Published in final edited form as:
Pers Individ Dif. 2010 August 1; 49(3): 187–191. doi:10.1016/j.paid.2010.03.030.

Psychometric properties of a short form of the Affective Lability Scale (ALS-18)

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Abstract

Psychometric properties of a short form of the Affective Lability Scale (ALS) that was developed in a nonclinical sample (i.e., undergraduate students) were examined in a sample of people diagnosed with Cluster B DSM-IV Axis II personality disorders (n=236), other personality disorders (n=180), and healthy comparison participants (n=164). The total score of the ALS-18 score correlated strongly with the original 54-item scale (r = .97) and aspects of convergent and discriminant validity of the ALS-18 subscales (Anxiety/Depression, Depression/Elation, and Anger) were evaluated using self-report measures of affective and psychosocial functioning in the domains of affect intensity, anxiety, anger, and minimization/denial. Clinical utility of the scale was also demonstrated; participants diagnosed with Cluster B personality disorders reported higher affective lability scores, and healthy control participants reported lower scores, relative to individuals with Cluster A or Cluster C personality disorders (p's < .001). Confirmatory factor analyses were conducted and demonstrated reasonably good fit to the data but future research is needed to test the three factor substructure of the ALS-18 against alternative factor models in samples that include clinical and non-clinical participants.

Keywords

affective lability scale; affect dysregulation; cluster B personality

Dysregulated affect is a primary feature of several types of psychopathology, including depression, bipolar disorder, borderline personality disorder (BPD), and intermittent explosive disorder (Benazzi & Akiskal, 2005; Bunce & Coccaro, 1999). One aspect of affect dysregulation is affective lability, which refers to rapid shifts in outward emotional expressions. Affective lability is particularly relevant to BPD and bipolar spectrum disorders, although the

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disorders appear to differ in lability between affective states (Koenigsberg et al., 2002; Henry et al., 2001). Mood disorders, including bipolar spectrum and depressive disorders, are associated with greater lability in terms of depression, elation, and depression/elation oscillation relative to BPD, which is associated with greater lability in terms of anger, hostility, anxiety, and oscillation between depression and anxiety (Koenigsberg et al., 2002; Trull et al., 2008).

The Affective Lability Scale (ALS; Harvey, Greenberg & Serper, 1989) was created to measure this construct and is a 54-item scale in which people rate their agreement with statements regarding the tendency of their mood to shift between what they consider normal mood to the affective domains of anger, depression, elation, and anxiety as well as their tendency to oscillate between depression and elation and between depression and anxiety. Items were created to tap into subjective experiences, physiological perceptions, and behaviors using six subscales (Harvey et al., 1989). Recognizing that this self-report measure is lengthy, Oliver and Simons (2004) created an 18-item short form (ALS-18) of the 54 item ALS. The ALS-18 comprises a three factor model of affective lability, with each factor retaining at least two items from each of the original six scales of the ALS, and was found to correlate highly with the original ALS total score (r = .94). In addition, in this non-clinical sample, the ALS-18 anxiety/depression scale was strongly associated with depressive symptoms (r = −.47), but less strongly with affective intensity (r = −.24) and emotional control of aggressive impulses (r = −.19). In contrast, the ALS-18 anger scale was associated with emotional control (r = −.47).

Given that the ALS-18 was created using responses from a non-clinical sample of undergraduate students, the current analyses aimed to evaluate the structure and construct validity of the ALS-18 in a sample that included people with DSM-IV Axis II personality disorders and healthy comparison participants. Analyses included group comparisons across diagnostic groups that would be expected to vary in levels of affective instability (e.g., people with a Cluster B personality disorder (PD) diagnosis versus people with Cluster A or Cluster C personality disorders and healthy control participants). Additionally, a confirmatory factor analysis was conducted on the three factor model in the total sample to evaluate model fit.

METHOD

Participants

Participants were 580 adults recruited for participation in the Mood and Personality Disorders Research Program through advertisements and clinical referrals. The longstanding aims of this research program are to evaluate the neurobiological and genetic correlates of DSM-IV Axis II personality disorders, with an emphasis on BPD and schizotypal personality disorder. Data for the current analyses were collected from January 1999 to February 2008, during which time the recruitment strategies and study exclusion and inclusion criteria for the research program did not change appreciably. Individuals with a lifetime history of schizophrenia or bipolar disorder, significant medical illness, or current substance abuse or dependence were not eligible for participation in the research program.

