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Development and Testing of the Alzheimer's Disease and Related Dementias (AD-RD) Mood
Scale

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1 Abstract

2 Background: Existing mood measures for individuals with Alzheimer’s disease and related
3 dementias (AD/RD) focus primarily on negative moods, particularly depression.

4 Objective: The purpose of this study was to design and test a new measure of both positive and
5 negative mood in individuals aged 55 or older with AD/RD.

6 Method: Formal and informal caregivers’ observations of mood in this population generated 26
7 positive and 27 negative mood descriptors reviewed by content experts before pilot testing. The
8 Alzheimer’s Disease and Related Dementias (AD-RD) Mood Scale and Mini-Mental State
9 Examination were administered to 298 subjects with very mild to severe cognitive impairment.
10 Two examiners simultaneously rated a subsample of subjects, a second subsample was retested
11 after 2 weeks and additional mood measures were administered to a third subsample.

12 Results: The final AD-RD Mood Scale contains 34 items in 2 positive subscales (Spirited and
13 Contented) and 3 negative subscales (Hostile, Apathetic and Sad). The 5 subscales explain 82%
14 of the variance. Interrater reliability was .78 for the positive items, .85 for the negative items.

15 Cronbach’s alphas were .92, .90, .85, .77 and .73 for Spirited, Hostile, Contented, Apathetic and
16 Sad subscales, respectively. Mean subscale scores were stable over time. Moderate to strong
17 validity coefficients produced by comparison with 4 existing measures were in the hypothesized
18 direction. Subscale scores discriminated between depressed and non-depressed subjects.

19 Discussion: The final 34 item AD-RD Mood Scale provides useful data on both positive and
20 negative moods of individuals with Alzheimer’s disease and related dementias. Further
21 evaluation of reliability and validity in a multiethnic sample is recommended as are confirmatory
22 factor analysis and expansion to add subscales related to tension and social unease.

23

1 Development and Testing of the Alzheimer's Disease and Related Dementias (AD-RD) Mood
2 Scale

3 Measurement of mood in individuals with Alzheimer's disease and related dementias
4 (AD/RD) is challenging because declining language capability limits self report of mood states.
5 Measures of mood based on observer ratings are generally more practical for individuals with
6 later stage AD and related dementias.

7 Most of the mood and emotion measures that have been developed for this population are
8 focused on negative mood and measurement of the symptoms of depression (Sunderland,
9 Alterman, Yount, Hill, Tariot, et. al., 1988). Some quality of life measures contain a very limited
10 number of positive items (Albert, Castillo-Castaneda, Sano, Jacobs, Marder, et al., 1996; Ready,
11 Ott, Grace & Fernandez, 2002). Most are not designed for the moderate to severely impaired
12 individual (Brod, Stewart, Sands & Walton, 1999). A comprehensive measure that captures both
13 positive and negative moods can be used to describe mood states at different stages of the disease
14 and to track progress in clinical programs or intervention research in which improved mood is
15 the desired outcome. The purpose of this paper is to describe the development and testing of a
16 new measure of both positive and negative mood for individuals with mild to advanced AD/RD.

17 *Conceptual Framework*

18 Although often used interchangeably, the terms emotion, affect and mood refer to
19 different characteristics of feeling states. *Emotions* are intense, brief feeling states that arise in
20 response to a particular stimulus. *Moods* are more enduring but generally less intense global
21 states (Schulz, 1982). Moods and emotions vary in intensity (degree of arousal), frequency,
22 direction (inward focus toward self or outward toward the environment), and duration. They may
23 be communicated to others via behavioral indicators, either verbal or nonverbal (facial

1 expression, voice, gestures). *Affect* is the general valence (positive or negative) of that state and
2 accounts for much of the variance in the state (Guerrero, Andersen & Trost, 1998). According to
3 DSM IV TR criteria, *depression* is persistent low mood or loss of interest in activities once
4 enjoyed (American Psychiatric Association, 2000).

