The Brief Dimensional Apathy Scale (b-DAS): Mokken analysis and scale reduction

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Outline

• What is apathy?
• Dimensional Apathy Framework
  – Dimensional Apathy Scale
  – ALS and AD
• The Brief DAS (b-DAS)
  – Mokken scaling
  – Final item selection
• Conclusion and Future directions
Definition of apathy

• We all experience apathy/demotivation \(\rightarrow\) selective apathy!

• Defined as:
  
  – “a state of primary motivational impairment”

  Marin (1990)

• Marin (1996) expanded further to include the definition as reduced motivation towards goal-directed behaviours
  
  – e.g. “I have no plans to do things”, “I don’t want to do anything today”, “Emotionally indifferent to things”
Prevalence

• **Amyotrophic lateral sclerosis (ALS)/ Motor neurone disease (MND)**
  » occurs in **31% - 41%** of patients (Witgert et al., 2010; Lillo et al., 2011)

• **Alzheimer’s disease (AD)**
  » **61% - 92%** of patients (Landes et al., 2005)
Dimensional Apathy Framework
Radakovic & Abrahams

• Triadic framework based three types of apathy

• Assessed using the Dimensional Apathy Scale (DAS)
  – Theoretically and practically driven item development
  – Inherent Multidimensionality
  – Designed independent of depression and motor disability was a focus of the design
Dimensional Apathy Scale (DAS)

1. I need a lot of encouragement to get things started
   ○ Almost always
   ○ Often
   ○ Occasionally
   ○ Hardly Ever

2. I contact my friends
   ○ Almost always
   ○ Often
   ○ Occasionally
   ○ Hardly Ever

3. I express my emotions
   ○ Almost always
   ○ Often
   ○ Occasionally
   ○ Hardly Ever

4. I think of new things to do during the day
   ○ Almost always
   ○ Often
   ○ Occasionally
   ○ Hardly Ever

5. I am concerned about how my family feel
   ○ Almost always
   ○ Often
   ○ Occasionally
   ○ Hardly Ever

6. I find myself staring in space
   ○ Almost always
   ○ Often
   ○ Occasionally
   ○ Hardly Ever

7. Before I do something I think about how others would feel about it
   ○ Almost always
   ○ Often
   ○ Occasionally
   ○ Hardly Ever

8. I plan my days activities in advance
   ○ Almost always
   ○ Often
   ○ Occasionally
   ○ Hardly Ever

9. When I receive bad news I feel bad about it
   ○ Almost always
   ○ Often
   ○ Occasionally
   ○ Hardly Ever

10. I am able to focus on a task until it is finished
   ○ Almost always
   ○ Often
   ○ Occasionally
   ○ Hardly Ever

11. I lack motivation
    ○ Almost always
    ○ Often
    ○ Occasionally
    ○ Hardly Ever

12. I struggle to empathize with other people
    ○ Almost always
    ○ Often
    ○ Occasionally
    ○ Hardly Ever

13. I set goals for myself
    ○ Almost always
    ○ Often
    ○ Occasionally
    ○ Hardly Ever

14. I try new things
    ○ Almost always
    ○ Often
    ○ Occasionally
    ○ Hardly Ever

15. I am unconcerned about how others feel about my behaviour
    ○ Almost always
    ○ Often
    ○ Occasionally
    ○ Hardly Ever

16. I act on things I have thought about during the day
    ○ Almost always
    ○ Often
    ○ Occasionally
    ○ Hardly Ever

17. When doing a demanding task, I have difficulty working out what I have to do
    ○ Almost always
    ○ Often
    ○ Occasionally
    ○ Hardly Ever

18. I keep myself busy
    ○ Almost always
    ○ Often
    ○ Occasionally
    ○ Hardly Ever

19. I get easily confused when doing several things at once
    ○ Almost always
    ○ Often
    ○ Occasionally
    ○ Hardly Ever

20. I become emotional easily when watching something happy or sad on TV
    ○ Almost always
    ○ Often
    ○ Occasionally
    ○ Hardly Ever

21. I find it difficult to keep my mind on things
    ○ Almost always
    ○ Often
    ○ Occasionally
    ○ Hardly Ever

22. I am spontaneous
    ○ Almost always
    ○ Often
    ○ Occasionally
    ○ Hardly Ever

23. I am easily distracted
    ○ Almost always
    ○ Often
    ○ Occasionally
    ○ Hardly Ever

24. I feel indifferent to what is going on around me
    ○ Almost always
    ○ Often
    ○ Occasionally
    ○ Hardly Ever

Radakovic & Abrahams (2014), Radakovic et al. (2016)
## Dimensional Apathy Scale (DAS)

**Executive Apathy**

**Emotional Apathy**

**Initiation Apathy**

**Radakovic & Abrahams (2014), Radakovic et al. (2016)**
**Dimensional Apathy Scale (DAS)**

<table>
<thead>
<tr>
<th>DAS</th>
<th>Dimensional Apathy Scale (Self)</th>
<th>PN:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Sex</td>
<td>Marital Status</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Choose the answer on how you have felt, behaved or performed at a rate of occurrence in the last month: (Circle the statement according to your response).