Participants in the current analyses included 236 people who met criteria for one or more DSM-IV Axis II Cluster B diagnosis, 180 people who met DSM-IV Axis II criteria for at least one other PD (OPD), but did not meet criteria for a Cluster B disorder, and 164 healthy controls (HC) who did not meet criteria for any DSM-IV Axis II disorders, and also did not meet criteria for a major DSM-IV Axis I disorder. The distribution of rater assigned diagnoses (Cluster B, OPD, HC) across two 4.5 year epochs, January 1999 to July 2003 (n = 195) and August 2003 to February 2008 (n = 385), was comparable. During each epoch, 40–41% of the sample was assigned a Cluster B diagnosis relative to 30–33% OPD and 26–29% HC. Although more

participants were enrolled into the research program in later years, the distribution of diagnoses was similar (X^2 (2, N = 580) = .78, p = .68).

Note that people in the Cluster B group included: borderline personality disorder = 199 (84%), antisocial personality disorder = 37 (16%), narcissistic personality disorder = 68 (29%), histrionic personality disorder = 19 (8%), paranoid personality disorder (PPD) = 89 (38%), schizotypal personality disorder (SPD) = 55 (23%), obsessive compulsive personality disorder (OCPD) = 58 (25%), dependent personality disorder (DPD) = 17 (7%), and avoidant PD (AvPD) = 61 (26%). The OPD group included: PPD = 37 (21%), schizoid personality disorder = 11 (6%), SPD = 75 (42%), OCPD = 67 (37%), DPD = 8 (4%), AvPD = 61 (34%), and personality disorder not otherwise specified = 9 (5%). These percentages sum to more than 100 because of multiple overlapping diagnoses. Demographic characteristics of the three groups are presented in Table 1.

Measures

Affective lability was measured with the Affective Lability Scale (ALS; Harvey et al., 1989). Each item is rated along a 4-point (0–3) scale, ranging from “Very uncharacteristic of me” to “Very characteristic of me”. The six subscales assess shifts between euthymia and: (1) depression, (2) anger, (3) anxiety, (4) hypomania, as well as (5) biphasic shifts between hypomania and depression, and (6) shifts between anxiety and depression. The ALS-18 developed by Oliver and Simons (2004) is a selection of 18 items from the ALS that were selected based on an exploratory factor analysis and retained on the basis of the eigenvalue greater-than-one guideline and the scree test. The authors also excluded items based on low item-total correlations. Participant answers to the resulting short form are rated on the same 4-point scale as the original ALS and include a total score as well as three subscales: Anxiety/Depression, Depression/Elation, and Anger.

Affect intensity was measured by the Affect Intensity Measure (AIM; Larsen et al., 1986), a 40-item, self-report measure in which subjects rate the degree to which they characteristically experience their moods on a 6-point (1–6) scale with anchors ranging from “Never” to “Always”. Trait anxiety was measured by the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983), a 40-item, self-report measure in which subjects rate the degree to which they feel anxious on a 4-point (1–4) scale ranging from “Not at all” to “Very much so”.

Anger was assessed using the State-Trait Anger Expression Inventory (STAXI; Spielberger, 1991), a 44-item self-report measure in which subjects rate the degree to which they feel angry on a 4-point (1–4) scale ranging from “Not at all” to “Very much so”. Subscales examined here include Trait Anger, Anger-In, and Anger-Out. The minimization/denial scale from the Childhood Trauma Questionnaire (CTQ; Bernstein & Fink, 1998), which taps a socially desirable responding style was also included.