5 The question of whether older adults with severe dementia are capable of feeling
6 emotions has been understudied (Cotrell & Schulz, 1993). There is some disagreement in the
7 literature on the degree to which severely impaired individuals experience complex moods or
8 psychiatric disorders as opposed to “simpler equivalents” of these disorders. Cohen (1991)
9 proposed that individuals with late stage dementia experienced separation from self. In contrast,
10 staff and family members who had close contact with older adults residing in two dementia care
11 units reported a wide range of emotions and moods in this population (Tappen & Williams,
12 1998). From the caregiver perspective, residents’ moods were readily identified. The AD-RD
13 Mood Scale was developed from their descriptions.

14 *General Mood Measures*

15 A number of scales developed to detect depression in cognitively intact older adults have
16 been used with individuals evidencing mild to moderate cognitive impairment. The Geriatric
17 Depression Scale (GDS) was designed as a basic screening tool (Brink, Yesavage, Lum,
18 Heersema, Adey, et al., 1982) and has been used extensively as an outcome measure (Yesavage,
19 Brink, Rose, Lum, Huang, et al., 1983). It has demonstrated acceptable levels of reliability and
20 validity in many studies (Jang, Clay, Roth, Haley & Mittleman, 2004; Watson & Pignone, 2003).
21 Sheikh and colleagues (1991) report 92% sensitivity and 89% specificity. Since the scale
22 requires a written or verbal response to items, it cannot be used reliably when verbal abilities are
23 severely affected by AD, thus researchers have excluded individuals with a Mini-Mental State

1 Examination (MMSE) score below 15, indicative of moderate dementia (Folstein, Folstein &
2 McHugh, 1975; MacRae, Asplund, Schnelle, Ouslander, Abrahamse, et al., 1996).

3 Lodgson and Teri (1995) adapted the Beck Depression Inventory (BDI) so that family
4 caregivers could act as surrogate respondents on behalf of the individual with more advanced
5 dementia. The scale contains 21 groups of statements relating to cognitive-affective and somatic
6 indicators of depression. Caregivers choose one out of each group that best describes the way the
7 subject has been feeling during the last seven days based on what they believe the individual
8 would report if able. In a sample of 73 older adults recruited for a behavioral study of depression
9 and dementia, the BDI (surrogate format) correlated well with GDS scores (.80). Also used in
10 studies of individuals with AD, the Montgomery-Asberg Depression Rating Scale (MADRS)
11 (Montgomery & Asberg, 1979) was designed for rating depression in non-demented individuals.
12 In a cross-sectional study of Swedish older adults age 85 to 95 (Bergdahl, Gustavsson, Kallin,
13 von Heideken Wagert, Lundman, et al., 2005), the MADRS was used to confirm depression in
14 participants with no impairment and with mild to moderate cognitive impairment. Those who
15 had dementia were more likely to be depressed ($p = .007$).

16 *Dementia Specific Measures*

17 The Dementia Mood Assessment Scale (DMAS) (Sunderland, et al., 1988) is a 24-item
18 scale that rates observable mood and functional abilities. The first 17 items measure mood while
19 the remaining items measure severity of dementia. Items focus on negative moods with the
20 exception of two items, “sense of enjoyment” and “self esteem”. Sunderland and associates
21 reported a mean score of 25.2 (SD = 9.3) in a sample of 21 individuals diagnosed with dementia
22 of the Alzheimer’s type who were hospitalized to participate in a drug study. Scores have been
23 found to be significantly correlated with global measures of depression ($r = 0.73$) and sadness

1 (r = 0.65) (Sunderland, et al., 1988). Older adults with advanced dementia may have limited
2 insight as well as limited verbal skills, thus some items such as guilt feelings and suicidal
3 ideation may be difficult to rate. Psychosomatic complaints are also unlikely to be self-reported
4 as such and require assessment by a mental health professional.

