

Development of a Short Version of the Apathy Evaluation Scale Specifically Adapted for Demented Nursing Home Residents

*Ulrike Lueken, Ph.D., Ulrich Seidl, M.D., Lena Völker, Cand.Med.,
Elisabeth Schweiger, Ph.D., Andreas Kruse, Ph.D.,
Johannes Schröder, M.D.*

Objective: *Apathy is among the most frequent neuropsychiatric symptoms in dementia, particularly Alzheimer disease. The Apathy Evaluation Scale (AES) has been widely employed for assessing apathy in different patient groups. To further facilitate the usage of the AES, an abbreviated version was constructed. Method:* On basis of a sample of 356 nursing home residents, a cross-validation procedure was carried out to develop a brief version of the AES. According to a thorough clinical examination, 85% of the residents were demented, 8% presented with mild cognitive impairment, whereas 7% did not present any cognitive deficits. After subdividing the patient group into two matched samples, the first subsample was used to identify problematic items due to defined psychometric and content-related criteria. The original 18-item scale was thus reduced to 10 items. Psychometric properties of the shortened version were subsequently reassessed in the second subsample. **Results:** The short version demonstrated favorable psychometric properties that could be confirmed by cross-validation with the second sample. Correlations with the original full-length version were high ($r=0.97$ for both subsamples); the shortened scale yielded no substantial losses regarding internal consistency or construct validity (correlations with the respective subscales of the Neuropsychiatric Inventory). **Conclusion:** The frequency of apathetic symptoms in the nursing home residents included confirms the clinical importance of apathy for understanding dementia. Given this specific patient population, setting, and mode of data collection, the short-version AES seems to be a valuable and time-efficient instrument for assessing apathy. (Am J Geriatr Psychiatry 2007; 15:376-385)

Key Words: Apathy, Apathy Evaluation Scale, neuropsychiatric symptoms, dementia, Alzheimer disease, nursing home

Received October 20, 2006; revised January 18, 2007; accepted January 18, 2007. The authors thank Robert S. Marin, M.D., for his valuable help in translating the AES and Dr. Wolfgang Woerner for his helpful comments on the statistical analyses. From the Section of Geriatric Psychiatry, University of Heidelberg, Germany (UL, US, LV, JS); the Center for Neuropsychological Research, University of Trier, Germany (ES); and the Institute for Gerontology, University of Heidelberg, Germany (AK). Send correspondence and reprint requests to Johannes Schröder, M.D., Section of Geriatric Psychiatry, University of Heidelberg, Voss Str. 4, D-69115 Heidelberg, Germany. e-mail: johannes_schroeder@med.uni-heidelberg.de

© 2007 American Association for Geriatric Psychiatry

In the majority of patients with dementia—particularly Alzheimer disease (AD) patients—the clinical picture is aggravated by accompanying psychopathological symptoms such as depression, apathy, delusional ideation, or hallucinations.¹ These have repeatedly been associated with increased distress and complaints of primary caregivers and family members^{2–4} and often precipitate nursing home placement and determine the patient's need for professional care.⁵

The frequency of neuropsychiatric symptoms among nursing home residents in general and of apathy in particular appears to be very high. Wood et al.⁶ found apathetic symptoms to be apparent in 84% of the nursing home residents studied, thus being the most common neuropsychiatric symptom. Similar findings were reported in other countries, such as Germany.⁷ However, psychopathological symptoms are often not recognized even by professional caregivers or general practitioners.

Apathy is generally defined by the absence of emotion, interest, concern, and motivation resulting into a lack of drive and self-initiated behavior.⁸ As recently proposed by Marin,⁹ apathy may be part of a superordinate syndrome or may constitute a syndrome on its own, thus not being attributable to mood disorder, altered level of consciousness, or cognitive impairment. Despite its importance for our understanding of dementia, the lack of a brief and robust rating instrument has prevented a more widespread consideration of apathy in clinical practice and scientific research.

In its original form, the Apathy Evaluation Scale (AES)¹⁰ consists of 18 items that address behavioral, cognitive, and emotional aspects of goal-directed behavior. The instrument is available as a self-rating or informant-rating version, as well as a clinical interview in order to obtain information from different observer sources. As a syndrome-independent apathy scale, the AES has been widely employed to assess apathy in a variety of medical, neurological, and psychiatric conditions.^{4,11–13}

We recently provided a German translation of the AES¹⁴ that was developed in close cooperation with the author of its original. (The German translation is available on request.) The German version possesses favorable psychometric properties and proves to be comparable to the original scale.¹⁴ However, when employing the AES in a sample of demented nursing

home residents, this approach imposed limitations in the usefulness of several items. Professional caregivers that were interviewed repeatedly communicated difficulties in judging items that were obviously superimposed by severe cognitive deficits and thus were rated in the same manner for demented patients with, but also without, accompanying symptoms of apathy. In light of the predominantly externally driven daily structure of this particular setting, other items as well appeared to lose specificity for apathetic behavior.

Therefore, we aimed to develop an abbreviated version of the AES that is easier and faster to accomplish, gains more acceptance by professional caregivers, and is adapted to this specific setting and patient group.

