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Apathy and Anhedonia Rating Scales in Parkinson's Disease: Critique and Recommendations

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Abstract: Apathy is a common condition in Parkinson's disease (PD) and is generally defined as a lack of motivation. It is associated with more severe cognitive dysfunction and a decrease in activities of daily living (ADL) performance. Anhedonia, the inability to experience pleasure, can be a symptom of both depressive and apathetic syndromes. The Movement Disorder Society (MDS) commissioned a task force to assess the clinimetric properties of apathy and anhedonia scales in PD patients. A systematic literature review was conducted to identify scales that have either been validated or used in PD patients. Apathy scales identified for review include the Apathy Evaluation Scale (AES), the Apathy Scale (AS), the Apathy Inventory (AI), and the Lille Apathy Rating Scale (LARS). In addition, item 4 (motivation/initiative) of the Unified Parkinson's Disease Rating Scale (UPDRS) and item 7 (apathy) of the Neuropsychiatric Inventory (NPI) were included. Anhedonia scales identified for review were the Snaith-Hamilton Pleasure Scale (SHAPS) and the Chapman scales for physical and social anhedonia. Only the AS is classified as "recommended" to assess apathy in PD. Although item 4 of the UPDRS also meets the criteria to be classified as recommended, it should be considered for screening only because of the obvious limitations of a single item construct. For the assessment of anhedonia, only the SHAPS meets the criteria of "Suggested." Information on the validity of apathy and anhedonia scales is limited because of the lack of consensus on diagnostic criteria for these conditions. © 2008 Movement Disorder Society

Key words: apathy; anhedonia; depression; Parkinson's disease; clinimetrics; psychometrics; rating scales; validity; reliability

Additional supporting information may be found in the online version of this article.

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TABLE 1. *Proposed diagnostic criteria for the syndrome of Apathy (Starkstein and Leentjens 2008, adapted from Marin, 1991)*[12,14]

A. Lack of motivation relative to the patient's previous level of functioning or the standards of his or her age and culture as indicated either by subjective account or observation by others.
B. Presence for at least 4 wk during most of the day, at least one symptom belonging to each of the following three domains:
1. Diminished goal-directed behavior.
   - Lack of effort.
   - Dependency on others to structure activity.
2. Diminished goal-directed cognition.
   - Lack of interest in learning new things or in new experiences.
   - Lack of concern about one's personal problems.
3. Diminished concomitants of goal-directed behavior.
   - Unchanging affect.
   - Lack of emotional responsivity to positive or negative events.
C. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.
D. The symptoms are not due to diminished level of consciousness or the direct physiological effects of a substance (e.g., a drug of abuse and a medication).

The symptoms of apathy, anhedonia, and depression are closely related and sometimes difficult to recognize or distinguish from each other in patients with Parkinson's disease (PD). A proposal for diagnostic criteria for *depression* in PD as well as an extensive review of *depression* rating scales in PD has recently been published in this journal.[1,2] Although there has been much research on depressive syndromes in PD, apathy has received much less attention. This relative lack of attention is not justified, because apathy is reported in 17 to 70% of all PD patients,[3–8] and has been associated with more severe cognitive dysfunction and a decrease in performing activities of daily living (ADL).[3,4,7,8]

Apathy is a disorder of motivation that may occur as a syndrome in itself, or as part of other neuropsychiatric disorders, notably depression and dementia. Some studies report that PD patients suffer from apathy more often in the absence of depression than during a depressive episode.[6,7] Apathy without depression has not only been described in PD, but also in Alzheimer's disease (AD), frontotemporal dementia (FTD), progressive supranuclear palsy (PSP), and stroke.[4,9] Several studies report an association of apathy with more severe cognitive symptoms or dementia,[5,10,11] but apathy may also exist in the absence of cognitive decline.[11]

The first proposal for diagnostic criteria for apathy as a syndrome was formulated by Marin.[12] He intended to define a syndrome of "pure" apathy that was not attributable to comorbid conditions such as dementia or depression.[12] However, because apathy frequently occurs in patients with such comorbidity, Starkstein proposed to broaden these criteria, so that patients with apathy in the context of depression, dementia, or other neurodegenerative diseases would also be included.[13] In a more recent publication, inclusion of a time criterion was proposed to ascertain the persisting nature of the disorder (Table 1).[14] Although these diagnostic criteria have been used in research practice, they have no formal status, that is, they are not part of international classification systems or endorsed by scientific societies. To date, there are no generally accepted criteria for apathy as a syndrome. This uncertain nosological status and the lack of a consistent definition of apathy are basic problems in validating assessment scales.

