

**Anne Rowling**  
Regenerative Neurology Clinic



**EUAN MACDONALD CENTRE**  
FOR MOTOR NEURONE DISEASE RESEARCH



# Apathy and persons living with Parkinson's disease: a multidimensional conceptualisation and approach

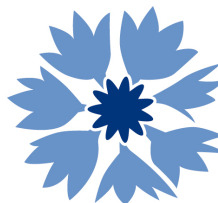
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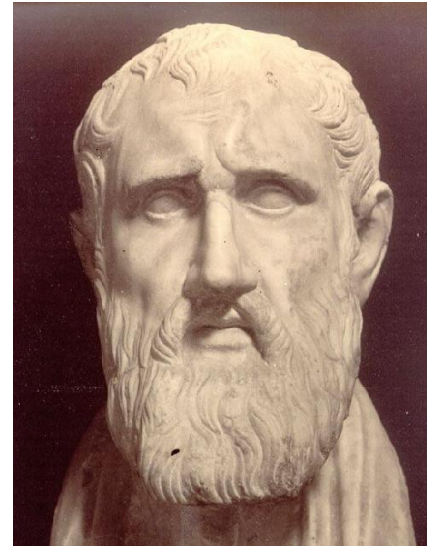
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# Outline

- History of apathy
- Definition of apathy
  - Apathy and Depression
- Multidimensional apathy
- Dimensional Apathy Scale
- Study
  - Background & Aims
  - Method
  - Results
  - Conclusions
- Summary
- Future directions

# History of apathy

- Greek stoic philosophy
  - *Apatheia*  
a- (without) -pathos (passion)
- *Apatheia* considered a virtue, imparting more objectivity
- The definition has transformed vastly from its original, philosophical roots



Zeno of Citium

# History of apathy

- Greek Monk Evagrius Ponticus
  - *Acedia*

A state of dejection leading to loss of interest in aspects of life

“Spiritual Apathy”

# History of apathy

- Hippocrates' *The Sacred disease* (from Marin, 1991):

“Those who are mad through phlegm are **quiet, and neither shout nor make a disturbance;** those maddened through bile are noisy, evildoers, and restless, doing something inopportune”