Procedure

Participants were interviewed for the presence of DSM-IV Axis I disorders using a semi-structured interview based on the Structured Clinical Interview for DSM-IV (SCID-I; First, Spitzer, Gibbon & Williams, 1997). The presence of DSM Axis II disorders was assessed using the Structured Interview for DSM-IV Personality Disorder (SIDP-IV, Pfohl, Blum & Zimmerman, 1996), although HC participants were not administered the full SIDP interview. The majority of the diagnostic interviews (approximately 75%) were conducted by two doctoral level clinical psychologists, who were assisted at times by other doctoral level psychologists, masters level psychologists and one clinical social worker. All diagnoses were assigned after consensus with a licensed clinical psychologist. The analyses conducted to evaluate convergent

and divergent validity are based on a battery of self-report measures administered shortly after acceptance into the research program. Written, informed consent was obtained and the protocol was approved by the IRB committees at the James J. Peters VA Medical Center and Mount Sinai School of Medicine.

Results

Responses to all 54 scale items of the ALS comprised a normal distribution across the full sample. Prior to analysis, the data were inspected for missing responses and one person's data were removed from the first sample because he/she did not complete seven items. Correlational analyses examining convergent and discriminant validity of the scale were conducted and clinical utility of the scale was examined by comparing the Cluster B group to the other clinical group and the healthy comparison group using analysis of variance. The preceding analyses were conducted using SPSS 16. A confirmatory factor analysis of the three subscale ALS-18 short form was also conducted to evaluate model fit using mPlus (V3.13) (Muthen & Muthen, 1998–2007). A maximum likelihood estimator was used for all analyses, including modeling for missing data, which were missing at random. Goodness of fit was evaluated using the comparative fit index (CFI), the root-mean square error of approximation (RMSEA), and 90% confidence intervals, and the standardized root-mean-square residual (SRMR). Guidelines for interpreting model fit statistics were obtained from Kline (2005).

Table 2 presents the scale inter-correlations, means and standard deviations, and internal consistency coefficients for the three subscales and total score of the 18-item ALS in a clinical sample (ALS-18; Oliver & Simons, 2004). The 54-item total score was strongly correlated with the ALS-18 total score (r = .97), which demonstrates that despite the elimination of items, this short form thoroughly captures the same construct measured with the longer version of the scale. The total scores and subscale scores showed good internal consistency with coefficient alpha equaling .78 or greater across the total and three subscales.

As can be seen in Table 3, the original ALS and the ALS-18 were similarly associated with measures of affect intensity and trait affect in our clinical sample. Relatively modest associations emerged between the ALS-18 scores and trait anxiety, indicating that the affective lability scores were less tightly associated with negative affectivity relative to trait anger or affect intensity. It is interesting to note that the correlations between the ALS-18 subscales and the AIM in our personality-disordered sample are higher than those reported by Oliver and Simons (r's = .41–.49 versus .16–.26) or as seen in our HC participants (r's = .20–.26), which suggests that these constructs may be more closely linked among people with personality disorders relative to a non-clinical sample. Indeed, these correlations were significantly different in our sample, (Fisher's Z's > 2.51, p's < .006). Further, as expected, affective lability was not strongly associated with a socially desirable responding style assessed by a minimization or denial scale of symptoms.

To evaluate the clinical utility of the ALS-18 in a clinical sample, the ALS-18 total and subscale scores were compared across the three diagnostic groups (Cluster B, OPD, HC), with group as a between-subjects variable. Results indicated that the groups differed on the total score (F(2, 579) = 177.31, p<.0001, η^2 = .38) and on each subscale: Anxiety/Depression (F(2,579) = 139.28, p<.0001, η^2 = .33); Depression/Elation (F(2,579) = 106.04, p<.0001, η^2 =.27); and Anger (F(2,579)=164.58, p<.0001, η^2 = .36). Post hoc analyses using Tukey's HSD revealed a distinct pattern of scoring, with Cluster B individuals scoring significantly higher, and HCs scoring significantly lower, than the OPD individuals on all subscales. Group means and standard deviations for the total score and three subscales are presented in Table 4.

