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Measurement Article

Attachment to Life: Psychometric Analyses of the Valuation of Life Scale and Differences Among Older Adults

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Abstract

Purpose of study: Examine psychometric properties of Lawton's Valuation of Life (VOL) scale, a measure of an older adults' assessment of the perceived value of their lives; and whether ratings differ by race (White, Black/African American) and sex.

Design and Methods: The 13-item VOL scale was administered at baseline in 2 separate randomized trials (Advancing Better Living for Elders, ABLE; Get Busy Get Better, GBGB) for a total of 527 older adults. Principal component analyses were applied to a subset of ABLE data (subsample 1) and confirmatory factor analyses were conducted on remaining data (subsample 2 and GBGB). Once the factor structure was identified and confirmed, 2 subscales were created, corresponding to optimism and engagement. Convergent validity of total and subscale scores were examined using measures of depressive symptoms, social support, control-oriented strategies, mastery, and behavioral activation. For discriminant validity, indices of health status, physical function, financial strain, cognitive status, and number of falls were examined.

Results: Trial samples (ABLE vs. GBGB) differed by age, race, marital status, education, and employment. Principal component analysis on ABLE subsample 1 (n = 156) yielded two factors subsequently confirmed in confirmatory factor analyses on ABLE subsample 2 (n = 163) and GBGB sample (N = 208) separately. Adequate fit was found for the 2-factor model. Correlational analyses supported strong convergent and discriminant validity. Some statistically significant race and sex differences in subscale scores were found.

Implications: VOL measures subjective appraisals of perceived value of life. Consisting of two interrelated subscales, it offers an efficient approach to ascertain personal attributions.

Keywords: Quality of life, Biographical management, Affective well-being

Attachment to life, or the extent to which life is considered to have value, is an important area of inquiry in gerontology with implications for advancing psychosocial supportive interventions. This is particularly the case for individuals who are aging with frailty and complex comorbidities that impinge on everyday life. Measuring attachment to life however is challenging. In 1999, Lawton and colleagues introduced a new measure, Valuation of Life (VOL), to capture an older adult's affective and cognitive appraisals of the perceived value of their lives. A brief scale, each of its 13

items reflects a unique stance towards life that participants are asked to endorse along five-point scales (1 = agree strongly to 5 = disagree strongly). The composite score, reflecting overall valuation, captures the summation of an internal dialogue in which older adults evaluate and weigh both the positive and negative aspects of their life and reasons for living. The overall score "summarizes the meaning and purpose of the individual's total life" (Lawton et al., 2001, p. 26) and is indicative of the ability of older adults to positively compensate for deficits associated with aging. With VOL, Lawton and colleagues suggested that, "both environmental and personal factors, positive and negative features, and physical and mental health and pathology, all processed by the individual jointly, determine how much individuals value their lives" (Lawton et al., 2001, p. 407).

Historically, VOL was developed to counteract the singular focus of traditional health utility measures on health and physical functioning as primary drivers of meaning in life evaluations. Among others, Lawton and colleagues argued that other aspects of daily life factored equally or even more so into appraisals as to whether one's life was valued: "…there is more to the wish to live than health. In fact, in concert with the many types of input from non-health-related sources of quality of life, health is at least matched in potency as an influence on the wish to live by cultural, social, and psychological factors" (Lawton et al., 1999, p.415).

VOL is anchored in positive psychology which postulates that positive emotions and psychological strengths shape appraisals of well-being (Gable & Haidt, 2005; Seligman & Csikszentmihalyi, 2000). This viewpoint reflects the stance that both positive and negative emotions coexist in dynamic and context specific relationships and should be considered simultaneously as influencing determinations of well-being. This is in contrast to prevailing deficit models that emphasize distress and negative emotions as primary drivers of mental health and in which positive and negative emotions are understood as bipolar, inversely related opposites. These orientations lead to different intervention strategies to support adults in late life. Whereas positive psychology seeks to strengthen internal resources to promote well-being, a deficit approach seeks to reduce symptomatology (Zarit & Robertson, 2006). This perspective is buttressed by many studies from different fields (Seligman, Steen, Park, & Peterson, 2005). Research on caregiving have shown that positive and negative emotions and reactions are distinct and co-existing dimensions (Roth, Fredman, & Williams, 2015). Self-efficacy, which reflects a person's appraisal of their abilities to shape desired outcomes, is a strong predictor of psychological outcomes with poor self-efficacy related to distress (Fry & Debats, 2002).

The initial developmental studies of VOL provided strong support for this concept. Early studies demonstrated that VOL had adequate psychometric properties and as hypothesized, outperformed health-related quality of life measures as measured in terms of years of desired life, in explaining an older adult's VOL. VOL was also found to be positively related to mental health indicators and other psychological constructs including mastery, inversely related to depressive symptoms, and a predictor of how long a person wished to live under hypothetical health scenarios (Lawton et al., 2001; Lawton, Moss, Winter, & Hoffman, 2002; Moss, Hoffman, Mossey, & Rovine, 2007).