5 The Cornell Scale for Depression in Dementia (CSDD) is a 19-item instrument designed
6 to rate depressive symptoms in subjects with dementia based on caregiver report and subject
7 interviews (Alexopoulos, Abrams, Young & Shamoian, 1988). After interviewing nursing staff
8 members and conducting a brief interview with the subject, the clinician rates the individual with
9 dementia on a 3-point scale according to level of severity. Reported internal consistency in a
10 sample of 26 cognitively impaired subjects was high (0.84). The CSDD has been shown to have
11 satisfactory interrater reliability even in severely demented subjects. When examined item by
12 item, interrater reliability ranged from 0.64 to 0.99. For total scores, it was 0.67. Of a sample of
13 48 subjects, 22 met diagnostic criteria for depression. The CSDD discriminated adequately
14 between groups of subjects with no depression, minor, probable major and major depression.
15 There was also a significant correlation with Research Diagnostic Criteria for depression (r =
16 0.83) (Alexopoulos, et al., 1988). A disadvantage is that some items describing vegetative signs
17 of depression could also be indicators of dementia severity. Lee, Strauss and Dawson (2000)
18 addressed this issue by including only the non-vegetative items. Several items are difficult to
19 assess in individuals with severely limited verbal skills (e.g. suicidal wishes, multiple physical
20 complaints and pessimism).

21 The Dementia Mood Picture Test (DMPT) (Tappen & Barry, 1995) was designed to
22 measure positive and negative moods in severely impaired subjects. To simplify administration,
23 the instrument is limited to three negative and three positive moods commonly referred to as

1 “primary” in the literature. To provide additional channels through which information may be
2 comprehended, large line drawings with the descriptors printed in 2” high letters are placed
3 before the individual as each question is asked. Subjects are asked whether or not they are
4 experiencing each mood (“Are you in a good mood?”) and the intensity of that mood. This test is
5 unusual in that it is designed to obtain the response of the individual with dementia directly but it
6 is limited to six primary moods.

7 Lawton and associates (1999) developed the Observed Emotion Rating Scale (OERS) to
8 study quality of life in nursing home residents with dementia. The 6-item OERS measures three
9 positive emotions (pleasure, interest and contentment) and three negative emotions (sadness,
10 anxiety and anger). An observer rates the frequency of expression of each emotion first over a
11 ten-minute period of time and then over the last two weeks. Contentment and interest were most
12 frequently observed, anger was least often observed. Interrater reliability scores were satisfactory
13 (.76 to .89). Validity was supported by comparisons between cognitively impaired and
14 unimpaired long term care residents. Unimpaired individuals were rated as more anxious.
15 Discriminant validity was evidenced by staff ratings showing that sad and anxious residents were
16 less likely to be rated as showing pleasure and contentment. This scale is also limited in the
17 range of emotions that it measures.

18 Ready, Ott, Grace and Fernandez (2002) developed the Cornell-Brown Scale for Quality
19 of Life in Dementia to measure treatment outcomes. The rating scale is based on an interview
20 with patient and caregiver and measures multiple dimensions of quality of life including positive
21 and negative mood indicators. Four positive (comfort, happiness, enjoyment of life’s pleasant
22 events, tolerance) and four negative (anxiety, sadness, lack of reactivity to pleasant events,
23 irritability) mood-related signs are included. The scale has been tested on 50 memory impaired

1 patients (mild to moderate impairment) and their caregivers from a hospital-based outpatient
2 clinic. The authors report good internal reliability (.81) and validity (Spearman rho = .63, $p < .01$)
3 based on comparison to patient self-ratings on a visual analogue scale with a cartoon
4 representation of sad at one end and happy at the other.

5 In summary, most researchers who have measured mood in cognitively intact and
6 cognitively impaired elders have focused on the measurement of depression rather than positive
7 moods. Several instruments designed for unimpaired older adults, including the Geriatric
8 Depression Scale, the Montgomery-Asberg Depression Scale and the Beck Depression Inventory
9 (surrogate format), have been used in impaired individuals. Other instruments have been
10 designed specifically for the older adult with dementia but measure primarily negative mood
11 (Dementia Mood Assessment Scale, Cornell Scale for Depression in Dementia). The Dementia
12 Mood Picture Test, the Observed Emotion Rating Scale and the Cornell-Brown Scale for Quality
13 of Life in Dementia measure positive moods or emotions but are limited to three or four positive
14 items per instrument.

15 Two additional limitations of existing instruments are the abstract nature of many items
16 and the inclusion of vegetative symptoms. In the DMAS, for example, raters are required to
17 conjecture about whether an individual feels “inferior,” “guilty” or “pessimistic.” Individuals
18 with advanced dementia cannot reliably express such specific complex feelings. Porteinsson,
19 Tariot and Schneider (1997) describe the difficulties in comparing research outcomes due to
20 inconsistency in what is considered an indicator of mood. The combination of vegetative
21 symptoms with behavioral and subjective symptoms and the possibility of overlap between
22 mood, symptoms of dementia and the effect of co-morbid illnesses frequently extant in this older
23 population lead to inconsistency in ratings. There is a critical need for a comprehensive outcome

1 measure composed of concrete, observable mood indicators encompassing the full range of
 2 positive and negative moods.