Finally, to evaluate the latent structure of the three subscale format of the ALS-18, a confirmatory factor analysis was conducted and the results indicated that model fit was

reasonable [X2 = 511.06 (132), p< .00001; CFI= .945; RMSEA = .07 (.064–.077, 90% C. I.); SRMR =.040]. Factor loadings for the three subscales and items are presented in Table 5. Fit diagnostics were considered in order to determine whether the model could be respecified to improve model fit. Examination of the three highest modification indices (and associated standardized expected parameter change values) indicated that one source of poor fit could be attributed to the presence of correlated errors for several sets of items. Inspection of the items revealed similar wording and content across all three sets. These item sets include numbers 8 and 36, which appear on the Depression/Elation subscale (M.I. =68.05; standardized expected parameter change =.18); items 34 and 43, also appearing on the Depression/Elation subscale (M.I. = 50.86; standardized expected parameter change =.12); and items 16 and 17, which appear consecutively in the 54 item scale and load onto the Anxiety/Depression subscale (modification index = 42.89, standardized expected parameter change =.11). The model was respecified allowing for correlated errors for these three sets of items, resulting in fit statistics that showed a significant improvement in model fit, [X2 = 362.70 (129), p< .00001; CFI= . 966; RMSEA = .056 (.049–.063, 90% C. I.); SRMR =.036].

Fit diagnostics from the original model further suggested that there was also some cross loading of items across subscales, although the modification indices were not as high as those associated with error covariances. Because the creation of the three factor short form was based on empirical procedures and not a theoretical rationale, further model respecification was not conducted as this could be justified on the basis of theory or past literature on the underlying structure of affective lability.

Discussion

Indicators of measurement validity were examined for a short form of the ALS that was originally developed using exploratory factor analysis in a non-clinical sample (ALS-18; Oliver & Simons, 2004). The aims of the current study were to evaluate the utility of this short form in a clinical sample that included people with impairment associated with affective lability and to conduct a confirmatory factor analysis. Results supported the former aim, but did not strongly support the three factor scale of affective lability developed by Oliver and Simons (2004).

The correlation between the total score of the original scale and the ALS-18 short form was high and good convergent validity of the short form was observed in the sample as demonstrated by strong positive correlations with trait measures of anxiety and anger. Additionally, and as expected, discriminant validity was demonstrated by the low association between the ALS-18 subscale scores and a response style that reflected denial or minimization of symptoms. The ALS-18 also showed strong construct validity; people who received DSM-IV Axis II Cluster B personality disorder diagnoses reported significantly higher affective lability scores than individuals with Cluster A or Cluster C disorders. In turn, these individuals reported significantly higher affective lability than healthy control participants. An identical pattern of scoring by diagnostic group, and comparable effect sizes for the total score and each subscale, were found using the 54-item ALS, which suggests that both versions of the ALS are equally adept at detecting group differences (η^2's .27–.38 for ALS-18 versus .32–.39 for ALS-54).

Results from a confirmatory factor analysis of the three subscale factor structure of the ALS-18 showed reasonable fit to the data. However, given that the development of the 18-item format of the ALS (and the three factor structure) was based on exploratory factor analysis, it is not surprising that the model did not show better fit as there are many potential sources of misfit that cannot be detected with this methodology. Inspection of fit diagnostics and individual items suggested that some items loaded onto a latent factor due to similarity in wording in addition to common underlying content. Model respecification that allowed for correlated residuals of three item pairs resulted in a significant improvement in model fit.

In the current sample, there was little support for the observed three factor substructure of the 18-item short form. That is, the pattern of results for the three subscales was similar across groups, the intercorrelations among the three subscales were strong (*r*'s > .67), and the fit diagnostics of the CFA suggested that some items loaded onto more than one factor. Further model respecification in this sample could not be supported on a priori theoretical grounds (MacCallum, 1986), but future research is needed to identify the underlying substructure of the construct of affective lability. Assessment of measurement invariance across different clinical (and non-clinical) samples is also a necessary step in understanding this construct as the current sample included only one diagnostic group (e.g., people with Axis II disorders). It should be noted that despite the fact that there was little support for the three factors identified by Oliver and Simons, analyses using these three subscales were presented in the current paper for two reasons. First, prior work does show that different aspects of affective lability are associated with different diagnostic categories (Koenigsberg at al., 2002; Henry et al., 2001; Trull et al., 2008). Second, the analyses on the subscales were presented to allow researchers and clinicians who are familiar with the short form and its three subscales to maintain comparability with previous work and results.