METHOD

Subjects and Setting

AES data were obtained in a large sample of nursing home residents (N = 356) that lived in different nursing homes distributed in West and East Germany (e.g., regions of Heidelberg, Germany, Münster, Trier, and Weimar). Residents were enrolled as part of a larger study that assessed quality of life of demented nursing home residents in Germany.⁷ Participants were carefully screened for physical and mental health by clinical exploration and physical examination. In addition, the general practitioners or specialists attending the residents were contacted for further information. All examinations were performed by a geriatric psychiatrist.

Residents met *International Classification of Diseases, Tenth Revision, Clinical Modification* criteria for dementia or mild cognitive impairment according to the concept of aging associated cognitive decline (ACCD).^{15,16} A smaller subgroup of residents without any evidence of dementia or other axis I psychiatric disorder was recruited for comparison. Residents with coexisting severe psychiatric disorders such as schizophrenia, substance abuse, delirium, or severe medical diseases were excluded. The study was approved by the ethical committee of the University of Heidelberg, Germany. After complete description of the study to the subjects, written in-

formed consent of the residents and/or their legal caregivers was obtained.

Neurological and Psychiatric Examination

Differential diagnosis of dementia was carried out according to National Institute of Neurological and Communicative Disorders and Stroke-AD and Related Disorders Association¹⁷ and National Institute of Neurological Disorders and Stroke-Association Internationale pour la Recherche et l'Enseignement en Neurosciences¹⁸ criteria, respectively. Global impairments and severity of cognitive deficits were assessed on the Global Deterioration Scale (GDS)¹⁹ and the Mini-Mental State Examination (MMSE),²⁰ respectively. Neuropsychiatric symptoms were evaluated using the Neuropsychiatric Inventory (NPI)²¹ and the AES in its German translation.¹⁴ In its original form, the latter comprises 18 items that are scored on a 4-point Likert-type scale with the following categories: "not at all characteristic," "slightly characteristic," "somewhat characteristic," and "very characteristic." All items were coded so that a higher score represented greater apathy. All psychiatric evaluations were carried out by experienced geriatric psychiatrists that had received formal training in the administration and scoring of the respective instruments.

Studies provide evidence that demented patients suffering from apathy only have partial awareness of their behavioral changes.²² Caregivers, however, have repeatedly proven to serve as reliable informants for cognitive or behavioral changes in AD patients.^{23,24} Hence, the AES was administered as an interview with professional caregivers who were familiar to the respective patient.

Process of Item Selection

In determining which item to exclude and which to retain, content-related as well as psychometric criteria were set up. Because the aim was to develop a shortened scale that was specifically adapted to the particular nursing home setting and its demented residents, content-related criteria were mainly derived from the comprehensive experience of the psychiatrists that carried out the examination, as well as from constructive feedback given by nursing home staff. These content-related criteria for exclusion en-

compassed high redundancy to other items of the scale, reduced specificity in context of the activity-related restrictions of the setting, superimposition by cognitive aspects of dementia and global impairments, or inappropriateness with regard to this particular age group. As to psychometric criteria, discriminatory power (part-whole-corrected), item difficulty (as indicated by mean values), squared multiple correlation coefficients (SMC), correlations (Pearson's product-moment correlation coefficients) with measures of convergent and discriminant validity (as being indicated by the NPI subscales apathy and depression, respectively), as well as correlations with cognitive aspects and global severity of dementia (measured by the MMSE and GDS), were used to evaluate the appropriateness of each item.

Problematic items were identified according to these criteria. The final decision of whether an item was omitted or retained was then made according to the overall suitability that emerged from all criteria combined.

Statistical Analysis

Because a relatively large sample was available, a cross-validation procedure was carried out in order to confirm results of the shortened scale in a second independent sample.

In a first step, the total sample was subdivided into two matched subsamples as being referred to as subsamples A and B in the following text. Differences in demographic and behavioral data were tested using χ^2 tests or *t*-tests for independent samples (two-tailed significance). In a second step, subsample A was employed to calculate psychometric properties for each item (discriminatory power, item difficulty, SMC), and correlations with external criteria (NPI subscales apathy and depression, MMSE, and GDS scores) in order to identify problematic items. It was aspired to exclude items with unfavorable psychometric properties that did not substantially contribute to construct validity and were strongly influenced by cognitive aspects or global impairments of dementia. Problematic items were excluded one after another. After excluding the first item, properties for the remaining ones were reassessed based on the reduced scale. This mode of analysis proceeded in an iterative way until the final size of the shortened version was achieved.

In a third step, correlations with the full-length scale, internal consistency (as indicated by Cronbach's α), construct validity, and correlations with cognitive deficits and global impairments of dementia were evaluated for the shortened scale and compared with the original full-length scale. These aspects were then reassessed by cross-validation with subsample B. To compare whether results of the shortened version obtained from subsample A differed significantly from those obtained from subsample B, correlation coefficients were tested for equality with a Fisher's Z-transformation test (two-tailed).

