



EUAN MACDONALD CENTRE
FOR MOTOR NEURONE DISEASE RESEARCH

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

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Clinical Audit Research Evaluation



Centre for Cognitive Ageing
and Cognitive Epidemiology



MND
Scotland



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 → 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)

DAS **Dimensional Apathy Scale (Self)** **PN:**

Age..... Sex..... Marital Status.....

Years of Education.....

Choose the answer on how you have **felt, behaved or thought**, based on the rate of occurrence in the last month: (Circle the statement that applies)

<p>1. I need a bit of encouragement to get things started</p> <ul style="list-style-type: none"> <input type="radio"/> Almost always <input type="radio"/> Often <input type="radio"/> Occasionally <input type="radio"/> Hardly Ever <p>2. I contact my friends</p> <ul style="list-style-type: none"> <input type="radio"/> Almost always <input type="radio"/> Often <input type="radio"/> Occasionally <input type="radio"/> Hardly Ever <p>3. I express my emotions</p> <ul style="list-style-type: none"> <input type="radio"/> Almost always <input type="radio"/> Often <input type="radio"/> Occasionally <input type="radio"/> Hardly Ever <p>4. I think of new things to do during the day</p> <ul style="list-style-type: none"> <input type="radio"/> Almost always <input type="radio"/> Often <input type="radio"/> Occasionally <input type="radio"/> Hardly Ever <p>5. I am concerned about how my family feel</p> <ul style="list-style-type: none"> <input type="radio"/> Almost always <input type="radio"/> Often <input type="radio"/> Occasionally <input type="radio"/> Hardly Ever <p>6. I find myself staring in to space</p> <ul style="list-style-type: none"> <input type="radio"/> Almost always <input type="radio"/> Often <input type="radio"/> Occasionally <input type="radio"/> Hardly Ever 	<p>7. Before I do something I think about how others would feel about it</p> <ul style="list-style-type: none"> <input type="radio"/> Almost always <input type="radio"/> Often <input type="radio"/> Occasionally <input type="radio"/> Hardly Ever <p>8. I plan my days activities in advance</p> <ul style="list-style-type: none"> <input type="radio"/> Almost always <input type="radio"/> Often <input type="radio"/> Occasionally <input type="radio"/> Hardly Ever <p>9. When I receive bad news I feel bad about it</p> <ul style="list-style-type: none"> <input type="radio"/> Almost always <input type="radio"/> Often <input type="radio"/> Occasionally <input type="radio"/> Hardly Ever <p>10. I am able to focus on a task until it is finished</p> <ul style="list-style-type: none"> <input type="radio"/> Almost always <input type="radio"/> Often <input type="radio"/> Occasionally <input type="radio"/> Hardly Ever <p>11. I lack motivation</p> <ul style="list-style-type: none"> <input type="radio"/> Almost always <input type="radio"/> Often <input type="radio"/> Occasionally <input type="radio"/> Hardly Ever <p>12. I struggle to empathise with other people</p> <ul style="list-style-type: none"> <input type="radio"/> Almost always <input type="radio"/> Often <input type="radio"/> Occasionally <input type="radio"/> Hardly Ever
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DAS **Dimensional Apathy Scale (Self)** **PN:**

