

Validation of the Behavioral Activation for Depression Scale (BADs) in a Community Sample with Elevated Depressive Symptoms

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Abstract The Behavioral Activation for Depression Scale (BADs) was previously developed to measure changes in avoidance and activation over the course of Behavioral Activation for depression. Initial scale development, definition of the factor structure and confirmation of the factor structure was performed with a non-depressed undergraduate sample. These prior results revealed four factors (Activation, Avoidance/Rumination, Work/School Impairment, and Social Impairment) with good factor structure, internal consistency, and test–retest reliability. The purpose of the current study was to evaluate the psychometric properties, factor structure and construct validity of the BADs with a community sample with elevated depressive symptoms ($N=193$). Results indicated good psychometric properties, additional evidence for construct validity of the total scale and subscales, and adequate fit of the data to the original factor structure. Normative data are also provided separately for depressed men and women, and for Caucasians and African Americans.

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

Introduction

Behavioral Activation for depression has a long and varied history. Lewinsohn (1974) first described depression as characterized primarily by losses of, reductions in, or chronically low levels of response-contingent positive

reinforcement (RCPR) and developed simple activation techniques (i.e., pleasant events scheduling) to increase rates of RCPR. Essentially, this involved identification of positive reinforcement contingencies and removal of aversive environmental contingencies and then scheduling and monitoring of specific client activities that should lead to contact with these contingencies. Such techniques, with some exceptions (e.g., Hammen and Glass 1975), have been shown to be as effective as other active treatments, including Cognitive Therapy (Cuijpers et al. 2007), and the simple rationale and straightforward application may ultimately lead to widespread use.

Currently, these techniques have been elaborated into two variants of Behavioral Activation: Behavioral Activation (BA; Martell et al. 2001) and Behavioral Activation Treatment for Depression (BATD; Hopko and Lejuez 2007; Lejuez et al. 2001a, 2002). Both essentially activate clients to contact positive reinforcement but are arguably more functional and idiographic than earlier versions of pleasant events scheduling. Specifically, the current variants do not suggest that individuals should simply engage in more pleasurable activities, but rather each variant provides explicit assessments of both client goals and the function of current client behavior to determine a set of focused activation targets (Kanter et al. 2004). However, significant differences exist between the two variants (Hopko et al. 2003a). Both emphasize the process of increasing positive reinforcement for non-depressed healthy behavior. BATD is more simple and structured, involving guided activity that is dictated by clients' life goals and values, while BA is more elaborate, including additional techniques such as social skills training and teaching clients to conduct functional analyses of their own behavior. Also, BATD explicitly encourages assessment of positive reinforcement for depressive behavior (e.g., sympathy from others for

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being “sick”) while BA explicitly encourages assessment of negative reinforcement for depressive behavior (e.g., avoidance behaviors that temporarily decrease negative affect but exacerbate depression in the long run).

Research on both variants has produced optimism that these simple, pragmatic approaches may be applicable for a range of depressive presentations as well as related conditions. Dimidjian et al. (2006) compared BA, CT, Paroxetine and a medication placebo in a large randomized trial and found that both BA and Paroxetine outperformed CT and placebo for moderate-to-severe depression. Several smaller trials have also been supportive, including a group therapy version of BA compared to a wait-list control in a public mental health setting (Porter et al. 2004), a randomized comparison of BATD to general supportive therapy on an inpatient unit (Hopko et al. 2003b), an uncontrolled trial of BA for posttraumatic stress disorder symptoms in a veteran sample (Jakupcak et al. 2006), and a trial of BATD with inner-city illicit drug users with elevated depressive symptoms (Daughters et al. 2008). In addition, a number of successful case studies of BATD have been published, including 6 depressed cancer patients (Hopko et al. 2005), 3 community mental health patients (Lejuez et al. 2001b), a case of co-morbid anxiety and depression (Hopko et al. 2004), a suicidal, depressed patient with Borderline Personality Disorder (Hopko et al. 2003c), and a depressed adolescent (Ruggiero et al. 2007). Currently, BA and BATD are being evaluated in randomized trials for depressed adolescents, depressed nicotine addicts, depressed Latinos, depressed obese patients, and depressed breast cancer patients (Kanter and Mulick 2007).