To analyze the relationship between dementia and apathy, the total sample was divided into four groups with different degrees of apathy symptoms that were classified according to the quartiles of the AES-10. A one-way analysis of variance was employed to test for differences in the GDS score of these four groups. Post-hoc *t*-tests (Bonferroni-corrected) specified differences between the respective groups. All statistical analyses were carried out using SPSS 12.0 and $p < 0.05$ was considered to indicate statistical significance.

RESULTS

Sample Characteristics

The sample exhibited several differential diagnoses of dementia subtypes. The majority of resi-

dents were classified as having AD (69%), followed by vascular dementia (7%), mixed forms (4%), frontotemporal dementia (1%), dementia in Parkinson disease (1%), and other nonclassified forms of dementia (3%). Mild cognitive impairment was present in about 8% of the subjects, whereas 7% did not show any signs of mild cognitive impairment or dementia.

The mean age (SD) of the sample was 85.6 (6.7) years and female sex prevailed with 82.9% subjects being women. Length of stay in the nursing home averaged at 41.5 (58.2) months. Table 1 summarizes demographic, neuropsychological, and neuropsychiatric data of the total sample and the two matched subsamples. Comparisons of data from subsample A and B yielded no substantial differences in any of the sample characteristics (Table 1).

Item Selection

Psychometric properties and correlations with external criteria for each item of the original full-length scale are given in Tables 2 and 3. However, because discriminatory power and SMC were calculated again after rejecting an item, values relating to the respective version of the reduced scale (i.e., the 17-item scale after rejection of the first item, the 16-item scale after rejection of the second item, etc.) will be referred in the text.

High Redundancy. The first group of items that was omitted displayed a high redundancy to other

TABLE 1. Demographic and Behavioral Data of the Total Sample and the Two Subsamples

	Total Sample	Subsample A	Subsample B	$\chi^2/t_{(df)}$	p Value
N	356	178	178		
Female (%)	295 (82.9)	147 (82.5)	148 (83.6)	0.07 ₍₁₎	0.80
Age (years) ^a	85.6 (6.7)	85.5 (6.6)	85.8 (6.8)	-0.39 ₍₂₆₄₎	0.70
Length of stay (months) ^b	41.5 (58.2)	41.9 (57.8)	41.1 (58.7)	0.12 ₍₂₆₃₎	0.91
Global Deterioration Scale	4.7 (1.8)	4.7 (1.8)	4.6 (1.7)	0.45 ₍₃₅₄₎	0.66
Mini-Mental State Exam ^c	11.9 (10.5)	11.7 (9.9)	12.1 (9.6)	-0.33 ₍₃₄₉₎	0.74
Neuropsychiatric Inventory					
Total	12.2 (10.5)	12.5 (10.7)	12.0 (10.4)	0.39 ₍₃₅₄₎	0.70
Apathy	2.4 (3.8)	2.6 (3.9)	2.3 (3.7)	0.54 ₍₃₅₄₎	0.60
Depression	2.4 (3.1)	2.4 (3.1)	2.3 (3.0)	0.45 ₍₃₅₄₎	0.66
Apathy Evaluation Scale—German Version					
Full length (18 items)	26.8 (15.8)	26.5 (15.8)	27.0 (15.8)	-0.28 ₍₃₅₄₎	0.78
Shortened (10 items)	14.7 (9.8)	14.5 (9.8)	14.8 (9.9)	-0.31 ₍₃₅₄₎	0.75

Notes: Data are means (standard deviation) except where noted.

^aN = 344.

^bN = 343.

^cN = 351.

TABLE 2. Psychometric Properties of Each Item of the Full-Length Scale (AES-18) for Subsample A (N = 178)

Item	Mean	Standard Deviation	Discriminatory Power ^a	Squared Multiple Correlation
1	1.22	1.24	0.74	0.63
2	1.66	1.33	0.75	0.67
3	1.56	1.34	0.72	0.62
4	2.01	1.20	0.68	0.72
5	2.18	1.15	0.60	0.65
6	1.19	1.32	0.61	0.42
7	1.27	1.20	0.69	0.58
8	1.55	1.35	0.71	0.55
9	1.31	1.33	0.70	0.61
10	2.08	1.25	0.65	0.53
11	1.50	1.37	0.54	0.47
12	1.35	1.28	0.52	0.46
13	0.88	1.22	0.48	0.49
14	0.60	1.02	0.44	0.32
15	1.92	1.24	0.61	0.50
16	1.60	1.37	0.79	0.71
17	1.55	1.26	0.70	0.65
18	1.34	1.22	0.75	0.68

^aPart-whole-corrected.

AES: Apathy Evaluation Scale.

items of the scale. Item 4 ("S/he is interested in having new experiences") exhibited the highest SMC ($r^2=0.715$) and was thus predictable by the remaining scale to a large extent. Moreover, it appeared to be semantically very similar to Item 5 ("S/he is interested in learning new things"), which was confirmed by a high correlation between both items ($r=0.795$). Because item 4 showed more favorable correlations with the NPI subscale apathy ($r=0.435$) than item 5 ($r=0.363$), the latter was chosen to be rejected.

After rejecting item 5, SMC peaked for item 16 ("getting things done during the day is important to him/her"; $r^2=0.711$). Correlations demonstrated the highest association to item 2 ("S/he gets things done during the day"; $r=0.776$) among all items. Item 2 was chosen to remain because it avoided aspects of introspection and was based primarily on observable behavior, which was easier to judge by caregivers.