Despite initial promising results, the VOL scale has received modest research attention. The few studies employing this scale show important outcomes. Jopp and colleagues (2008) found that sociodemographic characteristics differentially influenced VOL ratings such that health tended to inform the ratings among the young–old whereas social resources appeared more important with older age. Randall and Bishop (2012) showed that factors such as forgiveness and social ties mediated the strong relationship previously reported by others between religion and VOL in a study sample of incarcerated men. The VOL scale was translated into Japanese (Nakagawa et al., 2013) and Portuguese (Araujo, Ribeiro, Teixeira, & Paul, 2015) and found in both studies to be psychometrically sound for and meaningful to older adults with frailty in these two countries.

This present study extends previous efforts by obtaining an independent evaluation of the factor structure underlying the 13-item VOL within two distinct samples from randomized, controlled trials (ABLE; GBGB) in the United States. The ABLE trial tested a home-based six session intervention to reduce functional difficulties and improve self-efficacy and overall well-being (Gitlin et al., 2006). ABLE participants were Caucasian (N = 168) or Black/African American (N = 145), 70 years of age or older, had one or more functional difficulties, lived in the community, and were cognitively intact (Mini-mental State Examination [MMSE] score >23 (Folstein, Folstein, & McHugh, 1975).

The trial, Get Busy Get Better: Helping older adults Beat the Blues trial (GBGB; Gitlin et al., 2013) tested a home-based eight-session intervention to reduce depressive symptoms and improve daily function and well-being. GBGB participants were Black/African American (N = 208), 50 years or older, scored ≥5 on the Patient Health Questionnaire (PHQ-9; Kroenke, Spitzer, & Williams, 2001), consistent with depressive symptomatology, and were cognitively intact using the MMSE (>23).

These two samples provide an opportunity to examine VOL ratings among diverse older adults with different deficits (physical limitations; mood disorder). We first explored the factor structure with principal component analyses and later conducted confirmatory factor analyses on the remaining data. Once a suitable factor structure was identified and confirmed, two subscales were created and convergent and discriminant validity of VOL total and subscale scores were examined in the pooled sample of N = 527 using shared measures and in each separate sample (ABLE, GBGB), using measures unique to each study. For the total pooled sample, for convergent validity, we expected VOL scores to strongly correlate with measures of depressive symptoms and social

support. As previous research showed, we expected an inverse association with depressive symptoms; similarly, we expected that higher VOL scores would be associated with greater social support. Specific to the ABLE sample, we expected control-oriented strategies (e.g., compensatory strategies employed to obtain desired daily functional goals), and mastery, and for the GBGB sample, we expected behavioral activation (e.g., use of action-oriented coping strategies), to be strongly correlated with VOL measures. That is, higher VOL scores would be associated with greater control strategy use and behavioral activation, and higher mastery.

Conversely, for discriminant validity, we expected small to non-significant associations between VOL measures and indices of health status, physical function, and financial strain for the pooled sample; and for cognitive status and number of falls (in past year) in the ABLE sample. We reasoned similarly to Lawton et al., that while these factors may contribute in part to the perceived value of one's life, other factors would be more important contributors to VOL ratings such as those we propose to use to demonstrate convergent validity (i.e., depressive symptoms, social support).

Finally, we sought to identify differences on the VOL measures in the pooled diverse sample by race (White and Black/African American), and sex (male/female). As aging and health-related changes are experienced differentially, understanding variations in race and sex can guide the design of targeted interventions. In this study, only data obtained at the baseline interview (prior to randomization and intervention delivery in both trials) were used to examine psychometric properties and differential ratings.

VOL has both theoretical and practical import. Conceptually, it is designed to capture a range of appraisals and go beyond a singular or discrete measure of mood, mastery, or control for example. Clinically, chronic illness, functional challenges, and other decrements place older adults at risk for poor mental health. How older adults with physical deficits or mood disorders (the focus of this study) appraise their situation, provides insight as to their well-being which can inform strength-based interventions (Steger, Frazier, Oishi, & Kaler, 2006). As the field is hindered by poor measurement, this study sought to confirm and extend the properties of VOL and reinvigorate this construct. Confirming and extending the psychometric soundness of VOL is a first necessary step prior to evaluating its utility in designing strength-based interventions and measuring treatment effects.

Method

Study Sample and Procedures

Participants in this study consisted of 527 older adults from two separate samples: 319 from the ABLE trial (Gitlin et al., 2006) and 208 from GBGB trial (Gitlin et al., 2013). In both trials, participants were recruited through mailings by social service agencies, word-of-mouth, and media announcements. Potential participants were initially screened via telephone to determine eligibility specific to each study. Those eligible and willing to participate were then interviewed at home after obtaining informed consent using approved Institutional Review Board forms.