Anhedonia is generally seen as a symptom and not a syndrome. As a symptom, it may be part of the syndrome of apathy, following the criteria of Marin and their subsequent revisions.[12] It is also considered part of two other psychiatric disorders: it is one of the two core symptoms of major depressive disorder, and it may also be present in the negative syndrome of schizophrenia.[15] Anhedonia too lacks a clear definition. At present, the most popular definition describes anhedonia as the "inability to experience pleasure."[16] In this definition, the focus is on the subjective emotional experience of the patient and not on interpersonal behavioral aspects. The impact of anhedonia on motor symptoms, ADL functioning, and quality of life has hardly been studied. One small study of "physical" anhedonia in PD patients reported no significant correlations with a number of clinical parameters, among which motor function, apathy, depression, and cognitive performance.[17]

Because the impact of apathy on the level of functioning and quality of life of PD patients is ever more recognized and anhedonia may also be expected to reduce quality of life, the Movement Disorder Society

TABLE 2. *Overview of classification system of rating scales on the basis of their properties, as used by the MDS in the development of the Appendix of ancillary scales to complement the MDS-sponsored revision of the UPDRS (MDS-UPDRS)*

	Criteria			
Classification	Used in PD	Used in PD beyond original developers	Successful clinimetric testing	Total number of required criteria
Recommended	X	X	X	3
Suggested	X			2
Listed	X	0	0	1

X, required criterion; O, criterion should not be met.

(MDS) organized a review of the clinimetric properties of scales to measure apathy and anhedonia.

PATIENTS AND METHODS

Administrative Organization and Critique Process

Similar to the organization of earlier review task forces, the Steering Committee of the MDS Task Force on Rating Scales for PD invited the chairman (AL) to form a committee to critique existing apathy and anhedonia rating scales in PD and to place them in a clinical and clinimetric context. A committee of seven members from Europe, North America, and Australia was formed, including both neurologists and psychiatrists, all with extensive expertise in the area of mood and motivational symptoms in PD. These task force members selected the scales to be included in the review and identified unresolved issues and limitations of the scales used. The *proforma* that was previously used to assess depression rating scales was adapted for reviewing apathy and anhedonia scales.[2] This proforma allowed the structured assessment of the scales with regard to their descriptive properties, availability, content, use, acceptability, clinimetric properties, and overall impression in patients with and without PD (⟨website⟩). All statements were referenced, and both qualitative and quantitative results were tabulated and summarized. Each scale was reviewed by two task force members, one acting as the lead. The completed reviews were assessed by all other members of the task force and modified according to their suggestions. In a final appraisal of a scale, the task force used the terminology as used by the MDS in the development of the Appendix of ancillary scales to complement the MDS-sponsored revision of the UPDRS (MDS-UPDRS).[18] These criteria were also used in a recent review of scales to assess psychosis in PD and are summarized in Table 2.[19] The results of the reviews identified problems and chairman summarized the conclusions, and the draft report altered following the discussion with all task force members. The report was reviewed and altered according to suggestions by the members of the Steering Committee and submitted and approved by the Scientific Issues Committee of the MDS before submission to *Movement Disorders*.

Selection of Scales

All scales that have been designed to assess apathy and anhedonia and that have been either validated or used in studies with PD patients were included in the review. These scales were identified by way of a literature search. Multidimensional scales that are used to screen more broadly for different psychiatric and neuropsychological symptom areas were considered beyond the scope of this project, even though some of these scales have been used in the assessment of apathy and anhedonia in PD, such as the Brief Psychiatric Rating Scale and the Frontal Systems Behavior Scale. Scales assessing momentary mood states, such as the Profile of Moods States Questionnaire (POMS), were also excluded.[20] Because of its special status in the assessment of PD patients, as well as its wide use, an exception was made for item 4 (motivation) of part 1 of the Unified Parkinson's Disease Rating Scale (UPDRS).[21] Another exception was made for the apathy domain of the Neuropsychiatric Inventory (NPI) because of the frequency with which this scale is used to assess psychiatric symptoms in PD.[22] With respect to the lack of operational criteria for apathy, we have not adhered to a restrictive or specified definition of apathy, but instead included all scales and articles referring to apathy in whatever definition the authors have used.