Key variables to measure in studies of BA and BATD are when and how clients become less avoidant and more activated over the course of treatment, and the Behavioral Activation for Depression Scale (BADS) was developed for this purpose (Kanter et al. 2006). The BADS was produced through an exploratory factor analysis of a rationally derived set of items using an undergraduate sample ($N=391$) followed by confirmatory factor analysis using a second undergraduate sample ($N=319$). This produced a 25-item total scale and 4 subscales that demonstrated good internal consistency, test–retest reliability and construct validity. The subscales were: *Activation*, representing focused, goal-directed activation and completion of scheduled activities; *Avoidance/Rumination* representing avoidance of negative aversive states and engaging in rumination rather than active problem solving; *Work/School Impairment*, representing inactivity and passivity regarding work and school responsibilities; and *Social Impairment* representing similar social consequences and social isolation.

Scale development is an iterative process that occurs over several stages. Because the BADS factor structure was not developed or confirmed with a community sample with

elevated depressive symptoms, an important next step was to evaluate the psychometric properties, construct validity and factor structure of the BADS with this sample. This study therefore administered the BADS to a community sample with elevated depressive symptoms and included several additional measures for additional evaluations of construct validity. These additional measures include the Cognitive Behavioral Avoidance Scale (CBAS), the Social Support Questionnaire—Short Form (SSQ), and the Center for Epidemiologic Studies Depression Scale (CES-D). A rationale for including each measure and specific hypotheses on how each should relate to the BADS are included below.

Method

Participants and Procedures

This research was approved by the Institutional Review Board of the University of Wisconsin-Milwaukee. Individuals were recruited from advertisements in the Milwaukee community that asked individuals who were feeling depressed to complete a survey, and \$20 was provided for study completion. Participants were provided the option to complete the survey packet online or paper-and-pencil. In both cases, participants first provided informed consent and then completed the questionnaire packet (additional scales not relevant to the current study and not described below were also included).

A total of 214 community members completed the survey. However, 21 participants scored lower than the cut-off for moderate depressive symptoms using the Center for Epidemiological Studies—Depression scale ($CES-D \geq 16$; Radloff 1977). These individuals were removed from all analyses and will not be reported on herein, leaving a total sample of 193. The mean age of this sample was 39.02 ($SD=14.99$) years and 70.7% were women. Regarding ethnicity, 64.2% Caucasian, 23.3% African American, 3.6% Mexican American, 1.6% Native American, 1.6% Asian American, and 5.7% other. Average years of education was 14.01 ($SD=3.45$). For household income, 40.5% identified as lower, 27.4% identified as lower middle, 22.6% identified as middle, 7.9% identified as upper middle, and 1.6% identified as upper.

Measures

Behavioral Activation for Depression Scale (BADS; Kanter et al. 2006) The development and psychometric properties of the BADS are described above. The BADS consists of 25 items grouped into four subscales (Activation, Avoidance/Rumination, Work/School Impairment, and Social Impair-

ment). The scale begins 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 are 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 are reverse-coded and then all items are summed. To score the subscales, no items are reverse-coded. This process allows high scores on the total scale and the subscales to be represented by the scale and subscale names. In other words, for the total scale, higher scores represent increased activation, while for the Social Impairment subscale, higher scores represent increased social impairment.

Cognitive Behavioral Avoidance Scale (CBAS) The CBAS (Ottenbreit and Dobson 2004) is 31-item self-report measure that assesses cognitive/behavioral and social/non-social avoidance. Items are rated on a 5-point scale with higher scores indicating greater avoidance. The CBAS has good construct validity and good internal consistency ($\alpha=.91$; Ottenbreit and Dobson 2004). The CBAS was administered in Kanter and colleagues (2006) to 319 undergraduates and although all correlations with BADS total score and subscales were in the expected directions, the strength of these relationships was surprisingly low. These low correlations may have been due to the undergraduate sample used. Thus, in the current sample with elevated depression, it was hypothesized that the CBAS would be negatively correlated with the BADS total score and the Activation subscale and positively correlated with the Avoidance/Rumination, Work/School Impairment, and Social Impairment subscales at higher levels than in Kanter and colleagues.