There are some limitations of the current analyses that should be acknowledged. First, accruing a clinical sample that is large enough to conduct confirmatory data analyses necessitated that the data were collected over a period of nine years. This allowed for potential sources of error in measurement that may have contributed to poor model fit, including differences in sample recruitment and the use of different diagnostic raters over time. However, other than an increase in total recruitment, there were no appreciable changes in recruitment strategies or inclusion/exclusion criteria over the time period. The use of different raters over time might be associated with some diagnostic drift, which cannot be ruled out as a source of measurement error. It should also be noted that the ALS and other self-report scales were completed independently from the diagnostic rating and the clinicians did not have access to any self-report data prior to the interview. Thus, their scores did not bias the assignment of Axis II diagnostic category.

A second limitation of the current analyses is that the self-report measures were not validated against behavioral markers of affective lability. A recent study indicates some disparity among various measures of affective instability including self-report, momentary assessment, and mood recall procedures. Specifically, scores from self-report measures of affective instability show modest associations with participants' experienced affective instability and average mood intensity, as derived from ecological momentary assessment (EMA) reports (Solhan, Trull, Jahng, & Wood, 2009). Thus, the inclusion of EMA or other behavior-based methodologies could provide additional validation of the broad construct of affective instability. Recently, for example, we examined the association of total ALS scores and performance on an emotional continuous performance task (e,g., happy and sad facial expressions) and found that higher affective lability is associated with more commission errors and with lower ability to distinguish between go and no-go cues (e.g., d prime) (Rattigan & Flory, 2010). These results are consistent with a growing body of research showing that people with BPD show impairments in recognizing emotional expression, with a particular bias or sensitivity toward negative affect (Domes, Schulze & Herpertz, 2009).

Lastly, given the large degree of overlap among the three subscales of the ALS-18 and the moderate to strong correlations with measures of negative affectivity (e.g. trait anger and anxiety) that were observed, it is reasonable to ask whether affective instability is part of the broader personality construct of Neuroticism. This question could not be addressed in the current sample as we did not have a sufficient number of individuals who completed a measure of Neuroticism. However, Miller and Pilkonis (2006) addressed this question in a sample of patients with DSM-IV Axis I or Axis II disorders and reported that Neuroticism was associated with an anxious avoidant style, while affective instability (as measured by individual DSM-

III-R diagnostic criteria) was associated with an externalizing personality style. Moreover, while both Neuroticism and affective instability were associated with interpersonal dysfunction, there were stronger associations between Neuroticism and global interpersonal difficulties, including problems at work, relative to affective instability, which was associated with impaired romantic relationships. Thus, despite overlap in the constructs of Neuroticism and affective instability, the constructs have unique power in predicting impairment in different domains of interpersonal functioning. Further research is warranted to evaluate the unique associations between affective instability and impairment in psychiatric patients in order to identify potential targets for intervention.

Acknowledgments

This research was supported by National Institutes of Mental Health grant numbers MH069979 (J.D.F.), MH63875 (L.J.S.), by grant number MO1-RR-00071 from the National Center for Research Resources (NCRR), a component of the National Institutes of Health (NIH) and by the Veterans Affairs VISN 3 Mental Illness Research, Education & Clinical Center. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of NCRR or NIH.

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Table 1

Demographic characteristics by group (n=580)

	Cluster B (n=236)	OPD (n=180)	HC (n=164)
Mean Age (SD)	35.08 (10.4)	36.24 (12.1)	30.04 (9.2)
Male (% of sample)	108 (45.8%)	105 (58.3%)	72 (43.9%)
Ethnicity/Racial Distribution: n (% of sample)			
African/American	57 (24.2%)	51 (28.3%)	23 (14.0%)
Asian	14 (5.9%)	14 (7.8%)	27 (16.5%)
Caucasian	102 (43.2%)	75 (41.7%)	90 (54.9%)
Hispanic	53 (22.5%)	32 (17.8%)	22 (13.4%)
Unknown/Other	10 (4.2%)	8 (4.4%)	2 (1.2%)

Note: Cluster B=borderline personality disorder, narcissistic personality disorder, antisocial personality disorder, histrionic personality disorder; OPD= other personality disorders (Clusters A, C personality disorders); HC =healthy control participants.