Measures

Participants in both trials provided similar background information: age, race, sex, living arrangement (alone, with others), education (<high school, high school, >high school), and employment status (employed, unemployed).

Valuation of Life

In both trials, the 13-item version of VOL (referred to as positive VOL; Lawton et al., 2001) was collected at baseline. Each item reflects a generalized judgment or global stance towards life (e.g., "Life has meaning for me," "I feel hopeful right now") that is evaluated along five-point scales ranging from 1 (strongly disagree) to 5 (strongly agree). Domains represented positive (vs. psychopathological) aspects of life previously identified in the psychological literature and included futurity, purpose, hope, self-efficacy, and persistence. A total score is derived by summing responses across items. Scores range from 13 to 65, with higher scores indicating greater attachment to life.

Convergent Validity

Center for Epidemiological Studies Depression Scale (CES-D)

Whereas ABLE used 20-item CES-D version (Radloff, 1977), GBGB used the 10-item version (Santor & Coyle, 1997). Regardless of version, participants rate the frequency of occurrence of each item on four-point scales from 0 (rarely) to 3 (most of time). A total mean score is derived by summing across items. For ABLE, scores range from 0 to 60 with a cutoff score of 16 being indicative of depressive symptoms. For GBGB, scores range from 0 to 30 with a cutoff of 8 being indicative of depressive symptoms. When comparing the CES-D scores between ABLE and GBGB samples (Table 2), only 10 common items were used. Cronbach's alphas for these samples are as follows: ABLE 20-item CES-D = 0.73; GBGB 10-items CES-D = 0.76; ABE/CGGB common 10-items = 0.85.

Social Support

Three items used in both trials served as an indicator of social support (In the past month, how often has someone provided comfort to you; listened to you talk about your private feelings; expressed interest and concern in your well-being?). Participants rated each item from 0 = never to 3 = very often (range 0–9). Scores represent summed responses with higher scores indicating greater social

support received (Krause & Markides, 1990). Cronbach's alpha for this sample for the three items were 0.76.

Behavioral Activation

Behavioral activation was assessed only in GBGB. We used a modification of the original 31-item Behavioral Activation Scale (Kanter, Mulick, & Martell, 2004) that involved eliminating 14 items not relevant to this sample ("My work/schoolwork suffered…") and rewording three items to heighten their relevance. Participants rated the resulting 17 items from 0 = not at all to 6 = completely. Items reflected positive engagement ("accomplished goal," "engaged in activities," "did things even though hard because fit with goals"), avoidance of difficult situations ("there were certain things that I needed to do that I didn't do"), or dwelling on negative feelings ("…spent time thinking about my past, people who have hurt me, mistakes I've made.."). A total activation score was computed as the mean of the mean across items (Cronbach's alpha = 0.83 for sample). Higher scores indicate greater behavioral activation (Gitlin et al., 2013).

Control-Oriented Strategy Index

Control-oriented strategy use was measured only in the ABLE trial by an investigator-developed eight-item Likert-type measure (Gitlin, Hauck, Dennis, & Schulz, 2007), modeled after the health engagement scale developed by Wrosch and colleagues (2002). It measures the extent to which respondents endorse using cognitive and behavioral strategies to maintain functional independence. Participants rate the extent to which each statement is true along four-point scales (1 = not at all true to 4 = very much true). An index was derived by averaging responses across the eight items with higher mean scores indicating greater strategy use (Cronbach's alpha = 0.69 for ABLE sample).

Mastery

Mastery was measured only in the ABLE trial using seven items assessing the amount of control respondents feel they have over their lives (e.g., "I have little control over the things that happen to me," "There is really no way I can solve some of the problems I have"; Pearlin & Schooler, 1978). Participants rated each statement along four-point scales ranging from 1 (disagree a lot) to 4 (agree a lot). A total score was derived by summing across items with higher scores indicating greater mastery (Cronbach's alpha = 0.64 for ABLE sample).

Discriminant Validity

Physical Function

To measure functional difficulties, both trials used 17 items reflecting mobility, instrumental and basic activities of living. Participants rated difficulty level (1 = no difficulty to 5 = unable to do due to health problem) for each item over the past month. A mean score was derived by summing across scores and dividing by the number of items. Lower scores indicate less functional difficulties (Ettinger et al., 1997).

Health Conditions

In both trials, we used a checklist to identify presence/absence of 15 common health conditions (e.g., diabetes, stroke, heart condition). Number of health conditions was summed for a total index ranging from 0 to 15.

Financial Strain

In both trials, respondents indicated their level of financial strain on a four-point scale (1 = not difficult, 2 = not very difficult, 3 = somewhat difficult, 4 = very difficult) (Szanton, Thorpe, & Gitlin, 2014).

MMSE

The MMSE (Folstein et al., 1975) was administered by trained interviewers but only recorded at baseline for the ABLE trial. The MMSE assesses orientation, language and reasoning. Scores range from 0 to 30 with lower scores indicative of greater cognitive impairment.