Social Support Questionnaire—Short Form (SSQ) The SSQ (Sarason et al. 1987) is a 12-item self-report measure that assesses the quantity and quality of social support gained from interpersonal relationships. For each item, participants are asked to list up to 9 individuals who they feel supported by and then rate how satisfied they are with that support on a 6-point scale, resulting in a number-of-supports subscale and a satisfaction subscale. The SSQ has good internal consistency ($\alpha=.90-.93$) and acceptable psychometric properties (Sarason et al. 1987). The SSQ was administered to demonstrate a relationship between activation level and social functioning, as social factors are often important to the etiology and maintenance of depression (Barnett and Gotlib 1988) and to specifically validate the Social Impairment subscale, as no measure of social functioning was administered in Kanter and colleagues (2006). Thus, it was hypothesized that the SSQ would be positively correlated with BADS total score and negatively correlated with the Social Impairment subscale.

Center for Epidemiologic Studies Depression Scale (CES-D) The CES-D (Radloff 1977) is a 20-item self-report measure that assesses type and severity of depressive symptoms. Items are rated on a 4-point scale with higher scores indicating greater depression severity. The CES-D has moderate test–retest correlations and high internal consistency in a psychiatric population ($\alpha=.90$; Radloff 1977). A cut-off of 16 or higher on the CES-D, indicating moderate to severe depressive symptoms, was used in the current study. It was hypothesized that depression severity would be positively correlated with the BADS total score and the Activation subscale and negatively correlated with the Avoidance/Rumination, Work/School Impairment, and Social Impairment subscales, which would replicate the findings of Kanter and colleagues (2006).

Results

Depression Severity

The sample demonstrated a mean CES-D score of 29.42 ($SD=8.45$), indicating a moderate and clinically significant level of depressive symptoms. There were no significant differences in levels of depressive symptoms between men ($M=28.15$, $SD=8.39$) and women ($M=29.98$, $SD=8.45$), or between Caucasians ($M=29.08$, $SD=8.50$) and African Americans ($M=30.13$, $SD=8.18$).