1. I need a bit of encouragement to get things started
   - Almost always
   - Often
   - Occasionally
   - Hardly Ever

2. I have trouble keeping in touch with my friends
   - Almost always
   - Often
   - Occasionally
   - Hardly Ever

3. I express my emotions
   - Almost always
   - Often
   - Occasionally
   - Hardly Ever

4. I find it hard to think of new things to do during the day
   - Almost always
   - Often
   - Occasionally
   - Hardly Ever

5. I am concerned about how others feel about me
   - Almost always
   - Often
   - Occasionally
   - Hardly Ever

6. I find myself staring into space
   - Almost always
   - Often
   - Occasionally
   - Hardly Ever

7. Before I have finished something, I start to think about how to improve it
   - Almost always
   - Often
   - Occasionally
   - Hardly Ever

8. I plan my daily activities in advance
   - Almost always
   - Often
   - Occasionally
   - Hardly Ever

9. When I receive bad news I feel sad about it
   - Almost always
   - Often
   - Occasionally
   - Hardly Ever

10. I have trouble starting to do things
    - Almost always
    - Often
    - Occasionally
    - Hardly Ever

11. I keep myself busy
    - Almost always
    - Often
    - Occasionally
    - Hardly Ever

12. I struggle to empathise with other people
    - Almost always
    - Often
    - Occasionally
    - Hardly Ever

13. I am interested in things that others find uninteresting
    - Almost always
    - Often
    - Occasionally
    - Hardly Ever

14. I become emotional easily when watching something sad or happy on TV
    - Almost always
    - Often
    - Occasionally
    - Hardly Ever

15. I make personal goals for the future
    - Almost always
    - Often
    - Occasionally
    - Hardly Ever

16. I make plans for the day
    - Almost always
    - Often
    - Occasionally
    - Hardly Ever

17. I stick with my plans
    - Almost always
    - Often
    - Occasionally
    - Hardly Ever

18. I put off doing things I don’t want to do
    - Almost always
    - Often
    - Occasionally
    - Hardly Ever

19. I make plans for the future
    - Almost always
    - Often
    - Occasionally
    - Hardly Ever

20. I find it difficult to keep my mind on things
    - Almost always
    - Often
    - Occasionally
    - Hardly Ever

21. I keep myself busy
    - Almost always
    - Often
    - Occasionally
    - Hardly Ever

22. I feel indifferent to what is going on around me
    - Almost always
    - Often
    - Occasionally
    - Hardly Ever

23. I have trouble concentrating
    - Almost always
    - Often
    - Occasionally
    - Hardly Ever

24. I am interested in things that others find uninteresting
    - Almost always
    - Often
    - Occasionally
    - Hardly Ever

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**I can’t finish things**

**Executive Apathy**

**Emotional Apathy**

**Initiation Apathy**

Radakovic & Abrahams (2014), Radakovic et al. (2016)
Dimensional Apathy Scale (DAS)

Executive Apathy

1. I need a bit of encouragement to get things started.
   - Almost always
   - Often
   - Occasionally
   - Hardly Ever

2. I contact my friends.
   - Almost always
   - Often
   - Occasionally
   - Hardly Ever

3. I express my emotions.
   - Almost always
   - Often
   - Occasionally
   - Hardly Ever

4. I think of new things to do during the day.
   - Almost always
   - Often
   - Occasionally
   - Hardly Ever

5. I am concerned about how my family feels.
   - Almost always
   - Often
   - Occasionally
   - Hardly Ever

Emotional Apathy

6. When I receive bad news I feel bad about it.
   - Almost always
   - Often
   - Occasionally
   - Hardly Ever

7. Before I can do anything about it.
   - Almost always
   - Often
   - Occasionally
   - Hardly Ever

8. I plan my daily activities in advance.
   - Almost always
   - Often
   - Occasionally
   - Hardly Ever

9. I struggle to empathise with other people.
   - Almost always
   - Often
   - Occasionally
   - Hardly Ever

I can’t finish things

Initiation Apathy

10. I become emotionally when watching something happy or sad on TV.
    - Almost always
    - Often
    - Occasionally
    - Hardly Ever