Literature Search Strategy

Medline on PubMed was searched for relevant papers using the terms "Parkinson's disease" or "Parkinsonism" or "Parkinson disease," "apathy," and "anhedonia." In addition, for each scale, a search was conducted for the terms "Parkinson's disease" (or "Parkinsonism," or "Parkinson disease") and the name

of the respective scale. Only published or *in press* peer-reviewed papers, or abstracts known to the task force members, until February 2007, were included in this review.

RESULTS

Identified Scales and Their Utilization in Clinical Practice and Research

Four apathy rating scales and two anhedonia rating scales that have been validated or used in PD were identified. Apathy scales included the Apathy Evaluation Scale (AES), an abbreviated version of the AES known as the Apathy Scale (AS), the Apathy Inventory (AI), and the Lille Apathy Rating Scale (LARS).[5,12,23,24] Although the AI was specifically designed and validated to assess apathy in PD, no subsequent studies were identified that have used this scale; all other apathy scales have been used in several studies with PD patients. For reasons stated earlier, item 4 of the UPDRS and item 7 of the NPI[21,22] were also included.

Two anhedonia scales were identified and included in the review: the Snaith-Hamilton Pleasure Scale (SHAPS) and the Chapman scales for physical and social anhedonia.[16,25] All scales are in the public domain. The NPI is copyright protected by its developer, but made available at no charge for noncommercial research and clinical purposes. No information on the status of the Chapman scales was found.

Identified Problems with Existing Rating Scales

The Lack of Generally Accepted Diagnostic Criteria for Apathy as a Syndrome

The task force considers the lack of diagnostic criteria for apathy as a major barrier to research. Even though the nosological status of apathy is uncertain, a definition and a diagnostic criterion need to be agreed upon to facilitate the studies of apathy across different neuropsychiatric disorders and in relation to depression and dementia. Especially now that evidence is emerging that some forms of pharmacotherapy may be beneficial in the treatment of apathy,[26] an accepted and a valid definition of apathy will be necessary to register medications for this indication under current regulations of the United States Food and Drug Administration (FDA).[27] Clearly defined diagnostic criteria for apathy are a prerequisite for further study of the epidemiology, phenomenology, etiology, pathogenesis, prognostic implications, and treatment of this syndrome. The lack of diagnostic criteria also hampers the development of valid assessment scales, because no gold standard is available, and thus external validation is not possible.

The Lack of a Clear Definition of Anhedonia

Because anhedonia is considered a symptom that can be part of various syndromes, such as depression, dementia, or apathy, a consistent definition is desirable, although less compelling than for apathy. Anhedonia is often defined as a lack of emotional responsivity to positive or negative events, which is also one of the proposed diagnostic criteria for apathy.[14] The lack of a clear definition has its impact on the development of rating scales for anhedonia. The Chapman scales for anhedonia incorporate many items that refer to lack of motivation and interest, which according to the task force would better be described in the context of apathy.

Overlap of Symptoms of Apathy and Anhedonia with Symptoms of PD

In the same way that symptoms of depression may overlap with those of PD and make recognition of depressive syndromes more difficult, apathetic symptoms and anhedonia can overlap with symptoms of PD, impeding recognition. Reduced energy, interest, and activities may be due to apathy, but may also be part of uncomplicated PD, due to the increased effort in performing activities. Psychomotor retardation is part of apathy in non-PD patients, but also characteristic of PD itself, even in the absence of apathy. Mental slowing and concentration difficulties may be part of apathy, but also of the subcortical neurocognitive profile of PD. Flattening of effect in anhedonia may lead to diminished facial expression and be confused with the hypomimia of PD.