Superimposition by Cognitive Aspects and Global Impairments. The next group of items was strongly influenced by cognitive deficits. Item 11 ("S/he is less concerned about his or her problems than s/he should be") and item 15 ("S/he has an accurate understanding of his or her problems") both dealt with the ability to gain insight into one's problems. Although this is an important feature in the concept

TABLE 3. Pearson Product-Moment Correlations of Each Item of the Full-Length Scale (AES-18) With Criteria of Construct Validity, Global Severity, and Cognitive Symptoms of Dementia Based on Subsample A (N = 178)

Item	NPI Apathy	NPI Depression	GDS	MMSE ^a
1	0.64 ^b	0.06	0.41 ^b	-0.44 ^b
2	0.43 ^b	-0.01	0.47 ^b	-0.48 ^b
3	0.45 ^b	0.03	0.35 ^b	-0.36 ^b
4	0.41 ^b	0.03	0.51 ^b	-0.49 ^b
5	0.36 ^b	0.05	0.47 ^b	-0.46 ^b
6	0.43 ^b	0.03	0.36 ^b	-0.36 ^b
7	0.46 ^b	0.11	0.29 ^b	-0.27 ^b
8	0.48 ^b	0.08	0.52 ^b	-0.46 ^b
9	0.50 ^b	0.03	0.42 ^b	-0.40 ^b
10	0.37 ^b	0.09	0.65 ^b	-0.63 ^b
11	0.33 ^b	-0.07	0.56 ^b	-0.56 ^b
12	0.34 ^b	0.02	0.35 ^b	-0.38 ^b
13	0.51 ^b	0.09	0.14	-0.15 ^a
14	0.40 ^b	-0.02	0.09	-0.06
15	0.29 ^b	-0.01	0.53 ^b	-0.54 ^b
16	0.48 ^b	0.02	0.42 ^b	-0.43 ^b
17	0.40 ^b	0.06	0.31 ^b	-0.35 ^b
18	0.50 ^b	0.12	0.30 ^b	-0.32 ^b

^aN = 175.^bp < 0.01.^cp < 0.05.

AES: Apathy Evaluation Scale.

of apathy, it is also very characteristic for the progress of dementia in general. Indeed, both items correlated higher with cognitive aspects as indicated by the MMSE than with the validation criterion from the NPI (item 11: $r = -0.553$ versus $r = 0.284$; item 15: $r = -0.580$ versus $r = 0.343$, for MMSE and the NPI Apathy subscale, respectively). Moreover, item 11 required knowledge of two components that had to be judged simultaneously. First, caregivers had to estimate the extent to which the respective resident was able to gain insight into his or her problems (as a cognitive component). Second, it had to be evaluated whether the degree of concern (as an affective component) shown by the patient was appropriate. Third, the specific phrasing of item 11 encompassed a double negation that was frequently misunderstood by caregivers, although it was later explained by the interviewer to avoid inappropriate answers. Therefore, items 11 and 15 were excluded from the abbreviated scale.

Reduced Specificity Due to the Setting. Item 10 ("Someone has to tell her/him what to do each day") seemed to be rather superimposed by the externally

predetermined daily structure of the nursing home context itself. Moreover, the association with the apathy subscale of the NPI was among the lowest ($r = 0.328$), whereas correlations with the MMSE and the GDS were the highest of all items ($r = -0.603$ and $r = 0.636$, for MMSE and GDS, respectively). Therefore, item 10 was rejected as well.

Unfavorable Psychometric Properties, Inappropriateness to Age Group. The last group of items that was omitted displayed unfavorable psychometric properties and seemed to be inappropriate in this aged population. Item 14 ("When something good happens, s/he gets excited") displayed the lowest discriminatory power when investigating the full-length scale ($r = 0.439$) and the remaining items only ($r = 0.463$). Moreover, a mean value of 0.60 (SD: 1.02) indicated the lowest item difficulty of all items. Thus, the feature of excitement did obviously not contribute to the description of the clinical picture of apathy in this subsample. Finally, item 12 ("S/he has friends") and item 13 ("Getting together with friends is important to him/her") appeared to exhibit limitations regarding the advanced age of the subsample. The matter of friends seems to be a difficult one either because not many friends remain or friends of the same age lack the possibility to visit the resident in the nursing home. Hence, related behavior can only scarcely be observed by caregivers. In addition, item 13 displayed the lowest discriminatory power of the remaining items ($r = 0.436$) and lowest item difficulty as indicated by a mean value of 0.81 (SD: 1.18), thus pointing to a floor effect in the judge-

ments. Therefore items 12, 13, and 14 were rejected as well.

Cross-validation of the Shortened Scale

Psychometric properties of the 10-item version of the AES (AES-10) were evaluated in subsample A and compared with the full-length scale (AES-18). Afterward, the same procedure was repeated in subsample B to confirm results obtained from the former analysis. Table 4 summarizes data concerning correlations with the full-length scale, internal consistency, construct validity, and associations with cognitive deficits and global impairments for both subsamples.