Number of Falls

The number of falls was assessed only in the ABLE trial. Participants were asked to recall the number of times they experienced a fall to the ground in the past 6 months.

Statistical Analysis

Principal Component Analyses

We conducted principal component analyses on the data from the ABLE trial to determine whether a multifactor model might be suggested besides the one-factor structure of Lawton and colleagues' original study. The ABLE sample (n = 319) was randomly split in half prior to factor analysis using a random number generating procedure in SAS 9.3. There were no large or statistically significant differences between the two ABLE samples. Using data from ABLE subsample 1 (n = 156), principal component analytic techniques were applied to extract factors. A scree plot of eigenvalues was used to determine the number of factors retained, and a varimax rotation was performed. Two factors met the criteria and were retained.

Confirmatory Factor Analyses

We then conducted confirmatory factor analyses on the data from ABLE subsample 2 (n = 163) and with the entire GBGB study sample (N = 208) separately to verify the proposed two-factor model resulting from the principal component analyses. Each item was hypothesized to indicate only one latent factor; factor loadings not identified for each item were fixed to 0. The factors were

allowed to correlate with each other. Weighted least squares estimation was used to account for the inter-item polychoric correlation matrix. Root mean square error of approximation (RMSEA) and comparative fit index (CFI) were used to evaluate model fit. We also tested the one-factor model and conducted chi-square difference testing to determine if the two-factor model provided better fit to the observed data than the one-factor model.

Reliability and Validity

Cronbach's alpha was used to evaluate the internal reliability of the VOL scale. We evaluated convergent and discriminant validity by examining Spearman rank-order correlations between VOL total score and its two subscales with other measures that theoretically should or should not be related to these constructs. To test convergent validity, we examined VOL with depressive symptoms as measured by CES-D score, social support, control index, mastery, and behavioral activation. Discriminant validity was assessed by examining associations between VOL and health status, physical function, financial strain, cognitive status as assessed by MMSE, and number of falls. For measures assessed in ABLE and GBGB, study samples were combined (N = 527). For measures used in only one trial, the entire sample of that study was used for analyses (N = 319 for ABLE, N = 208 for GBGB).

Differences by Race and Sex

Finally, we used one-way analyses of variance (ANOVA) to determine if VOL and derived subscales differed by race (White versus Black/African American) and sex (male/female). Analyses were conducted on the entire sample from both studies (n = 527).

Confirmatory factor analyses were performed using the structural equation modeling procedures within Mplus 7 (Muthén & Muthén, 2012). All other analyses were conducted in SAS 9.3.

Results

Characteristics of Samples

Table 1 presents sample characteristics for the total sample (N = 527), and ABLE (n = 319) and GBGB (n = 208) samples separately. Overall, participants were, on average, 75 years of age (SD = 8.5), 65.7% African American, 80.5% female, and ~73% had a high school or greater education level. Also, most participants were not married (84.1%) and lived alone (59.8%). Participants, on average, reported 4.9 health conditions, suggesting relatively fair to good health.

When comparing ABLE and GBGB samples, ABLE participants were, on average, older (79.0 vs. 69.6 years, respectively) and more diverse, reflecting differences in inclusion criteria of the trials (ABLE trial ≥70 of age,

Table 1. Comparison of ABLE and GBGB Participants on Baseline Characteristics

Characteristic	Total (N = 527)	ABLE (n = 319)	GBGB (n = 208)	p value
Age, M (SD)	75.3 (8.5)	79.0 (5.9)	69.6 (8.7)	<.001
Race, n(%)				<.001
White	168 (31.9)	168 (52.7)	0 (0.0)	
African American	346 (65.7)	145 (45.5)	201 (96.6)	
Black Caribbean	4 (0.8)	0 (0.0)	4 (1.9)	
Other	9 (1.7)	6 (1.9)	3 (1.4)	
Sex, n(%)				.329
Female	424 (80.5)	261 (81.8)	163 (78.4)	
Male	103 (19.5)	58 (18.2)	45 (21.6)	
Living arrangement, n(%)				.251
Alone	315 (59.8)	197 (61.8)	118 (56.7)	
With others	212 (40.2)	122 (38.2)	90 (43.3)	
Marital status, n(%)				.048
Not married	443 (84.1)	260 (81.5)	183 (88.0)	
Married	84 (15.9)	59 (18.5)	25 (12.0)	
Education, n(%)				.008
<High school	143 (27.1)	99 (31.0)	44 (21.2)	
High school	164 (31.1)	103 (32.3)	61 (29.3)	
>High school	220 (41.7)	117 (36.7)	103 (49.5)	
Employment status, n(%)				<.001
Unemployed	502 (95.3)	313 (98.1)	189 (90.9)	
Employed	25 (4.7)	6 (1.9)	19 (9.1)	
Number of health conditions, M (SD)	4.9 (2.1)	5.0 (1.9)	4.8 (2.3)	.286