Overlap of Symptoms of Apathy and Anhedonia with Symptoms of Depression

Apathy as a syndrome may occur on its own or as part of depression. This implies that all symptoms of apathy may also be symptoms of depression (although the reverse would not be presumed). Another implication is that an apathy scale cannot be used to differentiate apathy from depression, because the two syndromes are not mutually exclusive. The same problem exists for anhedonia, which is one of the core symp-

TABLE 3. *Overview of the scales assessed and their classification*

Scale	Used in PD	Used in PD beyond original developers	Successful clinimetric testing in PD	Classification
AES	X	X	0	Suggested
AS	X	X	X	Recommended
AI	X	0	0	Listed
LARS	X	0	X	Suggested
UPDRS item 4	X	X	X	Recommended[a]
NPI section 7	X	X	0	Suggested
SHAPS	X	X	0	Suggested
Chapman	X	[b]	0	Listed

For an explanation of the classifying groups, see text.

[a]Although the Chapman scales were used in PD patients in one study beyond their original developers, this study concluded that the scale was not useful. Hence the scale was classified as "listed."

[b]As a single item construct, item 4 of the UPDRS cannot be considered a "scale" and is only advised for crude screening purposes.

TABLE 4. *Properties of apathy and anhedonia scales in Parkinson's disease*

Scale	Sensitivity*	Specificity*	Cut-off for screening in non-PD**	Cut-off for screening in PD**	Sensitivity to change[†]
AES	NA	NA	37/38	37/38[a]	+
AI	NA	NA	NA	NA	NA
AS	NA	NA	13/14	13/14	+
LARS	NA	NA	16/17	16/17	NA
NPI item 7	NA	NA	NA	NA	NA
UPDRS item 4	NA	NA	–	2/3	+
SHAPS	NA	NA	2/3	2/3	++
Chapman	NA	NA	18/19 physical 12/13 social	NA	NA

*Sensitivity and specificity have not been assessed versus a gold standard.

**The cut-off is the cut-off for "clinically relevant apathetic symptoms."

[†]For none of the scales sensitivity to change has been formally assessed. Scales indicated with a "+" or "++" have some clinical evidence for their sensitivity to change because of earlier use in treatment studies.

[a]Forty-one of 42 has also been suggested (see AES proforma).

toms of the depressive syndrome, but may also be part of an apathetic syndrome.

Overlap of Symptoms of Apathy with Symptoms of Cognitive Decline

Mental slowing and concentration difficulties may be part of apathy, but also of cognitive decline and dementia associated with PD. Given the association of apathy with cognitive decline, the relation between these two symptom domains should be further clarified.

Critique of Apathy and Anhedonia Scales

A summary review of each scale is provided here. The most important statements and conclusions are referenced in the text, but the reader is referred to the full reviews of the scales for more specific information clinimetric details and more extensive referencing. These reviews are available as supplementary material on the MDS website ⟨address to be added⟩. The final assessments and classifications are tabulated in Table 3, whereas Table 4 provides more detailed information on the scale properties.

Apathy Scales

The Apathy Evaluation Scale[28]

Description of the Scale. The AES consists of 18 items that are scored on a four-point Likert scale, with higher scores indicating more severe apathy. The 18 items include four self-evaluation items that are scored exclusively on the patient's rating and one item requiring the rater to evaluate the patient's insight. There are patient-rated, clinician-rated, and informant-rated versions.

Apathy in Non-PD Patients. The AES has been validated in patients with AD and other dementias, stroke, and major depression.[8,28] It has good internal consistency, interrater and test–retest reliability, and moderate item-total correlations. The informant- and patient-based versions have a good convergent validity, but concurrent validity with the NPI apathy subscore is

weak.[8,29] Discriminant validity with depression and anxiety is adequate.[8]

Apathy in PD Patients. In PD patients, the scale has shown a good internal consistency.[8] The convergent validity of patient- and informant-rated versions was confirmed in PD.[8] No correlation of AES scores with disease severity, disease stage, or ADL functioning was found.[8,30] There was no correlation with severity of depressive symptoms, but a correlation with the level of cognitive impairment was reported.[8,30] It was shown to be sensitive to change in one study with methylphenidate to treat apathy, and it could also detect changes in levels of apathy after deep brain stimulation.[30,31]

Final Assessment. The AES meets the criteria for "suggested scale." However, as far as clinimetric properties in PD patients are concerned, only information on reliability, but not on validity is available. The scale may be useful to screen for and to assess the severity of apathetic symptoms and may also be used to follow changes in apathy during treatment.