Correlations with the original full-length scale appeared to be high for both subsamples ($r = 0.97$; Figure 1).

The 10-item scale exhibited no substantial losses in internal consistency as measured by Cronbach's α (subsample A: $r = 0.938$ versus $r = 0.922$ for AES-18 and AES-10, respectively), although nearly half of the items were rejected. Values were comparable to results obtained from the other subsample (subsample B: $r = 0.936$ versus $r = 0.921$ for AES-18 and AES-10, respectively). Correlations with indicators of convergent (NPI Apathy) and discriminant validity (NPI Depression) in subsample A nearly remained unchanged in the reduced 10-item scale when compared to the original version (NPI Apathy: $r = 0.618$ versus $r = 0.610$; NPI Depression: $r = 0.055$ versus $r = 0.069$, for AES-18 and AES-10, respectively). Compa-

TABLE 4. Psychometric Properties of the 10-Item Scale (AES-10) in Subsamples A and B

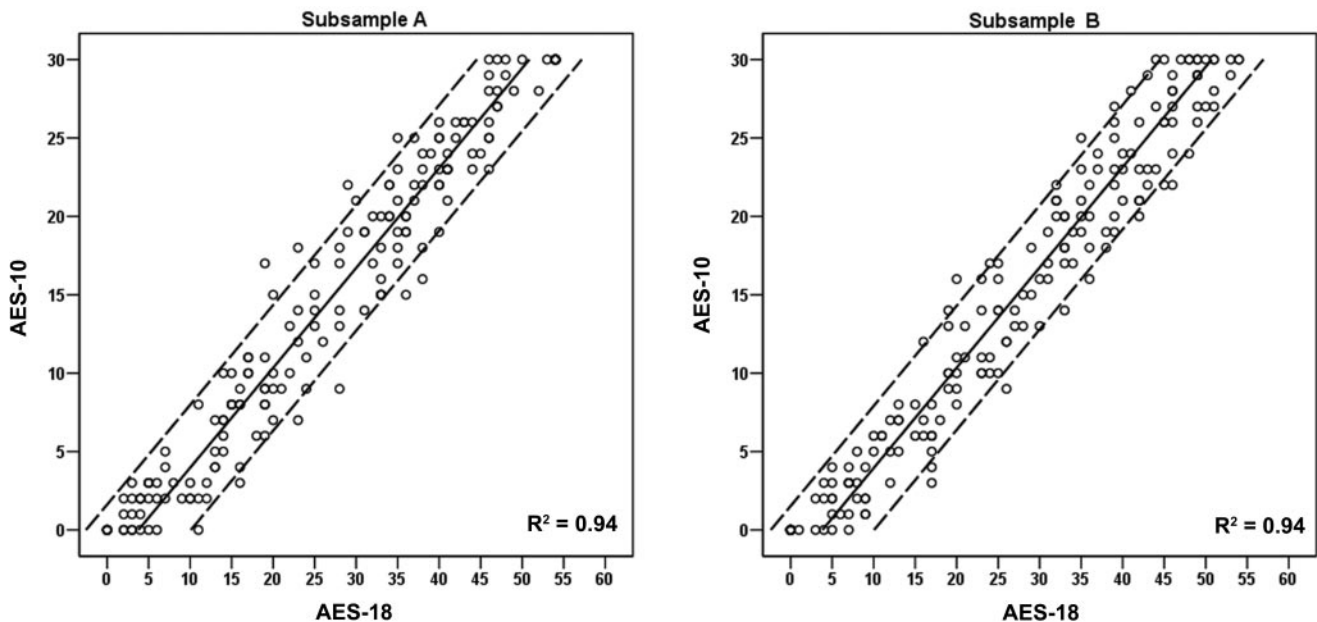
	Subsample A (N = 178)		Subsample B (N = 178)		Z Score	p Value
	AES-18	AES-10	AES-18	AES-10		
Correlation with AES-18	1.00	0.97	1.00	0.97	0.17	0.87
Internal consistency (Cronbach's α)	0.94	0.92	0.94	0.92	0.06	0.95
Construct validity						
NPI Apathy	0.62	0.61	0.61	0.62	0.18	0.86
NPI Depression	0.06	0.07	0.11	0.09	0.18	0.86
Correlation with global severity and cognitive deficits						
GDS	-0.58	-0.51	-0.63	-0.58	1.10	0.27
MMSE ^a	0.57	0.51	0.66	0.59	0.95	0.34

Notes: Correlation coefficients of AES-10 obtained from subsamples A and B were tested for equality with a Fisher's Z-transformation test.

^aN = 175 in subsample A and N = 176 in subsample B.

AES: Apathy Evaluation Scale; NPI: Neuropsychiatric Inventory; GDS: Geriatric Depression Scale; MMSE: Mini-Mental State Examination.

FIGURE 1. Correlation of the Full-Length Scale (AES-18) and the Reduced 10-Item Version (AES-10), Displayed Separately for Subsample A (N = 178; left) and B (N = 178; right)



AES: Apathy Evaluation Scale.