Note: ABLE = Advancing Better Living for Elders; GBGB = Getting Busy, Getting Better.

regardless of race vs. GBGB targeting African American sample ≥55 of age) (*p*s < 0.001; Table 1). ABLE participants were less likely to report >high school education (36.7 vs. 49.5%, respectively), and were more likely to be married (18.5 vs. 12.0%, respectively) or unemployed (98.1 vs. 90.9%, respectively) (*p*s < 0.05; Table 1). ABLE participants did not differ substantially from GBGB participants concerning sex, living arrangement, or number of health conditions (*p*s > 0.05; Table 1). Also, there were no large or statistically significant differences between ABLE subsample 1 and subsample 2.

Descriptive Statistics for VOL and Predictor Variables

Overall, participants reported, on average, financial strain or that paying for basics was somewhat or very difficult (61.2%), had mild depressive symptomatology (as indicated by a cutoff score of 8 on the CES-D; *M* = 10.5, *SD* = 6.9), and reported moderate social support (*M* = 5.1, *SD* = 2.5) (Table 2).

For measures administered only to the ABLE sample, participants scored on average a MMSE score of 26.9 (*SD* = 1.8), and most (62.7%) had not experienced a fall; had moderate levels of mastery (*M* = 19.1 of a possible score of 28, *SD* = 4.2) and frequently used control-oriented strategies (*M* = 3.3, *SD* = 0.5). For measures administered within GBGB only, participants reported low levels of behavioral activation (*M* = 2.9, *SD* = 1.0). When ABLE and GBGB samples were compared, participants in the ABLE trial were, on average, less likely to report financial hardship (17.0 vs. 30.3% for very difficult, respectively). ABLE participants were also less likely to report depressive symptoms and reported slightly greater levels of social support (5.2 vs. 4.8, respectively) (*p*s < 0.05; Table 2).

Within the total sample, participants reported an average total score of 49.2 (*SD* = 8.5) on VOL scale, suggesting a positive orientation towards life and comparable to the scores obtained by Lawton et al. (1999) in their study of 600 older adults (VOL total score: *M* = 50.2, *SD* = 6.35). Compared to GBGB participants, on average, ABLE participants reported a more favorable outlook to life (*M* = 50.7, *SD* = 8.3 for ABLE; *M* = 47.0, *SD* = 8.3 for GBGB) (*p* < .001).

Principal Component Analyses

In contrast to previous conceptualizations of VOL as a unitary construct (Lawton et al., 1999), our application of *principal component* analytic methods within the ABLE 1 subsample (*N* = 156) supported a two-factor conceptualization (Table 3). In general, individual VOL items were independently associated with one of two unique factors (factor loadings >0.40); only two items had loadings >0.40 on both factors (Table 3). The first factor consists of eight items with each loading ≥0.42. Only one item ("My life these days is a useful life") also loaded on the second factor. As we considered it more conceptually linked to the first factor, we included it in all subsequent analyses as such. As items reflect a cognitive, optimistic and future-oriented stance towards life, we labeled the first factor as "optimism."

The second factor consists of five items with each loading ≥0.62. Only one item ("I feel able to accomplish my life goals") also loaded on the first factor (0.44) but was more strongly

Table 2. Predictor Variables for Total Sample and ABLE and GBGB Subsamples

Variable	Total (*N* = 527)	ABLE (*n* = 319)	GBGB (*n* = 208)	*p* value
Financial strain, *n* (%)				.003
Not difficult at all	118 (22.5)	77 (24.3)	41 (19.7)	
Not very difficult	86 (16.4)	60 (18.9)	26 (12.5)	
Somewhat difficult	204 (38.9)	126 (39.8)	78 (37.5)	
Very difficult	117 (22.3)	54 (17.0)	63 (30.3)	
Depressive symptoms, *M* (*SD*)[a]	10.5 (6.9)	7.8 (6.1)	14.8 (5.8)	<.001
Social Support, *M* (*SD*)	5.1 (2.5)	5.2 (2.5)	4.8 (2.5)	.050
Physical Function	2.1 (0.6)	2.2 (0.6)	2.0 (0.7)	<.001
Mastery, *M* (*SD*)		19.1 (4.2)		
Number of falls (in past 6 months), *M* (*SD*)		0.8 (1.5)		
Number of falls (in past 6 months), %				
0		62.7		
1–5		35.4		
>5		1.9		
MMSE, *M* (*SD*)		26.9 (1.8)		
Control oriented strategies, *M* (*SD*)		3.3 (0.5)		
Behavioral Activation, *M* (*SD*)			2.9 (1.0)	
Valuation of Life, *M* (*SD*)	49.2 (8.5)	50.7 (8.3)	47.0 (8.3)	<.001

Note: ABLE = Advancing Better Living for Elders; GBGB = Getting Busy, Getting Better.