The Apathy Scale[5]

Description of the Scale. The AS consists of 14 items phrased as questions that are to be answered on a four-point Likert scale. In the original, patient-based, version the questions are read aloud to the patient by the examiner[5], but a caregiver rated version is available as well. It was developed specifically for patients with PD, because the Marin AES was considered too demanding. The AS is presented as an abridged and modified version of the AES.

Apathy in Non-PD Patients. The AS was developed for patients with PD but has also been used in patients with stroke and AD (5).

Apathy in PD Patients. In PD patients, it has a good face validity, internal consistency, interrater, and test–retest reliability, but these last two characteristics were determined in 11 PD patients only.[5] Against item 4 of the UPDRS part 1 (motivation), the scale has a high specificity, but rather low sensitivity.[5] It has shown to be sensitive to change during pharmacological treatment or treatment by deep brain stimulation.[30]

Final Assessment. The AS has acceptable criterion validity and meets the criteria for "recommended" scale. It is recommended to screen for and to assess the severity of apathy in PD patients. Given its use in patients with AD, it can probably be used in patients with mild dementia associated with PD as well. It has proven to be sensitive to change and may be used in treatment studies.

The Apathy Inventory[23]

Description of the Scale. The patient based version of the AI consists of three items. The patient is first asked to determine whether or not his behavior has changed in a certain respect, and in case of a positive answer, he is asked to estimate the change on a 12-point Likert scale. The informant-based version consists of the same three items. If the respondent's answer is yes, two additional questions estimate the frequency and severity of the symptom.

Apathy in Non-PD Patients. The original validation study included 60 patients with AD, 24 with "mild cognitive impairment," 12 PD patients, and 19 healthy volunteers. It has a good internal consistency, interrater, and test–retest reliability.[23] The scale has been used in a limited number of studies with patients with AD.

Apathy in PD Patients. Except for the patients included in the original validation study, in which 12 PD subjects were examined, the scale has not been used in other studies involving PD patients.

Final Assessment. The AI can be classified as "listed" scale. The brevity of the scale would make it an attractive instrument, but it should be better validated and used more extensively in PD before it can be adequately evaluated.

The Lille Apathy Rating Scale[24]

Description of the Scale. The LARS is a recently developed scale that consists of 33 items divided into nine domains. It is administered to the patient as a structured interview. The first three questions are scored on a five-point Likert scale, whereas the remaining items are answered as "yes" or "no." The LARS total score ranges from −36 to +36 points, with positive scores indicating more severe apathy.[24]

Apathy in PD Patients. The LARS was especially designed for patients with PD and validated in a group of PD patients with and without dementia. It has a good internal consistency, adequate test–retest, and interrater reliability and acceptable item-total correlations. Validated against a clinical judgment of apathy, it showed a good sensitivity and specificity.

Apathy in Non-PD Patients. So far, the scale has only been used in studies involving PD patients.

Final Assessment. The LARS meets the criteria for "suggested" scale. Although specifically designed for PD patients with good clinimetric properties, it has not yet been used by other groups than the one who designed and developed the scale. The scale is suitable to study the phenomenology, etiology, and correlations

with potential biological markers of apathy in patients with mild or moderate PD. Because sensitivity to change has not been determined, no recommendations for its use in treatment studies can be given. It is the longest of the available apathy rating scales and takes about 10 minutes to administer.

Item 4 (Motivation/Initiative) of the UPDRS[21]

Description of the Scale. The UPDRS is the most widely used assessment scale in PD and consists of four sections. Part I assesses mood, mentation, and behavior and includes four items. Items 1 to 3 assess intellectual impairment, thought disorder, and depression and will not be covered here. Item 4 assesses motivation/initiative and is the focus of this review. The item is scored on a five-point scale ranging from 0 to 4, with increasing scores indicating more severe loss of motivation and/or initiative. The item is particularly related to activities and does not capture the emotional concomitants of apathy.