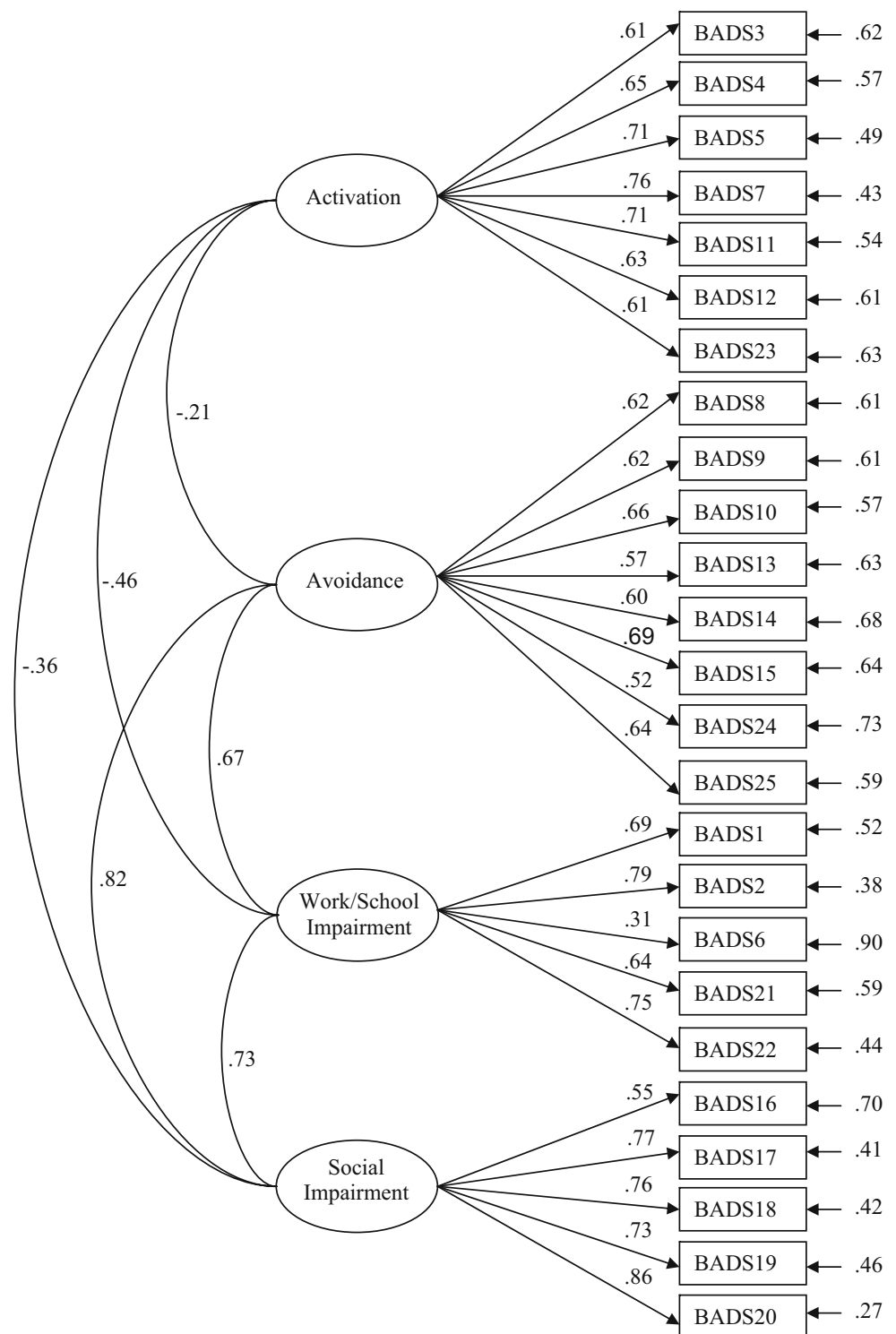
Scale Properties

The total scale and subscales demonstrated good internal consistency: Total scale $\alpha=.92$, Activation $\alpha=.84$, Avoidance/Rumination $\alpha=.82$, Work/School Impairment $\alpha=.75$, and Social Impairment $\alpha=.85$. Item-subscale correlations were inspected for each subscale. For Activation, correlations ranged from .55 to .67; for Avoidance/Rumination, correlations ranged from .45 to .60; for Work/School Impairment, item 6 correlated .24 with the subscale and the others ranged from .52 to .68; and for Social Impairment, item correlations ranged from .54 to .73. Item-total scale correlations ranged from .28 to .74.

Figure 1 presents inter-correlations between subscales. Subscale-total scale correlations (removing each subscale from the total scale for its analysis) were found to be significant ($p<.01$) for three of the subscales: Avoidance/Rumination $r=-.61$, Work/School Impairment $r=-.48$, and Social Impairment $r=-.61$. The Activation subscale was not significantly correlated with the total scale score when it was removed from the total ($r=.13$, $p=.096$).

Table 1 presents subscale means and standard deviations for the total sample, by gender, and for Caucasians and

Fig. 1 Completely standardized CFA factor solution



African Americans. In comparison to the original sample of non-depressed undergraduates ($n=319$; Kanter et al. 2006), the current community sample with elevated depressive symptoms scored significantly higher on the Avoidance (original sample $M=11.28$, $SD=8.74$, $t(510)=14.61$, $p < .01$), Work/School Impairment (original sample $M=6.98$, $SD=4.97$, $t(510)=11.35$, $p < .01$), and Social Impairment

subscales (original sample $M=3.70$, $SD=4.51$, $t(510)=17.06$, $p < .01$). In contrast, the original sample reported higher levels of Activation (original sample $M=25.89$, $SD=7.87$, $t(510)=12.74$, $p < .01$).