Regression lines with mean confidence intervals (95%) and the amount of explained variance (R^2) are also depicted.

able values were obtained by cross-validation in subsample B (NPI Apathy: $r = 0.606$ versus $r = 0.618$; NPI Depression: $r = 0.108$ versus 0.088 , for AES-18 and AES-10, respectively). Correlations with cognitive aspects and global severity of dementia were reduced in the AES-10 when compared to the original scale in subsample A (MMSE: $r = -0.578$ versus $r = -0.513$; GDS: $r = 0.574$ versus $r = 0.511$; for AES-18 and AES-10, respectively). A similar effect was observed in subsample B (MMSE: $r = -0.626$ versus $r = -0.584$; GDS: $r = 0.657$ versus $r = 0.593$; for AES-18 and AES-10, respectively). Although correlations still remained substantial, these observations pointed to a more refined scale that was less confounded by cognitive aspects of dementia.

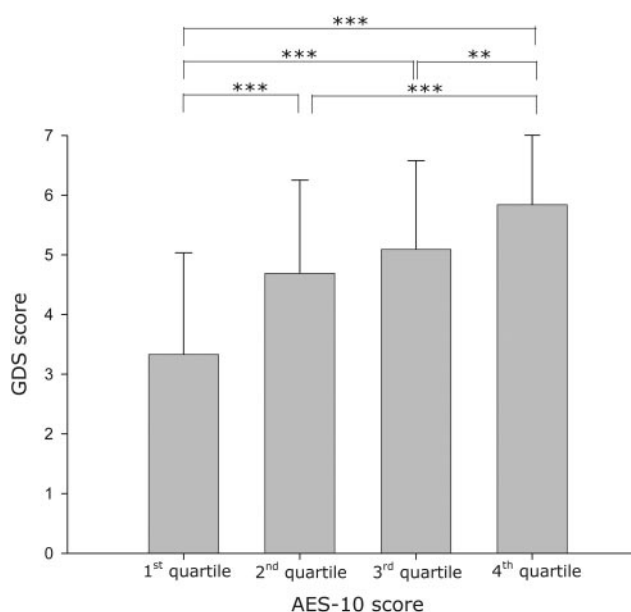
Fisher's Z transformation tests indicated that results obtained from subsample A and B were comparable for correlations with the full-length scale (A: N = 178, B: N = 178; $Z = 0.166$, $p = 0.868$), for Cronbach's α (A: N = 178, B: N = 178; $Z = 0.062$, $p = 0.951$), for correlations with the NPI apathy subscale (A: N = 178, B: N = 178; $Z = 0.179$, $p = 0.858$) and depression subscale (A: N = 178, B: N = 178; $Z = 0.179$,

$p = 0.858$), with the MMSE (A: N = 175, B: N = 176; $Z = 0.945$, $p = 0.345$), and with the GDS (A: N = 178, B: N = 178; $Z = 1.106$, $p = 0.269$).

Relationship Between Dementia and Apathy

Finally, results concerning the relation between dementia and apathetic symptoms revealed that the patient subgroups differed significantly in their GDS scores ($F_{3,352} = 43.50$, $p < 0.001$; Figure 2). As can be seen in Figure 2, Bonferroni-corrected t -tests specified that the patient group in the lowest quartile of apathy symptoms (first quartile of AES-10 distribution) displayed significantly lower GDS scores than all other groups (first quartile versus second: $t_{180} = -5.60$, $p < 0.001$; first quartile versus third: $t_{188} = -7.57$, $p < 0.001$; first quartile versus fourth: $t_{178} = -10.93$, $p < 0.001$). The second quartile group exhibited significantly lower GDS scores than the fourth quartile group ($t_{164} = -5.14$, $p < 0.001$), but not than the third quartile group ($t_{174} = -1.73$, $p = \text{NS}$). The latter again exhibited significantly lower GDS scores

FIGURE 2. Mean Scores of the Global Deterioration Scale (GDS) According to Different Degrees of Apathy (Error Bars Indicate the SD)



AES: Apathy Evaluation Scale.

Patients were subdivided by the quartiles of the AES-10 (first quartile: 0–6 points, $N = 98$; second quartile: 7–15 points, $N = 84$; third quartile: 16–23 points, $N = 92$; fourth quartile: >23 points, $N = 82$). Note that global severity of dementia increased with rising levels of apathy. T values and degrees of freedom of the respective comparisons are provided in the text. *** $p < 0.001$; ** $p < 0.01$ (Bonferroni-corrected t -tests).

than subjects belonging to the 4th quartile group of the AES-10 ($t_{172} = -3.53$, $p < 0.01$).

DISCUSSION

The aim of the present study was to develop a brief and time-efficient instrument to assess symptoms of apathy in this particular patient group of demented nursing home residents. Results presented for the abbreviated version of the AES demonstrated favorable psychometric properties of this brief scale that were confirmed by cross-validation with the second subsample. Correlations with the full-length scale were high; the AES-10 yielded no substantial losses regarding internal consistency or construct validity. Moreover, associations with cognitive deficits and global impairments were slightly reduced compared

with the original 18-item version, thus pointing to a more refined scale that was less confounded by symptoms that appear to be unspecific for apathy in this setting and patient group.