[a]10-item version of CES-D used to compare ABLE and GBGB sample with cutoff of ≥8 as indicative of clinical symptomatology.

Table 3. Varimax Factor Loadings Greater Than .40 From the Principal Components Analyses: ABLE Subsample 1 ($N = 156$)

	Factor loading	
Item	1	2
1. I have a strong will to live right now	0.86	
2. Life has meaning for me	0.82	
3. My personal beliefs allow me to maintain a hopeful attitude	0.78	
4. Each new day I have much to look forward to	0.75	
5. I intend to make the most of my life	0.56	
6. I feel hopeful right now	0.51	
7. My life these days is a useful life	0.48	0.48
8. My life is guided by strong religious or ethical beliefs	0.42	
9. I can think of many ways to get the things in life that are most important to me		0.83
10. I can think of many ways to get out of a jam		0.80
11. Even when others get discouraged, I know I can find a way to solve the problem		0.77
12. I meet the goals that I set for myself		0.71
13. I feel able to accomplish my life goals	0.44	0.62

Note: ABLE = Advancing Better Living for Elders; GBGB = Get Busy, Get Better.

associated with the second factor (0.62). We considered it more conceptually linked to the second factor, and therefore, included it as such. As items on this second factor reflect problem-solving, activation towards and confidence in obtaining one's desired goals, we labeled the second factor as "engagement." For this subsample, factor 1 explained 46.8% total variance in VOL total score and factor 2 explained 10.9% total variance. Together, these two factors explained 57.7% variance. Cronbach alpha for the total sample was 0.87 for factor 1, 0.84 for factor 2, and 0.91 for the total 13-item scale.

Confirmatory Factor Analyses

Findings from the confirmatory factor analyses supported the two-factor solution (RMSEA = 0.076; CFI = 0.981 for ABLE subsample 2 and RMSEA = 0.099; CFI = 0.965 for GBGB. All items loaded significantly onto the factor they were designated to as indicators (item loadings >0.40; Table 4). A chi-square difference test was used to compare the fit of two-factor model and one-factor model that allowed all items to load on a single factor. The two-factor model was found to fit the data significantly better than the one-factor model for both ABLE subsample 2 ($\chi^2_{diff}(1) = 40.06$, $p < .0001$) and GBGB ($\chi^2_{diff}(1) = 37.13$, $p < .0001$). Chi-square indices of fit for CFA models include: ABLE subsample 2, $\chi^2 = 124.596$ with $df = 64$, TLI = 0.977; and GBGB: $\chi^2 = 193.496$ with $df = 64$, TLI = 0.957.

For the total sample ($N = 527$), and as expected, the two factors were modestly correlated ($r = 0.68$; $p < .0001$ for the total sample), thus providing further evidence of the validity of the two-factor solution.

Convergent and Discriminant Validity

With regard to convergent validity, as anticipated, VOL and its subscale scores were positively associated with social support, behavioral activation (administered in GBGB only), control-oriented strategy use (administered in ABLE only), and mastery (administered in ABLE only) (*rs* ranging from 0.27 to 0.50 for total VOL). Conversely, VOL total and subscale scores were negatively associated with CES-D scores ($r = -0.54$, $p < .001$ for total VOL) (Table 5).

As to discriminant validity, physical function ($r = -0.09$) and financial strain ($r = -0.09$) were negatively associated only with factor 2 (*ps* < 0.05) and as expected neither construct was significantly associated with VOL total scores or with factors 1 and 2 (*ps* > 0.05). These weak correlations may be due to sample size but in either case, demonstrate no actual relationship between VOL subscales and these measures.

Neither number of falls or cognitive status was also found to be significantly associated with total VOL scores or its components as anticipated (*ps* > 0.05; Table 5). Given that cognitive status scores are for a cognitively intact sample, the range of possible scores was limited. Hence, a similar pattern of findings may not apply to cognitively impaired samples.

Health status had weak but statistically significant relationships with total score ($r = 0.18$), factor 1 ($r = 0.17$) and factor 2 ($r = 0.14$; ps < 0.01) suggesting that while health status is part of the calculation in the VOL, it is not strongly associated with an overall appraisal.

Differences by Race and Sex

Statistically significant racial differences were found for factor 1 (optimism), with Black/African Americans scoring higher than their White counterparts ($M = 32.0$ vs. $M = 30.4$, respectively; $p = .003$) (Table 6). We did not find evidence of racial differences for factor 2 (engagement; $p > .05$); and found a marginal effect for the total VOL score, with Black/African Americans scoring higher than Caucasians ($p = .054$).