To explore gender and ethnicity, 5 ANOVAs, using listwise deletion to handle missing data, were conducted with gender, ethnicity and their interaction entered as

Table 1 BADS means and standard deviations for the total sample and by gender and ethnicity

	Total (N=193)		Gender ^a				Ethnicity			
			Men (n=57)		Women (n=134)		Caucasian (n=120)		African American (n=43)	
	M	SD	M	SD	M	SD	M	SD	M	SD
Total BADS	69.83	20.15	68.40	18.33	70.44	20.93	70.60	19.29	66.53	21.95
Activation	15.68	7.75	15.58	8.15	15.69	7.61	14.96	7.48	17.45	8.58
Avoidance/Rumination	25.11	9.34	25.96	8.24	24.70	9.82	24.02	8.96	27.63	10.38
Work/School Impairment	13.80	6.43	14.25	6.41	13.58	6.47	13.82	6.00	14.62	8.04
Social Impairment	13.51	7.30	13.82	6.68	13.37	7.57	13.28	7.02	14.21	7.82

^aTwo individuals did not include their gender on the demographics form.

independent variables and total BADS score and each subscale score as dependent variables. Results indicated no significant differences in BADS total or subscales scores by gender, ethnicity or their interaction. Results remained the same when controlling for depression severity.

Construct Validity

Table 2 presents the correlations between the BADS and the CBAS, SSQ-number, SSQ-satisfaction, and CES-D scales. Regarding avoidance, the BADS total score and all subscales but the Activation subscale correlated with the CBAS in the expected directions. As avoidance, work/school impairment, and social impairment on the BADS increased, avoidance on the CBAS also increased in this sample. Regarding social support, the BADS total score and all subscales correlated significantly with SSQ-number and SSQ-satisfaction. In general, fewer and less satisfaction with social supports correlated with less activation, more avoidance and more social impairment. Regarding depression, the BADS total score and all subscales correlated significantly with the CES-D. A relatively small, but still significant relationship was found between the BADS activation subscale and depression in that as activation increased, depression decreased.

Being that data were collected on both the BADS and the CBAS for the current sample and the original sample of undergraduate students (n=319; Kanter et al. 2006), correlations between these two measures were compared across samples using the z-score test of independent

correlations. Results indicated that the correlation coefficients for these two samples were significantly different. Specifically, the correlations between the CBAS and BADS total (original $r=-.37$), Avoidance (original $r=.29$), Work/School Impairment (original $r=.28$), and Social Impairment (original $r=.41$) subscales and CBAS were significantly larger for the current sample than for the undergraduate sample ($z=-3.09, p <.01$; $z=3.51, p <.01$; $z=2.10, p=.02$; $z=2.59, p <.01$; respectively). In contrast, the BADS Activation subscale and CBAS were correlated significantly in the original sample ($r=-.40$), but not in the current sample ($z=3.42, p <.01$).

Confirmatory Factor Analysis

Initial data screening indicated no departures from a multivariate normal distribution in terms of skewness ($M=.30, SD=.22$, range $-.15$ to $.66$) and kurtosis ($M=-.74, SD=.21$, range -1.17 to $-.39$; West et al. 1995). Given these data characteristics, CFA using a robust maximum-likelihood estimation method in Mplus 3.12 (Muthén and Muthén 2004) was conducted. Several fit indices were generated, including the Tucker-Lewis Index (TLI; also known as the Non-Normed Fit Index) and the Comparative Fit Index (CFI). TLI 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 et al. 1996) statistic and confidence interval were computed as an indication of the population

Table 2 Correlations between BADS Total/Subscales and additional measures

	CBAS	SSQ—Number	SSQ—Satisfaction	CES-D
BADS Total	-.59**	.29**	.34**	-.72**
Activation	-.06	.15*	.28**	-.19*
Avoidance/Rumination	.57**	-.23**	-.19*	.61**
Work/School Impairment	.46**	-.16*	-.27*	.62**
Social Impairment	.60**	-.30**	-.32**	.70**

CBAS Cognitive Behavioral Avoidance Scale, SSQ Social Support Questionnaire, CES-D Center for Epidemiological Studies—Depression Scale * $p <.05$; ** $p <.01$

error variance (Browne and Cudeck 1993). Values less than .08 demonstrate an acceptable model fit according to Hu and Bentler (1999). Finally, the Standardized Root Mean Squared Residual (SRMR) was computed with a suggested cut-off value for good fit of .08 (Hu and Bentler 1999).