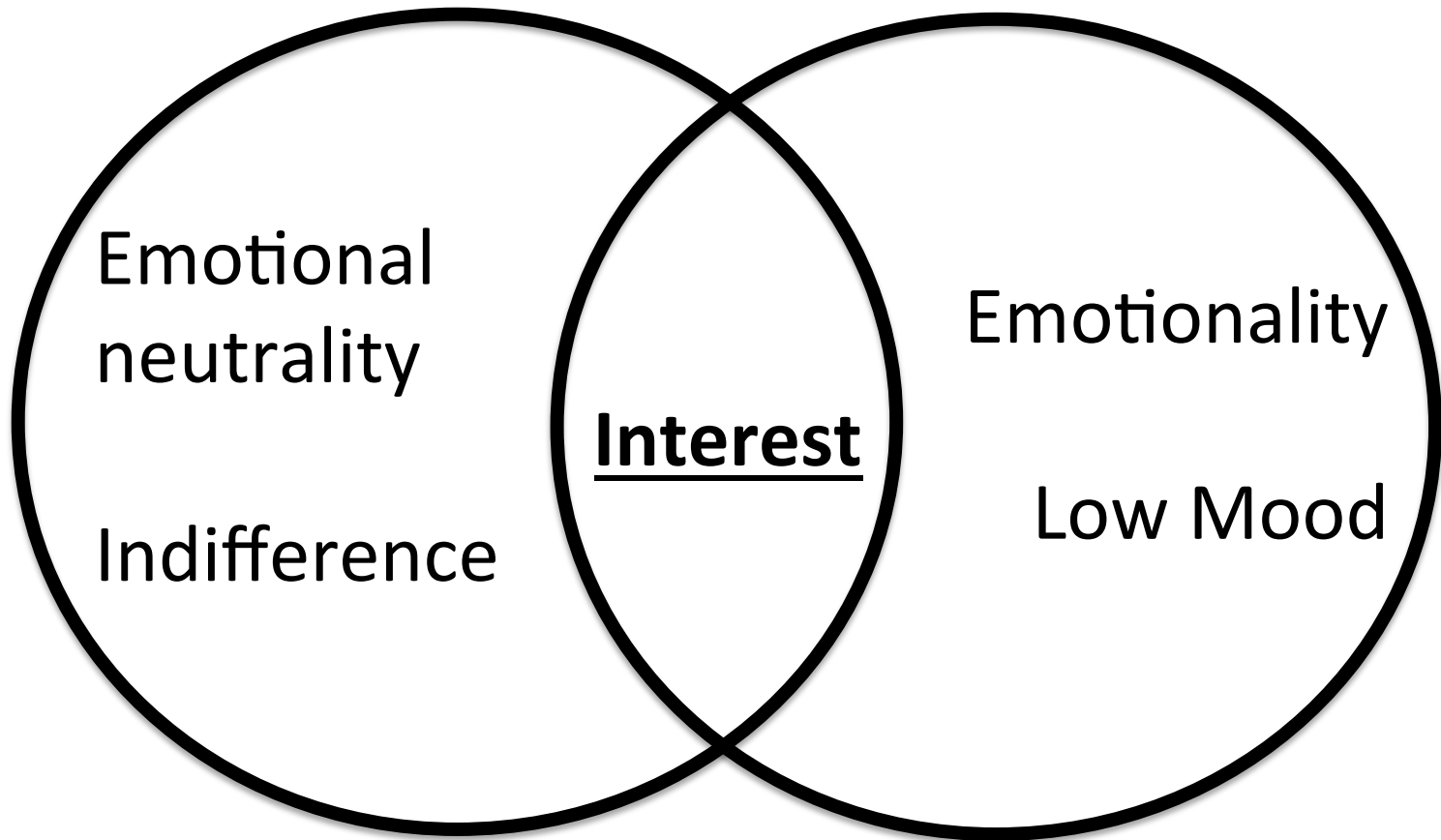
# Definition of apathy

- We all feel apathetic/demotivated → 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”

# Apathy and Depression

Apathy

Depression



# Multidimensional apathy

- Apathy is commonly regarded as one-dimensional BUT is in fact multidimensional

Hindawi  
Current  
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**Dimensions of Apathy in Parkinson's Disease: Exploratory Factor Analysis of the Apathy Scale**

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# Multidimensional apathy

- Marin
  - Behavioural, Cognitive, Emotional
- Cummings et al.
  - Emotion, Initiative, Enthusiasm