Table 2

Inter-correlations, means, standard deviations, and coefficient alphas for ALS-18 short form and subscales (n=580)

	1. Anxiety/Depression	2. Depression/Elation	3. Anger	M	SD	Coefficient alpha	N of items
1	1.0	.74	.73	4.89	4.21	.82	5
2		1.0	.67	8.62	5.89	.78	8
3			1.0	4.18	4.08	.84	5
ALS-18 Total				17.69	12.77	.87	18

Table 3

Indicators of convergent and divergent validity of the ALS-54 and ALS-18 (n=580)

	Affective Intensity Measure (AIM)	STAI-Trait Anxiety (STAI)	STAXI-Trait Anger (STAXI-TA)	STAXI- Anger In (STAXI-AI)	STAXI- Anger Out (STAXI-AO)	CTQ: Minimization/Denial (CTQ)
ALS-54	**.52**	**.40**	**.60**	**.64**	**.48**	**−.13**
ALS-18	**.51**	**.40**	**.62**	**.63**	**.49**	**−.14**
AIM		**.28**	**.44**	**.32**	**.35**	.00
STAI			**.30**	**.45**	**.20**	.04
STAXI-TA				**.56**	**.74**	**−.11**
STAXI-AI					**.39**	**−.12**
STAXI-AO						−.05

Note. STAI: State-Trait Anxiety Inventory; STAXI: State-Trait Anger Expression Inventory, CTQ: Childhood Trauma Questionnaire

Correlations with p<.01, in bold text

Table 4

ALS-18 Means (SD) in a clinical sample and healthy comparison participants

	Cluster B n=236	OPD n=180	HC n=164
Anxiety/Depression	7.25 (4.02)	5.01 (3.78)	1.38 (1.81)
Depression/Elation	11.66 (5.68)	8.67 (5.13)	4.19 (3.83)
Anger	6.89 (4.07)	3.57 (3.22)	.96 (1.53)
Total	25.79 (11.84)	17.25 (10.48)	6.53 (6.00)

Note: Cluster B=borderline personality disorder, narcissistic personality disorder, antisocial personality disorder, histrionic personality disorder; OPD= other personality disorders (Clusters A, C personality disorders); HC =healthy control participants.

Table 5

Factor Loadings for the 3 factor ALS-18 (n = 580)

Item	Factor Loading
Anxiety/Depression	
5. At times I feel just as realized as everyone else and then within minutes I become so nervous that I feel light-headed and dizzy.	.74
12. One minute I can be feeling OK and then the next minute I'm tense, jittery, and nervous.	.86
16. Many times I feel very nervous and tense and then suddenly feel very sad and down.	.84
17. Sometimes I go from feeling extremely anxious about something to feeling very down about it.	.80
20. I shift back and forth from feeling perfectly calm to feeling uptight and nervous.	.83
Depression/Elation	
8. There are times when I have very little energy and then soon afterwards I have the same energy level as most people.	.72
25. Sometimes I can think clearly and concentrate well one minute and then the next minute I have a great deal of difficulty concentrating and thinking clearly.	.74
34. I switch back and forth between being extremely energetic and having so little energy that it's a huge effort just to get where I'm going.	.80
36. There are times when I feel absolutely wonderful about myself but soon afterwards I often feel that I am just about the same as everyone else.	.61
42. I shift back and forth between being very unproductive and being just as productive as everyone else.	.74
43. Sometimes I feel extremely energetic one minute and then the next minute I might have so little energy that I can barely do a thing.	.79
45. There are times when I have more energy than usual and more than most people and then soon afterwards I have about the same energy level as everyone else.	.65
46. At times I feel that I'm doing everything at a slow pace but then soon afterwards I feel that I'm no more slowed down than anyone else.	.68
Anger	
14. I frequently switch from being able to control my temper very well to not being able to control it very well at all.	.77
21. There are times when I feel perfectly calm one minute and then the next minute the least little thing makes me furious.	.87
23. Frequently, I will be feeling OK but then I suddenly get so mad that I could hit something.	.78
33. There are times when I am so mad that I can barely stop yelling and other times shortly afterwards when I wouldn't think of yelling at all.	.70
41. There are times when I'm so mad that my heart starts pounding and/or I start shaking and then shortly afterwards I feel quite relaxed.	.73

Note: Item numbers refer to the original 54-item scale.