Apathy in PD Patients. Although the full UPDRS is often used in studies with PD patients, only limited information is available with respect to psychometric properties of individual items. For the motivation/initiative item, interrater reliability is moderate, whereas test–retest reliability is fair. When a cut-off of 2/3 was applied, one study found acceptable sensitivity and specificity of item 4 of the UPDRS with regard to the diagnosis of apathy as made following proposed diagnostic criteria.[32]

Final Assessment. Formally, the UPDRS item 4 classifies as recommended, because it has been used in PD assessments in reports other than the original scale description and has successfully undergone at least some clinimetric testing. However, as a single item, it is not a scale and does not provide much information. Hence, it can only be considered as a crude screening measure for apathy.

Item 7 (Apathy) of the NPI[22]

Description of the Scale. The NPI was developed as a structured interview conducted by the clinician to assess 10 forms of behavioral disorder that occur in patients with dementia, including delusions, hallucinations, agitation/aggression, depression, anxiety, euphoria/elation, apathy, disinhibition, irritability/lability, and aberrant motor behavior.[22] Subsequently a 12-item version was developed that also included sleep and appetite disturbances. Only item 7 (apathy) was assessed in this review. All items, including item 7, consist of a screening question followed, in case of a positive answer, by additional questions estimating the frequency and severity of the symptom. In the case of the apathy item, this screening probe consists of four questions.

Apathy in Non-PD Patients. The apathy subsection of the NPI has a good internal consistency, interrater, and test–retest reliability in patients with AD. The full scale has been widely used to study neuropsychiatric disturbances in patients with dementia.

Apathy in PD Patients. In a sample of 12 PD patients, the NPI apathy subsection showed good interrater agreement.[22] Otherwise, no information on reliability of the NPI apathy item in PD patients is available.

Final Assessment. Section 7 of the NPI can be considered a suggested scale. The full NPI is frequently used to screen and assess the severity of neuropsychiatric symptoms, including apathy, in neurodegenerative disorders, and has also been used to study the phenomenology and clinical correlations of apathy in PD populations. However, little is known about the clinimetric properties of the NPI in patients with PD.

Anhedonia Scales

The Snaith-Hamilton Pleasure Scale[16]

Description of the Scale. The SHAPS is a self-rated instrument that consists of 14 statements that patients can agree or disagree to on a four-point Likert scale. Thus, the scale assesses the presence and severity of one single symptom. It was developed with the aim of producing a shorter and "simpler scale for the measurement of anhedonia, that is unlikely to be affected by social class, sex, age, dietary habits and nationality."[16]

Anhedonia in Non-PD Patients. It has a good face validity, internal consistency, item-total correlation, and test–retest correlation.[16] There is some overlap between the items and symptoms of Parkinsonism. This may lead to the inflation of scores in PD patients if the cut-off score is not adjusted.

Anhedonia in PD Patients. Although there are no validation studies of the SHAPS in PD patients, it is probably the most widely used scale to assess anhedonia in this population. The scale has been used by several authors to assess the level of anhedonia in PD patients and to evaluate the effect of (pharmacological) treatment of motor symptoms of PD on hedonic symptoms.[8,33–37] It has proven to be sensitive to changes in hedonic tone.

Final Assessment. The SHAPS can be classified as a suggested scale. It is probably suitable for assessing

levels of hedonic tone for studying the epidemiology and etiology of anhedonia and for evaluating changes of hedonic tone during treatment. However, it lacks validation in PD patients.

The Chapman Scales for Physical and Social Anhedonia[25]

Description of the Scales. The Chapman scales for physical and social anhedonia are probably the most widely used instruments to measure anhedonia in patients with psychiatric diseases, such as schizophrenia and depressive disorder. The original scale consists of 88 true/false questions, divided over two subscales: a subscale for physical anhedonia consisting of 40 items and one for social anhedonia consisting of 48 items. Higher scores indicate more severe anhedonia, except in the Italian translation, which is reversely scored with higher scores indicating less severe anhedonia.[25,38] The scale for physical anhedonia was revised to include 61 items and is often used independently from the social anhedonia scale. The time frame is not well defined.