<p>13. I set goals for myself</p> <ul style="list-style-type: none"> <input type="radio"/> Almost always <input type="radio"/> Often <input type="radio"/> Occasionally <input type="radio"/> Hardly Ever <p>14. I try new things</p> <ul style="list-style-type: none"> <input type="radio"/> Almost always <input type="radio"/> Often <input type="radio"/> Occasionally <input type="radio"/> Hardly Ever <p>15. I am unconcerned about how others feel about my behaviour</p> <ul style="list-style-type: none"> <input type="radio"/> Almost always <input type="radio"/> Often <input type="radio"/> Occasionally <input type="radio"/> Hardly Ever <p>16. I act on things I have thought about during the day</p> <ul style="list-style-type: none"> <input type="radio"/> Almost always <input type="radio"/> Often <input type="radio"/> Occasionally <input type="radio"/> Hardly Ever <p>17. When doing a demanding task, I have difficulty working out what I have to do</p> <ul style="list-style-type: none"> <input type="radio"/> Almost always <input type="radio"/> Often <input type="radio"/> Occasionally <input type="radio"/> Hardly Ever <p>18. I keep myself busy</p> <ul style="list-style-type: none"> <input type="radio"/> Almost always <input type="radio"/> Often <input type="radio"/> Occasionally <input type="radio"/> Hardly Ever 	<p>19. I get easily confused when doing several things at once</p> <ul style="list-style-type: none"> <input type="radio"/> Almost always <input type="radio"/> Often <input type="radio"/> Occasionally <input type="radio"/> Hardly Ever <p>20. I become emotional easily when watching something happy or sad on TV</p> <ul style="list-style-type: none"> <input type="radio"/> Almost always <input type="radio"/> Often <input type="radio"/> Occasionally <input type="radio"/> Hardly Ever <p>21. I find it difficult to keep my mind on things</p> <ul style="list-style-type: none"> <input type="radio"/> Almost always <input type="radio"/> Often <input type="radio"/> Occasionally <input type="radio"/> Hardly Ever <p>22. I am spontaneous</p> <ul style="list-style-type: none"> <input type="radio"/> Almost always <input type="radio"/> Often <input type="radio"/> Occasionally <input type="radio"/> Hardly Ever <p>23. I am easily distracted</p> <ul style="list-style-type: none"> <input type="radio"/> Almost always <input type="radio"/> Often <input type="radio"/> Occasionally <input type="radio"/> Hardly Ever <p>24. I feel indifferent to what is going on around me</p> <ul style="list-style-type: none"> <input type="radio"/> Almost always <input type="radio"/> Often <input type="radio"/> Occasionally <input type="radio"/> Hardly Ever
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Dimensional Apathy Scale (DAS)

DAS Dimensional Apathy Scale (Self)		PN:
Age.....	Sex.....	Marital Status.....
Years of Education.....		
Choose the answer on how you have felt, behaved or rate of occurrence in the last month: (Circle the statement)		
1. I need a bit of encouragement to get things started ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	7. Before I about things about it ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	19. I get easily confused when doing several things at once ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever
2. I contact my friends ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	8. I plan my days activities in advance ◊ 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
3. I express my emotions ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	9. When I receive bad news I feel bad about it ◊ Almost always ◊ Often	21. I find it difficult to keep my mind on things ◊ Almost always
4. I think of new things to do during the day ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever		
5. I am concerned about how family feel ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	12. I struggle to empathise with other people ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	
6. I find myself staring in to space ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever		
		15. I am unconcerned about how others feel about my behaviour ◊ Almost always ◊ Often ◊ Occasionally
		16. I struggle to start things ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever
		17. I struggle to get things done ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever
		18. I keep myself busy ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever
		24. I feel indifferent to what is going on around me ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever

Executive Apathy

Emotional Apathy

Initiation Apathy

Dimensional Apathy Scale (DAS)

DAS		Dimensional Apathy Scale (Self)		PN:	
Age.....	Sex.....	Marital Status.....			
Years of Education.....					
Choose the answer on how you have felt, behaved on the following items at the rate of occurrence in the last month: (Circle the statement)					
1. I need a bit of encouragement to get things started ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	7. Before I do something I think about it ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	2. I contact my friends ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	8. I plan my days activities in advance ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	15. I am unconcerned about how others feel about my behaviour ◊ 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
3. I express my emotions ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	9. When I receive bad news I feel bad about it ◊ Almost always ◊ Often	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 about me ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	16. I find it difficult to start a task ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	21. I find it difficult to keep my mind on things ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever
5. I am concerned about how my family feel about me ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	12. I struggle to empathise with other people ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	6. I am concerned about how my family feel about me ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	17. I am concerned about how my family feel about me ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	18. I keep myself busy ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	24. I feel indifferent to what is going on around me ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever

Executive Apathy

Emotional Apathy

Initiation Apathy

I can't finish things

I don't care

Dimensional Apathy Scale (DAS)

DAS Dimensional Apathy Scale (Self)		PN:
Age.....	Sex.....	Marital Status.....
Years of Education.....		
Choose the answer on how you have felt, behaved or thought about the following items in the last month: (Circle the statement)		
1. I need a bit of encouragement to get things started ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	7. Before I do something I think about it ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	
2. I contact my friends ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	8. I plan my days activities in advance ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	
3. I express my emotions ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	9. When I receive bad news I feel bad about it ◊ Almost always ◊ Often	
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	12. I struggle to empathise with other people ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	