Global impairments generally increased with rising levels of apathy. However, post-hoc tests revealed that GDS scores significantly rose from the first to the second and third quartiles of the AES-10, then remained at a rather stable plateau between the second and third quartiles before they increased again in patients with severe degrees of apathy in the fourth quartile. This profile thus indicates that global impairment is closely related to apathy, although GDS scores remain rather stable in patients with moderate apathetic symptoms.

Apathy as one of the most prominent noncognitive features of dementia has been associated with a number of adverse outcomes such as a decreased level of overall functioning,^{22,25} increased caregiver distress,²⁶ cognitive impairment,¹ or faster rate of cognitive decline.²⁷ Moreover, apathy seems to be less prominent in AD patients derived from community dwellings as being indicated by lower prevalence rates,²⁸ thus emphasizing its importance for the present patient group. Although several scales for assessing apathy are available, only some seem to be appropriate in the particular setting of demented nursing home residents. The most commonly employed instrument appears to be the NPI; however, it assesses a broad range of symptoms that covers not only apathy and, depending on the number of symptoms present, takes longer to accomplish.

Sample effects have to be considered as a potential confounding variable. To avoid potential regional effects, subjects were recruited in different parts of the country. As to be expected in a typical nursing home population, the overwhelming majority of participants suffered from dementia of an at least moderate degree. Just 15% of the residents included did not show a dementing disorder; however, more than half of those presented with cognitive deficits fulfilling the criteria of mild cognitive impairment. The participants' mean age ranged well in the mid-80s; the majority of subjects were female. Alzheimer disease was diagnosed in about two-thirds of the cases, followed by vascular dementia. These findings do not exclude a selection bias per se; also, they reflect typical characteristics of a nursing home population.

The abbreviated version of the AES may fill a gap

for assessing symptoms of apathy in this rapidly accumulating target group of demented nursing home residents. The need for further research is substantiated by the present finding that apathy seems to aggravate in the progress of dementia. According to this association, apathy may be conceptualized as an integral part of dementia. However, apathy is neither an obligate symptom nor specific for dementia. Although the vast majority presents with apathetic symptoms, the latter do not occur in a small subgroup of patients. Because apathetic symptoms can be found in a myriad of neuropsychiatric conditions, one may assume that apathy may arise from a variety of cerebral changes.

In this context, the concept of primary and secondary negative symptoms²⁹ appears to be of particular heuristic importance because the latter can be regarded as equivalence of apathy in schizophrenia. Although primary symptoms are hypothesized to be directly associated with changes in the mesial frontal lobe—as part of the “hypofrontality” typically described in positron emission tomography studies³⁰—secondary apathetic symptoms are thought to reflect a patient's withdrawal due to other causes such as persisting positive symptoms, in particular delusions and hallucinations. The association between mesial frontal lobe changes and decreased drive—i.e., one of the core apathetic symptoms—was corroborated by a recent study that found changes in the anterior cingulum to be significantly correlated with an automatic measure of unconstrained motor activity.³¹ Hence, the differentiation between primary and sec-

ondary symptoms is not only of heuristic importance, but may also enhance our understanding of apathy and may thus facilitate the development of therapeutic approaches directed at the different aspects of this heterogeneous syndrome.

Using the AES-10, effort and time costs for examiners and professional nursing home staff can be substantially reduced, which bears importance not only regarding the high demands on caregivers, but also with respect to the examination of large samples. Depending on the expertise of the examiner, the original full-length scale takes approximately 15 minutes to accomplish. Using the abbreviated 10-item version, nearly half of the time will be saved but results remain comparable to those obtained with the original full-length scale. Because the development of the AES-10 relied substantially on the feedback provided by the nursing home staff who was interviewed, this scale will probably gain more acceptance among caregivers.

Given this specific patient group, setting, and mode of data collection, the short version of the AES seems to be a valuable and time-efficient instrument for assessing apathy. The AES-10 will hopefully contribute to further evaluate prevalence, determinants, and treatment options for managing apathy in this increasingly important patient group.

This work was supported by the Federal Ministry for Families, Senior Citizens, Women, and Youth, Germany.

This work was presented in part at the INS/GNP/SNVP meeting, July 26–29, 2006, Zürich, Switzerland.