3 Methods

4 *Test Development*

5 Items for the AD-RD Mood Scale were derived from a qualitative study of family
 6 members' and formal caregivers' descriptions of the moods of individuals with moderate to
 7 severe AD (Tappen & Williams, 1998). Family members and formal caregivers who were in
 8 frequent contact (minimally once weekly) with care recipients residing on an Alzheimer's
 9 Special Care Unit or attending an Alzheimer's Day Care Center in Tucson, Arizona were asked
 10 to describe how individuals with moderate or severe probable Alzheimer's disease
 11 communicated their moods. Comparison of the twenty family members' responses to the 19
 12 caregiving staff responses was done for verification purposes.

13 All items derived from the caregiver interviews were mentioned by at least two
 14 respondents and supported by either the literature on mood in Alzheimer's disease or onsite
 15 structured observations that were done over 4 months as a supplement to the interviews.

16 *Content Validity.* The completed instrument was reviewed by 2 content experts in
 17 dementia care and research. Modifications were made to the instructions and scoring as a result.
 18 Items were also evaluated for conceptual redundancy. Thus "safe" and "secure" were combined
 19 into 1 item but "likes to do thing" and "likes to be busy" were retained as separate items based
 20 on their recommendations.

21 Grounded in qualitative data and the theoretical literature, the resulting 53 items represent
 22 a wide range of positive and negative moods and mood indicators rather than focusing on
 23 symptoms of pathology such as suicidal ideation or the vegetative signs of depression.

1 The original test version of the AD-RD Mood Scale was a 53 item Likert scale.
2 Each mood descriptive item is rated from 1 (never exhibited) to 5 (always exhibited) based on
3 observations over the previous 7 days. The 53 items were divided into positive (26 items) and
4 negative (27 items) subscales.

5 *Psychometric Testing*

6 The AD-RD Mood Scale has been tested on 298 older individuals (aged 55+)
7 representing a range from very mild to severely impaired. This testing was done in a series of
8 psychometric and interventional studies. All studies were approved by the University's
9 Committee for the Protection of Human Studies and those of the host institution where
10 applicable. Individuals capable of understanding the purpose of the study and meaning of
11 consent provided their own consent. Responsible family members or legal guardians provided
12 consent for the remainder. For these subjects, their assent to participate was obtained as well.

13 *Study Measure.* In all four of the studies the AD-RD Mood Scale and Mini-Mental State
14 Examination [MMSE] (Folstein, Folstein & McHugh, 1975) were administered. The MMSE is a
15 widely used measure of cognition. Validated against clinical diagnosis and the Wechsler Test,
16 the Mini-Mental State Examination tests orientation, attention, registration, calculation, recall
17 and language. High (.89) test-retest reliabilities have been reported. It has been reported to
18 discriminate demented from non-demented individuals (Overall, 1989). In study 3 subjects were
19 also rated on the Dementia Mood Assessment Scale [DMAS] (Sunderland, et al., 1988), Cornell
20 Scale for Depression on Dementia [CSDD] (Alexopoulos, et al., 1988), Montgomery Asberg
21 Depression Rating Scale [MADRS] (Montgomery & Asberg, 1979) and the 4 subscales of the
22 Observed Emotion Rating Scale [OERS] (Lawton, et al., 1999). Psychometric properties of these
23 scales were presented in an earlier section.

1 *Sample.* The four studies are as follows:

2 Study 1 was the first test of the AD-RD Mood Scale conducted in one day center and two
3 skilled nursing facilities. Forty-four individuals aged 61 to 94 (M 79; SD 8.37) were tested.
4 Twenty (45%) were men, 24 (55%) women. Their Mini-Mental State Examination (MMSE)
5 (Folstein, Folstein & McHugh, 1975) mean score was 7.88 (SD 6.47) and ranged from 0 (very
6 severely impaired) to 23 (mildly impaired) out of a possible 30. Six (14%) were Hispanic, two
7 were African American, the remainder were European American. Other than formatting, no
8 substantive changes were made in the instrument as a result of this pilot study.