11. I find it difficult to keep my mind on things.
    - Almost always
    - Often
    - Occasionally
    - Hardly Ever

12. I keep myself busy.
    - Almost always
    - Often
    - Occasionally
    - Hardly Ever

13. I feel indifferent to what is going on around me.
    - Almost always
    - Often
    - Occasionally
    - Hardly Ever

Radakovic & Abrahams (2014), Radakovic et al. (2016)
### Dimensional Apathy Scale (DAS)

**Executive Apathy**
- I can’t finish things

**Emotional Apathy**
- I don’t care

**Initiation Apathy**
- I can’t think of new things

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Radakovic & Abrahams (2014), Radakovic et al. (2016)
Profile apathy in ALS

- Initiation apathy characteristic in ALS
  - Associated with verbal fluency deficit

\[ p < .05^*; \quad p < .001^{***} \]

Radakovic et al. (2016), Radakovic et al. (submitted)
Profile apathy in AD

- Global apathy characteristic of AD
  - Awareness deficit

Radakovic, Abrahams & Starr (under revision)
Aim

- Reduce the DAS to form a brief DAS, composed of 9 items for detection of apathy in clinical practice and research
Data

• 102 ALS and 102 AD patients’ caregivers

• Measures:
  – Dimensional Apathy Scale (DAS) – Executive, Emotional and Initiation Subscales
  – Apathy Evaluation Scale (AES)
  – Geriatric Depression Scale- Short form (GDS15)
Statistical methodology

• Mokken scaling investigation of relationship between items and apathy subscales

• Automated Item Selection Procedure (AISP)
  – Scalability coefficients
    • Scale \((H)\) – whole scale
    • Item \((H_i)\) – individual items
  
  \(\text{Higher Scalability coefficient} = \text{Stronger scale/item properties}\)

• Item-total correlations
  – Convergent validity \(\rightarrow\) AES (One-dimensional Apathy)
  – Divergent validity \(\rightarrow\) GDS15 (Depression)

• Thematically relevant item selection
Results- Mokken analysis

- AISP Scale \((H)\) and Item \((H_i)\) Scalability

**Executive Apathy**
- 8 items
- \((H < 0.3)\)
- 0 items removed
- Lowest \(H_i\)
- 4 items removed
- 4 items retained

**Emotional Apathy**
- 8 items
- \((H < 0.3)\)
- 3 items removed
- Not scalable
- Lowest \(H_i\)
- 1 item removed
- 4 items retained

**Initiation Apathy**
- 8 items
- \((H < 0.3)\)
- 0 items removed
- Lowest \(H_i\)
- 4 items removed
- 4 items retained
Results-Final item selection

- Item-Total Correlations
  - 12 selected items had good convergent validity against one-dimensional apathy ($r > .5$) and divergent validity against depression ($r < .5$)

- Thematic items coherence

  **Executive Apathy**
  - 3 items retained
  - 1 item removed

  **Emotional Apathy**
  - 3 items retained
  - 1 item removed

  **Initiation Apathy**
  - 3 items retained
  - 1 item removed
Brief DAS

**Brief Dimensional Apathy Scale (b-DAS)**

Choose the answer on what you have observed the person has been feeling, behaving or thinking, based on the rate of occurrence in the last month. Please choose YES or NO based on whether the person is aware of this.

<table>
<thead>
<tr>
<th>(Read statement)</th>
<th>(Circle answer)</th>
<th>Are they aware of this? (Circle answer)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S/he thinks of new things to do during the day</td>
<td>0 Almost always 1 Often 2 Occasionally 3 Hardly Ever</td>
<td>YES / NO</td>
</tr>
</tbody>
</table>

- 9 item (3 Executive, 3 Emotional and 3 Initiation), carer-rated scale
- Awareness assessment
Conclusions and Future Directions

• The Brief DAS (B-DAS) is a short, psychometrically robust multidimensional apathy instrument

• Use in ALS and other neurodegenerative diseases (both movement disorders and dementias)

• Clinical relevance of measuring apathy, potential for motivationally-based intervention
Thank you for listening.

And a great thanks to all who participate in the research.

Collaborators:
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Prof. John M. Starr
Prof. Ian Deary
Dr Sarah McGrory
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