DAS Dimensional Apathy Scale (Self)		PN:
15. I am unconcerned about how others feel about my behaviour ◊ Almost always ◊ Often ◊ Occasionally	20. I become emotional easily when watching something happy or sad on TV ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	
16. I find it difficult to keep my mind on things ◊ Almost always ◊ Often ◊ Occasionally	21. I find it difficult to keep my mind on things ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	
17. I am not interested in things ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever		
18. I keep myself busy ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	24. I feel bored ◊ Almost always ◊ Often ◊ Occasionally ◊ Hardly Ever	

Executive Apathy

Emotional Apathy

Initiation Apathy

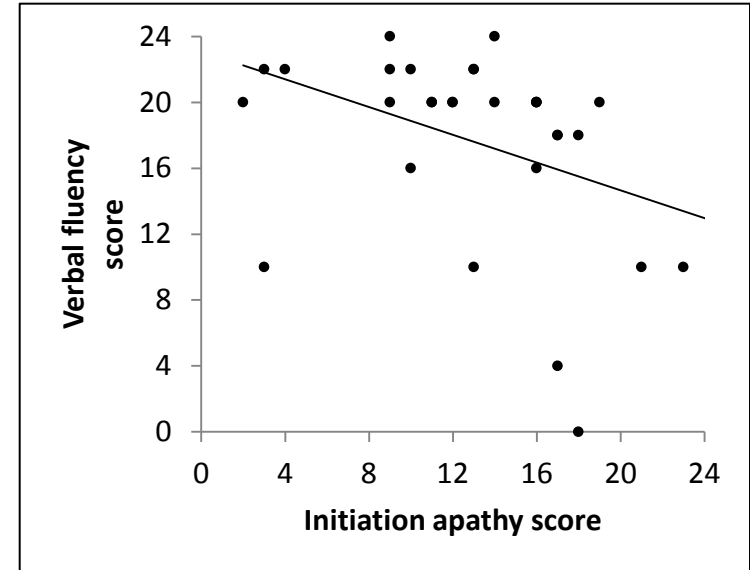
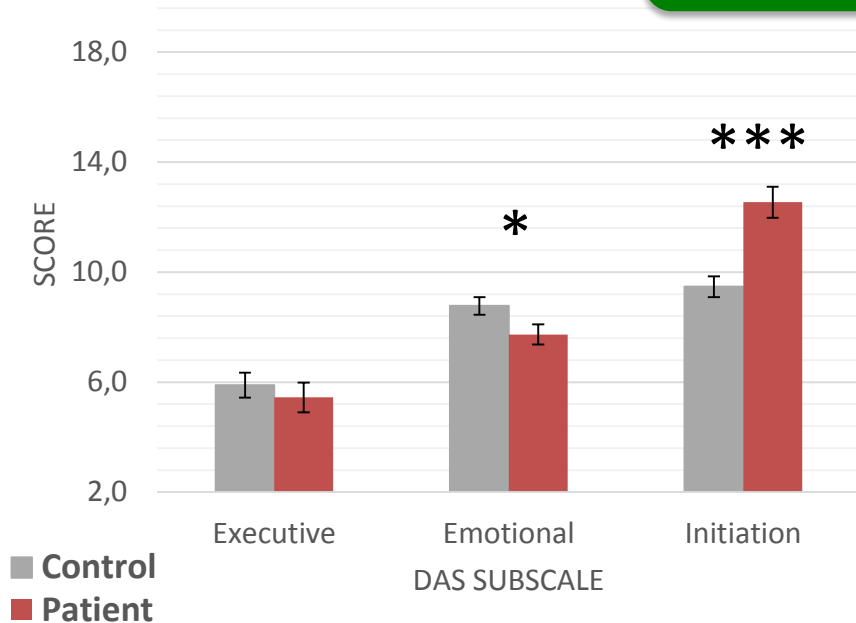
I can't finish things