9 Studies 2 and 3 were intervention studies of 77 and 120 residents, respectively, of nursing
10 home and assisted living facilities. The average age of the 77 nursing home residents in Study 2
11 was 87 (SD 6.70); range 70-105. Their average MMSE was 9.89 (SD 6.04) with a range of 0 to
12 26. Twelve (16%) were men, 65 (84%) were women. Seventy-five (97%) were European
13 American, 2 (3%) were African American. Their average length of stay in the nursing home was
14 1062 days (SD 847) with a range of 329 to 4310 days. The average age of the 120 nursing home
15 and assisted living residents in Study 3 was 87.73 (SD 6.04) with a range of 70 to 100. Twenty-
16 one (17%) were men, 99 were women (83%). Mean MMSE was 10.15 (SD 7.51), range 0 to 29.
17 Seventy-two (83%) were European American, 18 (15%) were Hispanic and 2 (2%) were African
18 American. The average length of stay was 808 days (SD 759), range 29 to 5354 days. Baseline
19 data from these studies were used for this analysis.

20 Study 4 involved additional testing of the AD-RD Mood Scale and other instruments.
21 Fifty-seven additional community dwelling and institutionalized individuals with an MMSE of
22 24 or less were tested in Study 4. Their average age was 79.33 (SD 9.22) with a range of 55 to
23 96. Average MMSE was 17.21 (SD 5.98); range 3 to 24. Twenty-eight (49%) were men and 29

1 (51%) were women. All were European American. Approximately half lived in low income
2 housing. The remainder resided in long-term care facilities.

3 All measures were administered during a single session. In Study 2, two examiners rated
4 a subset of 23 subjects simultaneously to assess interrater reliability. In Study 4, 39 subjects were
5 retested 2 weeks later to assess test-retest reliability.

6 Results

7 *Item Analysis*

8 For purposes of analyzing the individual items and their interrelationships, examiner
9 ratings on the 298 subjects from the 4 studies were combined.

10 Initial item analysis was done on the a priori positive and negative subscales.
11 Standardized Cronbach alphas were .93 (positive subscale) and .91 (negative subscale),
12 indicative of acceptable homogeneity. Item to total correlations ranged from -.18 to .78 on the
13 positive subscale and .15 to .74 on the negative subscale. Little item redundancy was found
14 within the subscales; none exceeded .80. Several interitem correlations within the subscales
15 approached zero or were negative. The strongest negative correlation was the item quiet relative
16 to the item talkative, $r = -.55$. The items calm and energetic were negatively related as well,
17 $r = -.11$. On the negative subscale, the item embarrassed had a negative relationship to the item
18 lost $r = -.14$.

19 These negative and near-zero interitem correlations suggested a more complex structure.
20 Responses to the original 53 items were subjected to exploratory factor analysis employing
21 squared multiple correlations as prior communality estimates followed by oblique rotation and
22 the Procrustean transformation (Hatcher, 1994). The SCREE test evidenced large breaks between
23 factors 2 and 3 and factors 7 and 8. The eigenvalue one or Kaiser criterion suggested a 7 factor

1 solution as the factor 7 eigenvalue was 1.12 and the factor 8 eigenvalue was .73. Items with
2 factor loadings of .40 or greater were said to load on that factor. Forty-one items loaded on one
3 of the 7 factors, 12 did not and were deleted. No items exceeded .40 on more than one factor.
4 Factor 7 contained only 2 items (agitated and tense) and was deleted. Three items loaded on
5 Factor 6 (worried, embarrassed and afraid will be laughed at). Deletion of one item raised the co-
6 efficient alpha from .66 to .68, still below the desired level of .70 for a new instrument (Nunnally
7 & Bernstein, 1994). Factor 6 was deleted. The cumulative common variance explained by the 5
8 retained factors is 82%.

