the hallmark feature of BA. In contrast to earlier forms of BA, the current BA model does not suggest that individuals should simply engage in more pleasurable activities, but rather they should engage in activities that help

them achieve their specific goals. The Activation subscale reflects this distinction.

Second, the Avoidance/Rumination subscale consists of eight items that demonstrated high internal consistency. Consistent with the BA model, avoidance as measured by this subscale focuses considerably on avoidance of aversive thoughts and feelings. High correlations with the AAQ, which focuses on a similar notion of "experiential avoidance" (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996), and lower but still significant correlations with the CBAS, which assesses avoidance more broadly, support the validity of this subscale. Also, the avoidance subscale correlated most strongly with the BDI, again highlighting the relationship between avoidance and depression fundamental to the BA model.

It was initially hypothesized that avoidance and rumination items would factor separately. However, exploratory and confirmatory analyses indicated that these items assess one underlying construct. The high correlation between the Avoidance/Rumination subscale of the BADS and the rumination subscale of the Response Styles Questionnaire provides additional evidence for the validity of this grouping. Although different from initial hypotheses, this finding is consistent with the BA view that individuals frequently ruminate as an avoidance strategy for aversive situations or tasks (Ferster, 1973; Martell et al., 2001). The relationship between rumination and depression is clear: Rumination has been found to predict the onset (Just & Alloy, 1997; Nolen-Hoeksema, 2000), length (Umberson, Wortman, & Kessler, 1992), and severity (Nolen-Hoeksema, Parker, & Larson, 1994) of depressive episodes. Less clear is the nature of that relation and the specific function of rumination as avoidance, although rumination has been found to lead to decreased social involvement and increased social isolation (Umberson et al., 1992).

Research on the role of worry in anxiety provides additional support. Several convincing reviews highlight that chronic worry is associated with the absence of attempts to actively solve problems and is a dysfunctional attempt to avoid anxious arousal (Barlow, 2002; Borkovec, 1994; Craske, 1999). Given apparent similarities between worry and rumination, as well as recent research that they often co-occur in the same individuals and share the same processes (Watkins, Moulds, & Mackintosh, 2005), a parallel function of rumination in depression —that rumination may represent

Table 7 Correlations among BADS subscales and other scales in Study 2 ($N = 319$)

	ATQ	BDI	AAQ	CBAS*	RSQ-RUM
BADS Total	−.62	−.67	−.51	−.37	−.56
Activation	−.36	−.46	−.42	−.40	−.26
Avoidance	.63	.63	.51	.29	.64
Work/School	.47	.48	.28	.28	.42
Social	.60	.61	.41	.41	.50

Note. All correlations significant at $p < .01$.

*$n = 220$.

a dysfunctional attempt to avoid depressive affect— was expected. Future research is needed to shed light on this topic.

The final two subscales, the Work/School Impairment subscale and the Social Impairment subscale, each contain five items and both evidenced acceptable internal consistency. Behavioral Activation attempts to teach individuals to examine how their avoidance impacts their required work/school activities and, again, an emphasis is placed on behaviors that are directed toward the accomplishment of goals that the individual has determined to be important in this area. Notably, Study 2 produced some evidence for the predictive validity of the Work/School Impairment subscale, as it emerged as the single predictor of returning for the study's follow-up administration. Specifically, participants high in work/school impairment were less likely to return for follow-up (and thus did not obtain potentially needed extra-credit points), thus exemplifying the consequences of avoidance on school performance. Finally, social interactions and activities are also a primary treatment focus within the BA model and the Social Impairment subscale captures this issue. These latter two subscales are a way for clinicians and researchers to directly assess whether or not BA is resulting in decreases in avoidance and increases in activation in primary day-to-day functioning in these areas.

Although the BADS was designed specifically for BA and not BATD (Lejuez et al., 2002), some discussion of the utility of the BADS for BATD may be helpful. Specifically, three of the four BADS subscales—Activation, Work/School Impairment, and Social Impairment—may be useful to assess client behavior in both treatments. These subscales assess a broad goal-directed activation repertoire as well as specific repertoires related to work, school and social activity; these repertoires are fundamental to and targeted by both treatments. The fourth subscale—Avoidance/Rumination— may be somewhat specific to BA as it assesses avoidance of aversive affect and rumination, two related variables that are specifically emphasized in BA and not BATD. However, decreases in avoidance and rumination may also occur in BATD as activation increases. In fact, such changes are predicted by Herrnstein's (1970) matching theory, upon which BATD is based. Thus the full scale and subscales may be appropriate for both BA and BATD clients.

Existing measures used to track changes over the course of depression treatment in either depression directly or purported mediators of depression tend to minimize or ignore the role of behavior (e.g., the BDI or ATQ) or focus exclusively on the assessment of pleasurable activities (e.g., the IES). Given the functional analytic nature of BA and BATD, it is especially important for these clinicians to be able to assess problem behaviors and then closely monitor the consequences of their interventions over the course of treatment. Thus, it is important to examine the relationship of the BADS to other empirically validated measures used

in this context. The significant, negative correlation found between the BADS and the BDI was expected in that low scores on the BADS, reflecting more severe avoidance, less activation, and more work/school and social consequences of avoidance should correlate with increased severity of depressive symptoms. Likewise, the BADS correlated quite strongly and negatively with the ATQ. The BADS can be conceptualized as the behavioral counterpart to the ATQ— while the ATQ purportedly measures changes in cognitive mediators over the course of treatment, the BADS may measure changes in behavioral mediators.

Thus, a full investigation of mediation and mechanism of change in BA and BATD could potentially use the BADS as a component of a multi-modal assessment. Specifically, the BADS is an attempt to measure whether clients are changing their behavior in ways that should lead to increased RCPR, according to the theory underlying BA. It does not assess RCPR directly or the outcome of the client behavior. A true behavioral assessment of RCPR would (1) establish the presence, in the client's environment, of reinforcing events contingent on the occurrence of target behavior, and (2) show an increase in the targeted behavior over time. Anything other than that, behaviorally speaking, is a proxy measure. However, the Environmental Reward Observations Scale (EROS; Armento & Hopko, in press) appears to be a reliable, valid and simple approach to such a proxy assessment of RCPR and may be useful in that regard. An assessment battery administered weekly over the course of treatment that includes the BADS, EROS and a measure of depression such as the BDI may converge on the purported mechanism of change in BA nicely.

The BADS in its current form and this study have several limitations. First, scale items were developed in accordance with the BA treatment manual (Martell et al., 2001); this strategy for item selection may have resulted in the exclusion of certain areas of interest to BA not covered in the manual, such as eating and substance abuse. As the scale accounted for 44% of the total variance in Study 1, additional items may help explain a larger portion of variance and thus make the scale more sensitive to changes over the course of therapy. In addition, the current study included an undergraduate sample that demonstrated a poor follow-up rate in Study 2, limiting confidence in conclusions about test-retest reliability. It also included a relatively small sample of men, precluding a full investigation of gender differences in model fit and validity, which may be necessary given evidence for gender differences in Avoidance and Social Impairment subscale scores.

Replication of these results with different samples, particularly clinical and more ethnically diverse samples, is necessary. The psychometric properties and factor structure obtained here may not generalize to these other populations; such work is critical before the BADS can be used by

researchers and clinicians to measure processes of change during treatment. Establishing convergent and divergent validity with a broader range of measures would also be helpful in understanding more precisely what the BADS and its subscales measure. Finally, current evidence for predictive validity is limited. Additional demonstrations, including predictions of changes in depression over the course of therapy, would further understanding of the predictive potential of this measure.

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