I don't care

I can't think of new things

Profile apathy in ALS

Initiation Apathy



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

$p < .05^*$; $p < .001^{***}$

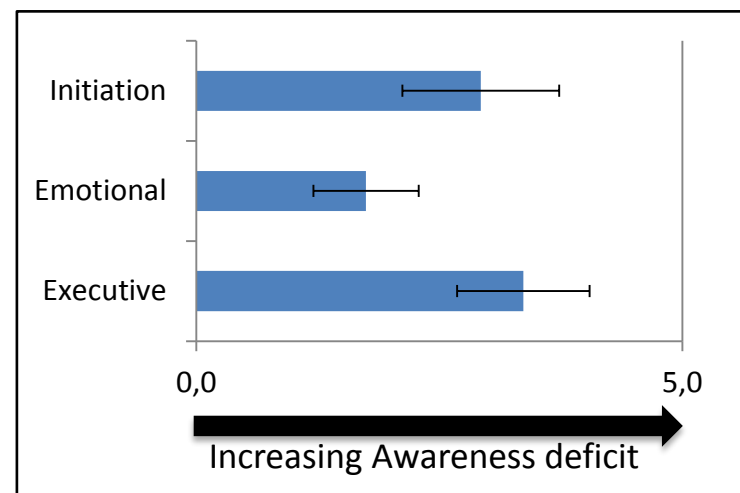
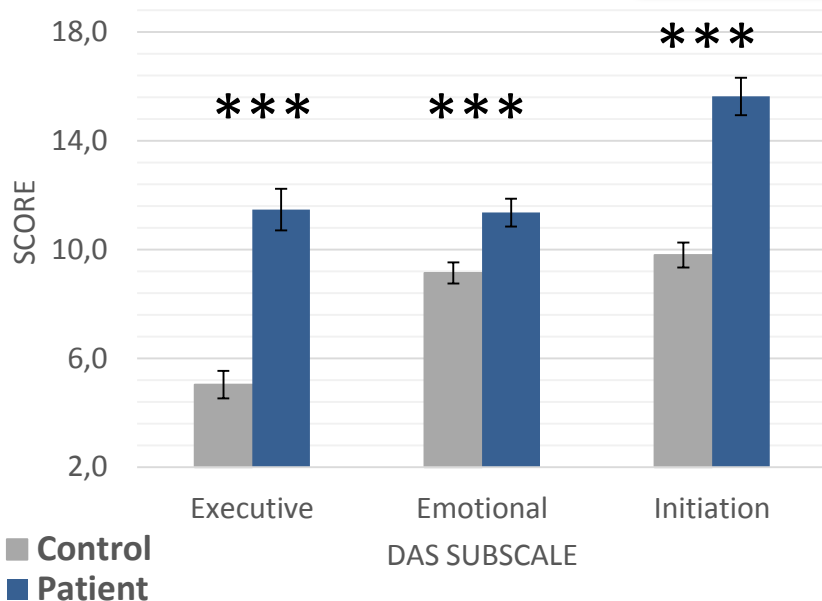
Radakovic et al. (2016), Radakovic et al. (submitted)

Profile apathy in AD

**Executive
Apathy**

**Emotional
Apathy**

**Initiation
Apathy**



- **Global apathy characteristic of AD**
– Awareness deficit

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
- Item-total correlations
 - Convergent validity → AES (One-dimensional Apathy)
 - Divergent validity → GDS15 (Depression)
- Thematically relevant item selection

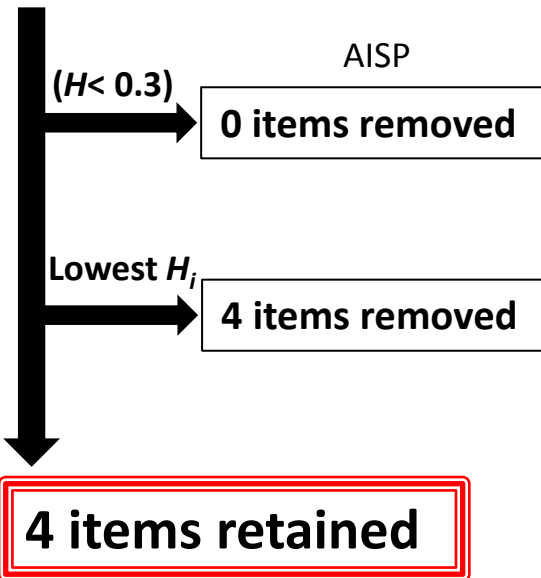
Higher Scalability coefficient
=
Stronger scale/item properties