9 The 5 factors were modified on the basis of further within-factor interitem analysis. Two
10 items with interitem correlations under $r = .15$ were deleted. Factor 1 contained one item,
11 energetic, that met this criterion. Deletion of this item raised the alpha coefficient from .91 to
12 .92. Factor 4 also had one item, bored, that met this criterion. Deletion of this item raised the
13 alpha coefficient from .75 to .77.

14 Factor 1, Spirited, contains 12 items (Table 1) that reflect high energy directed outward
15 with a positive valence. Item to total correlations ranged from .49 to .75. Interitem correlations
16 ranged from .19 (wants attention to bright, alert) to .82 (likes to do things and likes to be busy).

17 Factor 2, Hostile, contains 8 items that reflect high energy directed outward with a
18 negative valence. Item to total correlations ranged from .53 to .85. Interitem correlations ranged
19 from .35 to .79. The item cooperative is reverse scored.

20 Factor 3, Contented, contains 5 items reflecting a balance in inward and outward directed
21 energy and a positive valence. Item to total correlations ranged from .60 to .69. Interitem
22 correlations ranged from .43 to .64.

1 Factor 4, Apathetic, contains 5 items reflecting very low energy, inwardly directed, with
 2 a negative valence. Item to total correlations ranged from .40 to .68. Interitem correlations
 3 ranged from .20 to .55. Part of the original positive subscale, the items attentive and quiet loaded
 4 on this subscale. Attentive is reverse scored, quiet is not.

5 Factor 5, Sad, contains 4 items reflecting inwardly directed energy with a negative
 6 valence. Item to total correlations ranged from .39 to .63. Interitem correlations ranged from .20
 7 to .60.

8 The final AD-RD Mood Scale has 5 subscales and 34 items. The themes reflected by the
 9 items that loaded on each of the 5 retained factors were used to name the subscales: Spirited,
 10 Hostile, Contented, Apathetic and Sad.

11 *Reliability Estimations*

12 Interrater reliability was evaluated on Study 2 data utilizing the original positive and
 13 negative subscales. Interrater reliability of the positive subscale was Pearson $r = .78$; it was .85
 14 for the negative subscale. For comparison purposes, subjects were also rated by the two
 15 examiners on the Montgomery-Asberg Depression Rating Scale [MADRS] (Montgomery &
 16 Asberg, 1979), yielding a similar interrater reliability of $r = .79$.

17 Test-retest reliability over 2 weeks was done utilizing Study 4 data. Mean scores were
 18 stable over time. Analysis of variance indicated no significant differences across the two testing
 19 sessions (Table 2).

20 Subscale homogeneity (internal consistency) was assessed by calculating coefficient
 21 alpha (Cronbach, 1941). Reliability estimates were .92, .90, .85, .77 and .73 for the Spirited,
 22 Hostile, Contented, Apathetic and Sad subscales, respectively.

23 *Construct and Predictive Validity*

1 Construct validity, the degree to which a measure relates to other measures consistent
2 with theory-based hypotheses about the construct being measured (Carmines & Zeller, 1979),
3 was assessed by comparing the 5 subscale scores with scores on the DMAS, CSDD, MADRS,
4 and 4 OERS subscales (Table 3). Baseline data on 87 subjects who completed the intervention in
5 Study 3 was used for this analysis. Moderate to strong positive validity coefficients were found
6 between the two positive subscales of the AD-RD Mood Scale, Spirited and Contented, and
7 those of the OERS. Negative validity coefficients were produced by the comparison with the
8 depression and mood scales. Conversely, comparison with the positive subscales of the OERS
9 produced moderate to strong negative validity coefficients with the remaining 3 negative
10 subscales, Hostile, Withdrawn and Sad, and positive validity coefficients when compared with
11 the depression and mood scales. All of these comparisons were statistically significant
12 ($p < .05$) and all were in the hypothesized direction.

13 Predictive validity, the relationship between a predictor (the 5 subscales) and a criterion
14 event occurring before, during or after the predictor is applied (Nunnally & Bernstein, 1994),
15 was estimated using the same baseline data from Study 3 (Table 4). Subjects were divided into
16 “depressed” and “not depressed” groups on the basis of their Cornell (CSDD) scores of > 7 and \leq
17 7, respectively. Significant differences in scores between the depressed and not depressed groups
18 were found on all 5 AD-RD Mood Scale subscales. As predicted, means of the Spirited and
19 Contented subscales were lower for the depressed group and means for the Hostile, Apathetic
20 and Sad subscales were higher for the depressed group.