Table 4. Weighted Least Squares Estimates (and Standard Errors) from Two-Factor Model Confirmatory Factor Analyses

Item	ABLE subsample 2 (N = 163)		GBGB (N = 208)	
	Factor 1	Factor 2	Factor 1	Factor 2
1. I have a strong will to live right now	0.88 (0.02)	0	0.76 (0.03)	0
2. Life has meaning for me	0.89 (0.02)	0	0.86 (0.03)	0
3. My personal beliefs allow me to maintain a hopeful attitude	0.86 (0.03)	0	0.84 (0.02)	0
4. Each new day I have much to look forward to	0.78 (0.03)	0	0.86 (0.03)	0
5. I intend to make the most of my life	0.84 (0.03)	0	0.75 (0.04)	0
6. I feel hopeful right now	0.66 (0.04)	0	0.75 (0.04)	0
7. My life these days is a useful life	0.67 (0.05)	0	0.58 (0.05)	0
8. My life is guided by strong religious or ethical beliefs	0.64 (0.04)	0	0.58 (0.04)	0
9. I can think of many ways to get the things in life that are most important to me	0	0.75 (0.04)	0	0.80 (0.03)
10. I can think of many ways to get out of a jam	0	0.65 (0.05)	0	0.63 (0.04)
11. Even when others get discouraged, I know I can find a way to solve the problem	0	0.87 (0.03)	0	0.81 (0.03)
12. I meet the goals that I set for myself	0	0.71 (0.05)	0	0.64 (0.05)
13. I feel able to accomplish my life goals	0	0.66 (0.04)	0	0.83 (0.03)

Note: ABLE = Advancing Better Living for Elders; GBGB = Get Busy, Get Better.

Table 5. Spearman Correlation Coefficients Between the Valuation of Life Scales and Other Variables

Variable	VOL total	Factor 1	Factor 2	ABLE, GBGB, or both
Convergent validity				
Depression (CES-D)	−0.54***	−0.50***	−0.50***	Both
Social support	0.27***	0.31***	0.17***	Both
Behavioral activation	0.50***	0.45***	0.49***	GBGB
Control-oriented strategy Index	0.37***	0.34***	0.33***	ABLE
Mastery	0.49***	0.47***	0.40***	ABLE
Discriminant validity				
Health status	0.18***	0.17***	0.14**	Both
Physical function	−0.07	−0.06	−0.09*	Both
Paying for basics	−0.02	0.04	−0.09*	Both
MMSE	0.03	0.05	0.00	ABLE
Number of falls	−0.06	−0.09	−0.02	ABLE

Note: ABLE = Advancing Better Living for Elders; CES-D = Center for Epidemiologic Studies-Depression Scale; GBGB = Get Busy, Get Better; MMSE = Mini-mental State Examination.
*p < .05; **p < .01; ***p < .001.

For sex, statistically significant differences were found for factor 2 only, with females scoring lower on this dimension of personal agency than males (M = 17.5 vs. M = 18.4, respectively; p = .036). The VOL total and factor 1 scores did not differ between females and males (p > .05; Table 6).

Discussion

This study extends Lawton and colleagues' original development of the VOL and provides insight as to the characteristics and performance of this construct using a diverse sample pooled from two trials conducted in the United States: ABLE targeted an older, physically frail adult population; GBGB targeted middle aged to older Black/African Americans with clinically meaningful depressive symptoms (mild to severe).

Extending beyond the original conceptualization of a single factor structure consisting of 13 positive items, we identified and systematically show that a two-factor solution is viable: eight items reflecting "optimism" and five items reflecting "engagement." First, the scree plot shows a strong unidimensional structure that could support a one-factor solution, although a second minor component is evident. Second, the CFA comparisons show the two-factor

Table 6. Comparison of VOL and Subscale Scores by Race, Sex, and Depressive Symptoms

	Race		*p* value	Sex		*p* value
	White (*n* = 168) *M* (*SD*)	Black (*n* = 346) *M* (*SD*)		Female (*n* = 424) *M* (*SD*)	Male (*n* = 103) *M* (*SD*)	
VOL total	48.2 (8.5)	49.7 (8.5)	.054	49.0 (8.4)	50.2 (8.6)	.179
Factor 1	30.4 (5.7)	32.0 (5.3)	.003	31.5 (5.4)	31.8 (5.6)	.521
Factor 2	17.7 (3.6)	17.7 (3.9)	.948	17.5 (3.8)	18.4 (3.7)	.036

fits better than the one-factor solution. Third, the factor correlation of 0.68 is moderate, showing that factors are at least partially distinct. Fourth, the differential effects that subscales show, particularly in relationship to race and sex support the two-factor solution.

Our two-factor solution is consistent with other psychometric studies although the distribution of items slightly differed. For example, a study with a Portuguese sample using oblique rotation solution resulted in seven items referred to by authors as "personal and existential" for factor one, explaining 36.6% of total variance; and six items for factor two referred similarly to as "personal agency and control," explaining 12.4 % of total variance. We similarly found that factor 1 (optimism) explained 46.8% total variance in VOL total score and factor 2 (engagement) explained 10.9% total variance. Together, these two factors explained 57.7% variance. However, whereas in the Portuguese version "My life these days is a useful life" loaded on factor two (0.58) more so than factor one (0.35), we found that it loaded similarly on both factors. As such, we conceptually linked it to the second factor in keeping with the Japanese study (Nakagawa et al., 2013). The only other difference is that the Japanese study labeled factor one as "spiritual self-efficacy." We prefer the label cognitive optimism as items reflect a positive cognitive stance. We labeled factor two as engagement as items reflect affirmative and active coping mechanisms.