Anhedonia in Non-PD Patients. The scale lacks face validity as it includes aspects of social withdrawal, loss of interest, lack of motivation, and other features that are currently considered part of the concept of "apathy" and not of anhedonia. In addition, many items are sensitive to personal opinions, preferences, and habits. Nevertheless, it has good internal consistency and item-total correlation.[25]

Anhedonia in PD Patients. The scale was used in one study with PD patients. In this study, the researchers highlighted the shortcomings and impracticability of the scale.[17]

Final Assessment. The Chapman scales classify as "listed" scales. The single study that used the scales in PD patients concluded that the scale was not useful. In addition, it lacks face validity, and with its length of 101 items to assess a single symptom, it cannot be recommended.

CONCLUSIONS AND RECOMMENDATIONS

Several instruments are available to screen for and measure the severity of apathetic symptoms in PD patients. The AS and the LARS were specifically developed for and validated in patients with PD. The AS meets criteria for recommended, and the LARS, although classified as a suggested scale is well-designed and promising. There is limited information on the clinimetric properties of the AES and the AI in PD. Although item 4 of the UPDRS is classified as recommended according to the definition, the task force is of the opinion that it should be considered for screening only because of the obvious limitations of being a single-item construct. For the assessment of anhedonia, two scales are available, neither of which has been validated in PD. The Chapman scales for physical and social anhedonia cannot be advised for use because of the lack of face validity and the high number of items. Although the SHAPS, classified as suggested has not been validated in PD patients, it is the most frequently used scale to assess anhedonia in this population and has clinically proven its usefulness.

All apathy and anhedonia rating scales show overlap of items with symptoms of PD to some extent. The clinimetric properties of rating scales may depend on the way this overlap is approached. In general, exclusive, inclusive, substitutional, and attributional approaches are distinguished. In a recent critique of *depression* rating scales, the inclusive approach was advised.[2] In this inclusive approach, all symptoms are scored, irrespective of the fact that they may also be attributable to PD ("rate what you see"). This approach was thought to be more consistent with the definition of depression as a syndrome (i.e., a constellation of symptoms without reference to a specific etiology), and it may also be expected to result a higher interrater agreement. For the same reasons, this task force also advises an inclusive approach when administering apathy or anhedonia rating scales. When using patient-rated scales, the patient should be explicitly instructed to score every symptom according to its severity or frequency, irrespective of the presumed etiology.

None of the available scales are specifically suited to assess apathy or anhedonia in the different phases of motor fluctuations ("on" vs. "off" states). None of the scales give instructions as to whether patients suffering from "on" and "off" phases should be assessed during an "on" or "off" period. Because the time frame specified in the scales exceeds the duration of these "on" or "off" states, theoretically, the timing of assessment should not matter. It may be, however, that the state of mind of patients during "off" periods is such that they may perceive their own feelings and actions differently, and hence give different answers than during "on" periods. For this reason, the task force recommends that the assessment of apathy and anhedonia in PD patients be performed only during their "on" periods, which is also in line with the advice of the task force on depression rating scales.[2]

Because apathy is often associated with cognitive decline, the assessment of apathy in demented patients

may prove especially problematic. It is for this reason that the task force considers the Dementia Apathy Interview and Rating scale (DAIR) that was not included in the review, as a potentially interesting scale that merits further study.[39] The DAIR was developed as an informant-based interview to assess apathy in patients with Alzheimer's disease. In this population, the scale has a good internal consistency, with very high interrater and test–retest agreement, but only a weak correlation with clinicians' rating of apathy as gold standard.[39] Its advantages are that it is brief and that it may be administered over the phone. The scale has not been used in studies involving PD patients yet. A review of the scale's properties is included in the supplementary material.

The lack of generally accepted diagnostic criteria for apathy as a syndrome means that there is no gold standard to assess such psychometric properties as the sensitivity and specificity of scales. Although careful psychometric testing of the existing scales should be performed, the development of a new scale for apathy may be considered if existing scales do not reflect the construct of apathy closely enough once diagnostic criteria have been agreed upon.