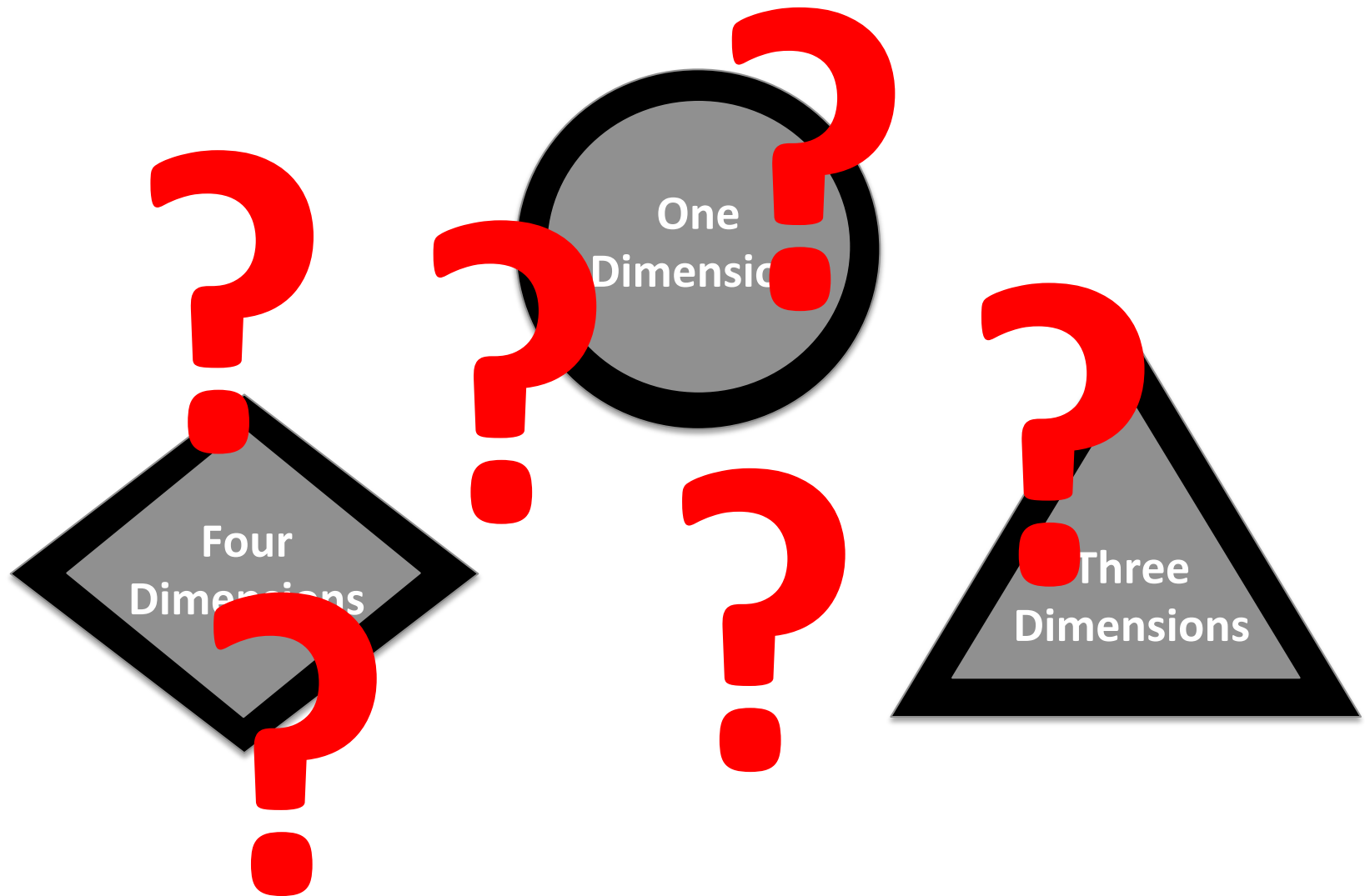
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- Stuss et al.
  - Affective, Behavioural, Cognitive, “Social apathy”

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- Robert et al.
  - Emotional Blunting, Lack of Initiative, Lack of Interest
- Sockeel et al.
  - Intellectual Curiosity, Action Initiation, Emotional, Self Awareness
- Starkstein and Leetjens
  - Goal directed behaviour, goal directed cognition
- Levy and Dubois
  - Auto Activation, Emotional Affective, Cognitive Inertia

# Multidimensional apathy



# Multidimensional apathy

- Lille Apathy Rating Scale (Sockeel et al., 2006)
  - Not an adequate measure of multidimensional apathy (Radakovic et al., 2015)