Results- Mokken analysis

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

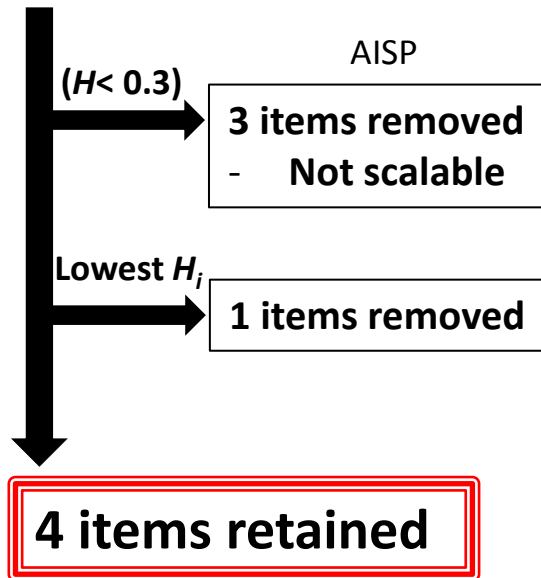
Executive Apathy

8 items



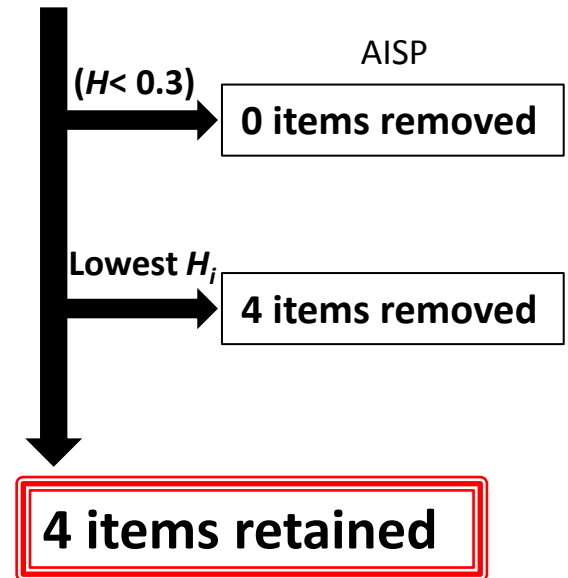
Emotional Apathy

8 items



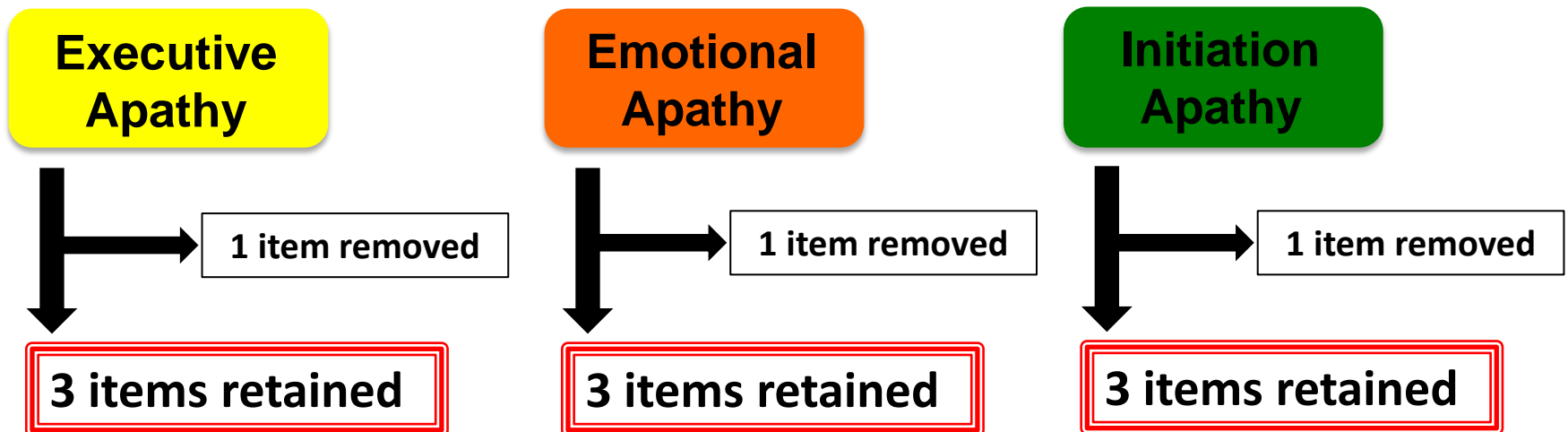
Initiation Apathy

8 items



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



Brief DAS

Brief Dimensional Apathy Scale

b-DAS

Your Relationship to the Person/Patient.....

Person's/Patient's Name.....

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.

(Read statement)	(Circle answer)	Are they aware of this? (Circle answer)
1. S/he thinks of new things to do during the day	0 Almost always 1 Often 2 Occasionally 3 Hardly Ever	YES / NO

- 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:

Prof. Sharon Abrahams
Prof. John M. Starr
Prof. Ian Deary
Dr Sarah McGrory

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Ms Denise Cranley
Dr Robert Swingler
Mr Philip Brown

Prof Siddharthan Chandran
Ms Laura Stephenson
Ms Judith Newton
Mr Christopher Crockford



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