Our conceptualization of factors are consistent with and can be understood using Motivational Theory of Life-span Development. This theory posits that primary and secondary control strategies work in concert to maximize self-regulation of goal attainment and that each supports the other (Heckhausen, Wrosch, & Schulz, 2010). Primary control strategies target external behavioral resources and involve activation to achieve self-identified goals, as suggested by our VOL engagement factor. Secondary control strategies target internal motivational and affective resources relevant to goal pursuit, which we suggest is reflected in the optimism factor of VOL. With age-related changes, older adults may use both primary and secondary control strategies to successfully adapt to changing life circumstances (Heckhausen et al., 2010). Similarly, we suggest that the VOL involves both a behavioral (engagement) and cognitive, problem-solving stance (optimism).

As to convergent and discriminant validity, we confirm Lawton and colleagues original findings that the VOL total score is positively related to mental health indicators and aspects of well-being, only minimally related to physical health, and unrelated to cognitive status, financial strain, falls, and physical functional status. A similar pattern of relationships was found for all predictor variables for each of the two factors except for financial strain and physical function. For both variables, weak (*rs* = −0.09), yet statistically significant (*p*s = 0.05 level) negative associations were found suggesting that having less functional difficulties and financial strain is associated with more positive appraisals. Thus, taking action to achieve one's personal life goals may be hindered by financial and physical functional status. Nevertheless, these factors, as predicted did not impact overall subjective appraisals of perceived value of life. One can conclude from this study that for community living older adults with physical frailties or depressive symptomatology, evaluations of the VOL are informed by factors over and above health and functioning. Thus, whereas health utility measures narrowly focus on health conditions and deficits to derive measures of well-being, VOL covers a broader swath of considerations that weigh into such appraisals. As it does so with only 13 items, it is a parsimonious scale.

We also show race specific variations in VOL scores. African Americans scored higher than White older adults on overall VOL scores, although this was not statistically significant ($p = 0.054$); and higher scores on factor 1, optimism. These differences were small but statistically significant ($p = 0.003$), although scores were not unadjusted for functional difficulties, age and other factors that may be contributing to these differences. There were no differences between the two groups for factor 2, engagement. The difference in optimism is consistent with other studies showing that African Americans tend to express greater positivism and less upset when confronted with age-associated changes and disability (Gitlin et al., 2007), or caring for family members (Roth et al., 2015). Furthermore, a study of male prisoners (age 45–80) found that VOL mediated the relationship between race and health conditions, with African American prisoners reporting fewer health conditions than White prisoners (Merten, Bishop, & Williams, 2012).

As to sex, men and women scored similarly on VOL total and factor 1, optimism, but men scored slightly higher than women on factor 2, engagement ($p = .036$). It is unclear why but this finding may be consistent with previous research

on personal control in which women tend to score lower than men. Future research should determine whether VOL reflects a particular stance towards life rooted in immutable personality structures or whether cognitive optimism and engagement can be enhanced. VOL may be responsive to interventions that provide compensatory or control-oriented strategies, enhance activation and personal agency, problem solving skills, and attachment to life, and/or which treat depressive symptoms. The differences by race and sex suggest that variations in attachment to life may be influenced in part by sociocultural factors associated with the experiences of being African American and male or female.

Several study limitations should be noted. First, VOL was tested with geographically bounded samples (Philadelphia region) and with two groups, white and African American adults. Its evaluation with more diverse samples would be important to pursue. Second, some variables used to examine convergent and discriminant validity were not available in both trials which may limit in part the strength of the validation findings. A third limitation may be a conceptual matter. One might ask whether we need another scale to evaluate an older adult's outlook. We would argue that VOL is unique and has important and added benefit to the field in these ways: it is brief (13-items), parsimonious in that each item reflects a distinct cognitive, behavioral or psychological factor, and items go beyond a narrow focus on health as a driving force of appraisals of one's life.

In summary, we show that the VOL scale has a stable two factor structure and strong convergent and discriminant validity. This brief 13-item scale can be used as a total score or as two interrelated subscales that measure appraisals of both the cognitive and behavioral orientations that underlie attachment to life. Grounded in positive psychology, VOL items reflect a positive orientation towards actively being engaged in contrast to deficit oriented scales that measure symptom distress. Our study confirms Lawton and colleagues original premise that with age, although deficits are experienced, these are not the overwhelming determinants as to how an older adult evaluates whether life continues to be valued.

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