The following unresolved issues in the area of apathy rating scales require further research:

1. Diagnostic criteria for apathy as a syndrome should be developed and agreed on by scientific societies and disease classification committees (DSM and ICD). These criteria should not be confined to PD, but be equally applicable for apathy in other neurodegenerative, neurological, and psychiatric disorders, such as AD and other dementias, stroke, depression, and schizophrenia. This approach will allow further study of the apathy syndrome across disease entities.
2. Once diagnostic criteria have been agreed upon, validation of available apathy scales against these external criteria should be performed to assess sensitivity and specificity of these scales among PD patients with or without apathy. Because of the lack of diagnostic criteria, this testing has not yet been done, although some researchers have tried to overcome this problem by validating the scale against clinician opinion or item 4 of the UPDRS part 1 as the gold standard. However, clinicians' opinions on what apathy is may vary due to the lack of a consistent definition, which makes it an unreliable gold standard. Item 4 of the UPDRS is focused on "motivation and initiative" and does not encompass the emotional aspects of apathy, which also make it an unreliable standard to validate rating scales against.
3. Further validation studies are required for those apathy scales that are commonly used, but have not or not extensively been validated in PD patients, such as the AES, the AI, and the DAIR.
4. Further studies of the phenomenological and pathophysiological similarities and differences between depression and apathy are required. Identifying typical clinical presentations will enable easier recognition of apathy and depression as different syndromes and will provide support for the further development of diagnostic criteria for apathy, or, at least, subtypes of depression that include apathy. From the viewpoint of depressive disorder, the NINDS/NIMH task force already advised that the validity of the "diminished interest" part of the second core symptom of DSM IV major depressive disorder ("markedly diminished interest or pleasure....") should be further studied, as this symptom may be more characteristic for apathy than for depression.[1] This also applies to the DSM IV research diagnostic criteria of minor depressive disorder. A recent study showed that in 33% of PD patients suffering form minor depression, this diagnosis is made solely on the basis of loss of interest in the absence of depressed mood (as opposed to 8% in major depressive disorder).[40]
5. The confounding influence of depressive symptomatology on the performance of apathy rating scales should be evaluated. Because evidence is accumulating that depression and apathy are distinct but overlapping clinical syndromes, apathy scales should be studied for their ability to detect and measure apathy in PD patients equally well in the presence and absence of depressive syndromes. If existing scales do not meet this requirement, they should be adapted or a new scale developed that does fulfil this requirement.
6. The confounding influence of cognitive decline on the performance of apathy rating scales should be evaluated. Because cognitive decline is often associated with apathy, apathy rating scales should be studied for their ability to detect and measure apathy equally well in patients with and without cognitive decline. Some of the scales have been studied or used in patients with dementia, but the confounding effects of cognitive decline on the clinimetric performance of the scales are largely unknown. Subtypes of dementia that include apathy may be revealed.
7. Because apathy is often accompanied by cognitive symptoms and loss of insight and is characterized by lack of suffering of the patient, the effect of this on the reliability of answers in patient-rated scales

should be evaluated. Reliability may be especially compromised in the most severely apathetic patients. Patient-rated instruments should be compared with caregiver-rated instruments, and it should be determined when the latter is to be preferred.
8. To facilitate treatment studies of apathy, sensitivity to change and minimal clinically relevant differences of the various apathy scales should be studied.

In the field of anhedonia rating scales, the following issues require further research:

1. An unambiguous and generally accepted definition of anhedonia should be constructed.
2. Anhedonia rating scales will have to be validated for use in PD patients. So far, no anhedonia scale, including the most frequently used one, the SHAPS, has been validated in PD patients.
3. The added value of evaluating anhedonia with a separate anhedonia scale above evaluating with a single anhedonia item, or a limited number of items, from a depression scale will have to be studied for various purposes. Situations that would require a separate anhedonia scale can thus be identified. For screening purposes, a single item score may be as sensitive as a cut-off on an anhedonia rating scale. Given the larger score range of a separate scale for anhedonia, such a scale may be more sensitive to change and hence preferred in treatment studies.
4. To facilitate studies evaluating the impact of treatment (motor, antidepressant, or other) on hedonic levels in PD patients, sensitivity to change and minimal clinically relevant differences of the various anhedonia scales should be studied.

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