References

1. Mega MS, Cummings JL, Fiorello T, et al: The spectrum of behavioral changes in Alzheimer's disease. *Neurology* 1996; 46:130–135
2. Coen RF, Swanwick GR, O'Boyle CA, et al: Behaviour disturbance and other predictors of carer burden in Alzheimer's disease. *Int J Geriatr Psychiatry* 1997; 12:331–336
3. Nagaratnam N, Lewis-Jones M, Scott D, et al: Behavioral and psychiatric manifestations in dementia patients in a community: caregiver burden and outcome. *Alzheimer Dis Assoc Disord* 1998; 12:330–334
4. Thomas P, Clement JP, Hazif-Thomas C, et al: Family, Alzheimer's disease and negative symptoms. *Int J Geriatr Psychiatry* 2001; 16:192–202
5. Rovner BW, Katz IR: Neuropsychiatry in nursing homes, in *Textbook of Geriatric Neuropsychiatry*. Edited by Coffey CE, Cummings JL. Washington, D.C., American Psychiatric Press, 1994, pp 683–693
6. Wood S, Cummings JL, Hsu MA, et al: The use of the neuropsychiatric inventory in nursing home residents. Characterization and measurement. *Am J Geriatr Psychiatry* 2000; 8:75–83
7. Becker S, Kruse A, Schröder J, et al: [The Heidelberg instrument for the assessment of quality of life in dementia (H. I. L. DE.)—dimensions of quality of life and methods of organization]. *Z Gerontol Geriatr* 2005; 38:108–121
8. Jaspers K: [Allgemeine Psychopathologie]. Berlin, Springer, 1973
9. Marin RS: Differential diagnosis and classification of apathy. *Am J Psychiatry* 1990; 147:22–30
10. Marin RS, Biedrzycki RC, Firinciogullari S: Reliability and validity of the Apathy Evaluation Scale. *Psychiatry Res* 1991; 38:143–162
11. Kant R, Duffy JD, Pivovarnik A: Prevalence of apathy following head injury. *Brain Inj* 1998; 12:87–92
12. Andersson S, Krogstad JM, Finset A: Apathy and depressed mood in acquired brain damage: relationship to lesion localization and psychophysiological reactivity. *Psychol Med* 1999; 29:447–456
13. Marin RS, Firinciogullari S, Biedrzycki RC: Group differences in

- the relationship between apathy and depression. *J Nerv Ment Dis* 1994; 182:235-239
14. Lueken U, Seidl U, Schwarz M, et al: [Psychometric properties of a German version of the Apathy Evaluation Scale]. *Fortschr Neurol Psychiatr* 2006; 74:714-722
15. Schröder J, Kratz B, Pantel J, et al: Prevalence of mild cognitive impairment in an elderly community sample. *J Neural Transm Suppl* 1998; 54:51-59
16. Schönknecht P, Pantel J, Kruse , et al: Prevalence and natural course of aging-associated cognitive decline in a population-based sample of young-old subjects. *Am J Psychiatry* 2005; 162: 2071-2077
17. McKhann G, Drachman D, Folstein M, et al: Clinical diagnosis of Alzheimer's disease: report of the NINCDS-ADRDA Work Group under the auspices of Department of Health and Human Services Task Force on Alzheimer's Disease. *Neurology* 1984; 34:939-944
18. Roman GC, Tatemichi TK, Erkinjuntti T, et al: Vascular dementia: diagnostic criteria for research studies. Report of the NINDS-AIREN International Workshop. *Neurology* 1993; 43:250-260
19. Reisberg B, Ferris SH, de Leon MJ, et al: The Global Deterioration Scale for assessment of primary degenerative dementia. *Am J Psychiatry* 1982; 139:1136-1139
20. Folstein MF, Folstein SE, McHugh PR: "Mini-mental state." A practical method for grading the cognitive state of patients for the clinician. *J Psychiatr Res* 1975; 12:189-198
21. Cummings JL, Mega M, Gray K, et al: The Neuropsychiatric Inventory: comprehensive assessment of psychopathology in dementia. *Neurology* 1994; 44:2308-2314
22. Starkstein SE, Petracca G, Chemerinski E, et al: Syndromic validity of apathy in Alzheimer's disease. *Am J Psychiatry* 2001; 158:872-877
23. Koss E, Patterson MB, Ownby R, et al: Memory evaluation in Alzheimer's disease. Caregivers' appraisals and objective testing. *Arch Neurol* 1993; 50:92-97
24. Strauss ME, Pasupathi M, Chatterjee A: Concordance between observers in descriptions of personality change in Alzheimer's disease. *Psychol Aging* 1993; 8:475-480
25. Boyle PA, Malloy PF, Salloway S, et al: Executive dysfunction and apathy predict functional impairment in Alzheimer disease. *Am J Geriatr Psychiatry* 2003; 11:214-221
26. Kaufer DI, Cummings JL, Christine D, et al: Assessing the impact of neuropsychiatric symptoms in Alzheimer's disease: the Neuropsychiatric Inventory Caregiver Distress Scale. *J Am Geriatr Soc* 1998; 46:210-215
27. Doody RS, Massman P, Mahurin R, et al: Positive and negative neuropsychiatric features in Alzheimer's disease. *J Neuropsychiatry Clin Neurosci* 1995; 7:54-60
28. Lyketsos CG, Steinberg M, Tschanz JT, et al: Mental and behavioral disturbances in dementia: findings from the Cache County Study on Memory in Aging. *Am J Psychiatry* 2000; 157:708-714
29. Carpenter WT Jr., Heinrichs DW, Alphas LD: Treatment of negative symptoms. *Schizophr Bull* 1985; 11:440-452
30. Schröder J, Buchsbaum MS, Siegel BV, et al: Cerebral metabolic activity correlates of subsyndromes in chronic schizophrenia. *Schizophr Res* 1996; 19:41-53
31. Farrow TF, Hunter MD, Wilkinson ID, et al: Structural brain correlates of unconstrained motor activity in people with schizophrenia. *Br J Psychiatry* 2005; 187:481-482