21 Discussion

22 Derived from formal and informal caregivers’ descriptions of the moods they observed in
23 individuals with AD and related dementias, 53 items were generated for the test version of the

1 AD-RD Mood Scale. The items were divided a priori into two subscales based on the
2 theoretically-derived valence of the item, positive or negative. The original scale was used in
3 several studies. The occurrence of negative and near zero interitem correlations within these 2
4 subscales suggested a more complex structure. Exploratory factor analysis with oblique rotation
5 and additional interitem analysis resulted in a 34 item instrument with 5 subscales: Spirited,
6 Hostile, Contented, Apathetic and Sad.

7 This shorter revised version of the AD-RD Mood Scale evidenced acceptable levels of
8 reliability in use with community dwelling and institutionalized older adults (aged 55 and older)
9 with very mild to severe cognitive impairment levels, the majority of whom (197) had a clinical
10 diagnosis of Alzheimer's disease utilizing established criteria (McKhann, Drachmann, Folstein,
11 Katzman, Price, et al., 1984). Interrater reliability on the original subscales was comparable to a
12 well established measure of depression, the Montgomery-Asberg Depression Scale. Test-retest
13 results evidenced moderate to strong stability over two weeks, indicating that the scale measures
14 moods of some duration, not less stable emotional responses. The internal consistency of the
15 subscales was within the acceptable range for a new instrument, .77 to .92 (Nunnally &
16 Bernstein, 1994).

17 Efforts to establish validity of the Scale began with the derivation of items from empirical
18 data. The Scale is grounded in the observations of those most familiar with the moods of
19 individuals with AD and related dementias. Prior to testing of the new instrument, the content
20 and format were reviewed by two experts who suggested changes in wording and presentation.
21 Further minor changes in format were made after the first pilot test to improve readability.

22 Validity was further tested by comparison with established tests of emotion, mood and
23 depression. All of the resulting validity coefficients were significant and in the hypothesized

1 direction. The subscale scores were also compared in depressed versus non-depressed
2 subsamples of nursing home residents with AD. The differences between the two groups were
3 significant on all 5 subscales and in the hypothesized direction.

4 Most of the instruments currently used to measure emotion, mood or depression in the
5 older population with AD/RD were tested on small samples. None of the published reports
6 included factor analytic assessment. Predictive validity tests were relatively weak and/or based
7 on challengeable assumptions, for example, that non-demented individuals would evidence more
8 anxiety.

9 Limitations in testing the AD-RD Mood Scale include the small samples used to evaluate
10 interrater reliability and test-retest stability over time. Clinical diagnoses of AD/RD were not
11 available on community dwelling subjects, only a global measure of cognition (the MMSE). The
12 numbers of Hispanic and African American subjects were too small for separate analysis. Further
13 testing on a multiethnic sample should be done.

14 A limitation on clinical use of the AD-RD Mood Scale is that it requires trained raters. At
15 least a moderate level of skill in communicating with the severely impaired and in interpretation
16 of the expression of mood in individuals with communicative dysfunctions is needed for
17 accuracy and consistency. Further, the AD-RD Mood Scale was not designed to identify
18 pathology or a clinical diagnosis of depression but to produce a profile of the moods most
19 commonly encountered in individuals with AD/RD.

20 Although dysphoric mood and depression have been linked to poor health outcomes, the
21 role of optimism and positive mood states in health have been understudied (Ostir, Markides,
22 Black & Goodwin, 2000). In a longitudinal study, Ostir and colleagues found a relationship
23 between positive affect measured by four items such as “I was happy” to functional ability

1 supporting the importance of incorporating both positive and negative states. Further study is
2 needed to explore the links between quality of life in persons with AD/RD and positive moods
3 such as Spirited and Contented.

4 The items constituting the two factors that were deleted suggest direction for further
5 expansion and retesting of the AD-RD Mood Scale. Additional item generation related to factor
6 6, which is characterized by tension without the outwardly directed aggression and irritability of
7 the hostile subscale, and factor 7 embarrassment and self-consciousness (implying discomfort in
8 social situations and, perhaps, awareness of the effect of their cognitive limitations) should be
9 done. Confirmatory factor analysis of the 5 subscales utilizing another large sample of
10 individuals with AD/RD is also needed.