Evidence for model fit varied somewhat by index, χ^2 ($df=270$)=621.57, $p<.001$; TLI=.804; CFI=.823; RMSEA=.082, 90% Confidence Interval=.074 to .091; SRMR=0.10. The SRMR and RMSEA provided evidence for moderate to good model fit, while the CFI and TLI were less impressive. However Raykov and Widaman (1995) point out that CFI and TLI are dependent upon sample size. Figure 1 presents the completely standardized factor solution of the CFA.

Discussion

This study provides additional evidence for the psychometric properties of the BADS using a community sample with elevated depressive symptoms. The subscales demonstrated good internal consistency in this administration and acceptable item-total correlations. One scale item (item 6) performed somewhat poorly and it may be important to flag this item as a potential concern as the scale continues to develop. It is premature at this point, however, to remove item 6 from the scale. The current investigation also provides normative data for the BADS for community samples of men and women, and Caucasians and African Americans, all with elevated depressive symptoms. Men and women did not demonstrate significant differences in BADS total or subscale scores, nor did African Americans and Caucasians.

This study also provides additional evidence for the construct validity of the BADS, with the BADS total score and subscales showing predicted relations with measures of avoidance, social support and depression. Furthermore, in the current sample with elevated depressive symptoms the BADS was more strongly related to a measure of avoidance than it was in the undergraduate sample of Kanter et al. (2006). This is undoubtedly due to the higher levels of depression in this sample, but different measures of depression were used in the two studies making it difficult to fully tease apart the relations between BADS scales, avoidance and depression. Undoubtedly the relations are complex as discussed below. It is worth noting that the activation subscale appeared to be less related to depression than the other three subscales or the BADS total score in the current study and in Kanter et al. (2006). The earlier study also found that the social activity subscale of the Interpersonal Events Schedule (a measure of engagement in pleasurable social activities; Youngren and Lewinsohn 1980) was less related to depression severity ($r=-.28$) than the BADS total score ($r=-.70$). Taken together these findings support the addition of goal-directed

activation, as suggested by both BA and BATD, to traditional pleasant events scheduling. However, it also is possible that the lower correlations between depression and the activation subscale on the BADS could represent a relative weakness of this subscale.

Importantly, the factor structure of the BADS was originally confirmed with an undergraduate sample; this study now offers support for the factor structure using a community sample with elevated depressive symptoms that is more representative of the population for which the scale is intended. Although the strength of fit varied somewhat by fit index, in general the fit was adequate and no fit index called for real concern. However, the fit is less than perfect and future research may consider investigating alternate structures or the inclusion of additional items to better represent the hypothesized factor structure. One limitation of this study was the relatively small sample size used to conduct the CFA. As mentioned earlier, some fit indices are affected by sample size, and therefore this may be a reason for the less than excellent model fit. Future studies should attempt to utilize larger samples when confirming the factor structure of the BADS.

The BADS now has demonstrated strong relationships with measures of depression and avoidance in three separate samples, providing evidence for construct validity. However, these constructs are quite interrelated and efforts to disentangle them are encouraged. An important aspect of the theory of depression upon which BA and BATD are based is that changes in activation should mediate changes in depression (Hopko et al. 2003a; Martell et al. 2001). Thus, longitudinal research showing that changes in activation predate and predict changes in depression is necessary; this scale, as well as other useful measures including the Environmental Reward Observations Scale (Armento and Hopko 2007) may facilitate such research, and thus BA and CBT treatment researchers are encouraged to consider inclusion of these scales in future randomized trials. Along these lines, Coffman et al. (2007) found that clients with increased functional impairments and problems with primary support groups performed especially poorly in CBT but not in BA in the recent randomized trial (Dimidjian et al. 2006). Perhaps BADS subscales (e.g., work/school impairment and social impairment), as they were designed specifically for clients in BA treatment, may offer additional predictive utility in this regard.

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