11 The AD-RD Mood Scale may be used to compare prevalent moods at different stages of
12 this progressive disease. It may also be used as an outcome measure for interventional studies
13 designed to improve mood, reduce the accompanying problematic behaviors that may result from
14 negative moods, and improve the quality of life of individuals suffering from Alzheimer's
15 disease and related dementias.

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Table 1. Factor Loadings: AD-RD Mood Scale^a

	Factor 1		Factor 2		Factor 3		Factor 4		Factor 5
	Spirited		Hostile		Contented		Apathetic		Sad
Wants attention	1.00	Hateful	1.00	Relaxed	1.00	Flat	1.00	Tearful	1.00
Sense of humor	.96	Aggressive	.92	Feels safe, secure	.92	Lost	.79	Wants to die	.71
Euphoric (very high spirits)	.95	Angry	.88	Content	.87	Quiet	.59	Sad	.69
Wants affection, love	.93	In bad mood	.71	Calm	.75	Apathetic	.51	Depressed	.57
Likes to do things	.90	Upset	.65	Accepting	.57	Attentive	-.50		
						[reverse scored]			
Jovial	.90	Irritated	.69			Bored ^b	.42		
Affectionate	.89	Cooperative	-.48						
		[reverse scored]							
Likes to be busy	.87	Suspicious,	.46						

paranoid

Enthusiastic	.85
Talkative	.78
In good spirits	.75
Bright, alert	.52
Energetic ^b	.47

^a Items loading at .40 or better were retained

^b Deleted following item to total and interitem analysis

Table 2. Comparison of Subscale Means Across 2 Weeks Time

	Time 1	Time 2	F	p
Spirited	38.78 (10.36)	37.24 (9.21)	.49	.4852
Hostile	11.94 (4.80)	11.15 (3.62)	.69	.4852
Contented	20.00 (3.97)	19.77 (3.13)	.08	.7814
Apathetic	10.57 (3.88)	10.84 (3.27)	.18	.7115
Sad	6.84 (2.72)	7.02 (2.27)	.11	.7465

N = 39

Table 3. Comparison with Other Mood and Affect Measures: Correlation and Significance

	DMAS	CSDD	MADRS	OERS	OERS	OERS	OERS
	Dementia	Cornell	Montgomery	Observed	Observed	Observed	Observed
	Mood	Scale for	Asberg	Emotion	Emotion	Emotion	Emotion
	Assessment	Depression	Depression	Rating Scale	Rating Scale	Rating Scale	Rating Scale
	Scale	in Dementia	Rating Scale	10 MIN	10 MIN	2 WEEK	2 WEEK
				Negative	Positive	Negative	Positive
Spirited	-.63	-.57	-.68	-.27	.67	-.48	.47
	<.0001	<.0001	<.0001	.0102	<.0001	<.0001	<.0001
Hostile	.66	.61	.61	.67	-.61	.65	-.51
	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
Contented	-.71	-.68	-.74	-.55	.71	-.56	.60
	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
Apathetic	.80	.72	.80	.42	-.57	.50	-.68

	<.0001	<.0001	<.0001	<.0001	.0001	<.0001	<.0001
Sad	.67	.65	.57	.40	-.51	.54	-.41
	<.0001	<.0001	<.0001	.0001	<.0001	<.0001	<.0001

N = 87

Table 4. Subscale Discrimination Between Impaired Individuals With Depressive Symptomatology and Those Without

Subscale	Depressed ^a		Not Depressed ^b		F	p
	M	SD	M	SD		
Angry	18.16	(6.05)	12.80	(4.44)	21.48	.0001
Withdrawn	14.46	(3.94)	10.54	(3.80)	21.63	.0001
Sad	8.00	(2.69)	6.33	(5.04)	9.93	.0023
Peaceful	15.23	(4.22)	19.28	(4.10)	25.32	.0001
Spirited	30.25	(8.17)	37.50	(10.88)	12.13	.0008

^a Cornell Scale for Depression in Dementia score > 7

^b Cornell Scale for Depression in Dementia score ≤ 7