## **Caveats**

uncorroborated apathy domains and not comprehensive measurement

# Multidimensional 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 <b>felt, behaved or</b> rate of occurrence in the last month: (Circle the statement)				
1. I need a bit of encouragement to get things started	7. Before I do anything about things I think about it	<b>Executive Apathy</b>		
<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever	<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever			
2. I contact my friends	8. I plan my days activities in advance	<b>Emotional Apathy</b>		
<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever	<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever			
3. I express my emotions	9. When I receive bad news I feel bad about it	<b>Initiation Apathy</b>		
<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever	<input type="checkbox"/> Almost always <input type="checkbox"/> Often			
4. I think of new things to do during the day	10. I struggle to empathise with other people	<b>I can't finish things</b>		
<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever	<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever			
5. I am concerned about how family feel	11. I struggle to empathise with other people	<b>I can't think of new things</b>		
<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever	<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever			
6. I think of new things to do during the day	12. I struggle to empathise with other people	<b>I don't care</b>		
<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever	<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever			
13. I am concerned about how family feel	13. I struggle to empathise with other people	<b>I can't think of new things</b>		
<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever	<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever			
14. I think of new things to do during the day	14. I struggle to empathise with other people	<b>I can't think of new things</b>		
<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever	<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever			
15. I am unconcerned about how others feel about my behaviour	15. I struggle to empathise with other people	<b>I can't think of new things</b>		
<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever	<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever			
16. I think of new things to do during the day	16. I struggle to empathise with other people	<b>I can't think of new things</b>		
<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever	<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever			
17. I am unconcerned about how others feel about my behaviour	17. I struggle to empathise with other people	<b>I can't think of new things</b>		
<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever	<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever			
18. I keep myself busy	18. I struggle to empathise with other people	<b>I can't think of new things</b>		
<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever	<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever			
19. I am unconcerned about how others feel about my behaviour	19. I struggle to empathise with other people	<b>I can't think of new things</b>		
<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever	<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever			
20. I become emotional easily when watching something happy or sad on TV	20. I struggle to empathise with other people	<b>I can't think of new things</b>		
<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever	<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever			
21. I find it difficult to keep my mind on things	21. I struggle to empathise with other people	<b>I can't think of new things</b>		
<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever	<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever			
22. I become emotional easily when watching something happy or sad on TV	22. I struggle to empathise with other people	<b>I can't think of new things</b>		
<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever	<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever			
23. I find it difficult to keep my mind on things	23. I struggle to empathise with other people	<b>I can't think of new things</b>		
<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever	<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever			
24. I become emotional easily when watching something happy or sad on TV	24. I struggle to empathise with other people	<b>I can't think of new things</b>		
<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever	<input type="checkbox"/> Almost always <input type="checkbox"/> Often <input type="checkbox"/> Occasionally <input type="checkbox"/> Hardly Ever			

# Multidimensional apathy

Cerebral Cortex July 2006;16:916-928  
doi:10.1093/cercor/bhj043  
Advance Access publication October 5, 2005

## Apathy and the Functional Anatomy of the Prefrontal Cortex–Basal Ganglia Circuits

Richard Levy and Bruno Dubois

Fédération de Neurologie and INSERM U610, Hôpital de la Salpêtrière, Paris, France

REVUE NEUROLOGIQUE 168 (2012) 585–597



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**Basal ganglia and limbic system: a new frontier**

**Apathy: A pathology of goal-directed behaviour. A new concept of the clinic and pathophysiology of apathy**

***L'apathie : un modèle pathologique des comportements volontaires***

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# Multidimensional apathy

## Motor neurone disease

- DAS measures apathy independent of motor symptoms in motor neurone disease
- Motor neurone disease is characterised by

**Initiation  
Apathy**

# Background

- Parkinson's disease (PD)
  - Apathy is observed between **30% and 51%** (Kirsch-Darrow et al., 2006; Dujardin et al., 2007; Pedersen et al., 2009)
- Theorised three dimensional substructure of apathy (Pagonabarraga et al., 2015)
  - Can be measured by the Dimensional Apathy Scale

# Aims

- To explore the multidimensional apathy in persons living with PD (PwPD) and their caregivers/relatives/friends (CRFPD)
- To determine the relationship of multidimensional apathy with clinical variables, motor dysfunction and activities of daily living in PwPD



# Methods

- Postal questionnaire study
- 54 PwPD recruited in to study, response rate of 72.2%
- Total of 34 PwPD and of their 30 PDCRFs participated
- 34 gender-age-education matched healthy controls and of their 30 informants participated

# Methods

- Questionnaires
  - Apathy Evaluation Scale (AES)
  - Geriatric Depression Scale- Short form (GDS15)
  - Dimensional Apathy Scale (DAS) – Executive, Emotional and Initiation Subscales
- Additional measures
  - Lawton Instrumental Activities of Daily Living
  - Hoehn & Yahr scale

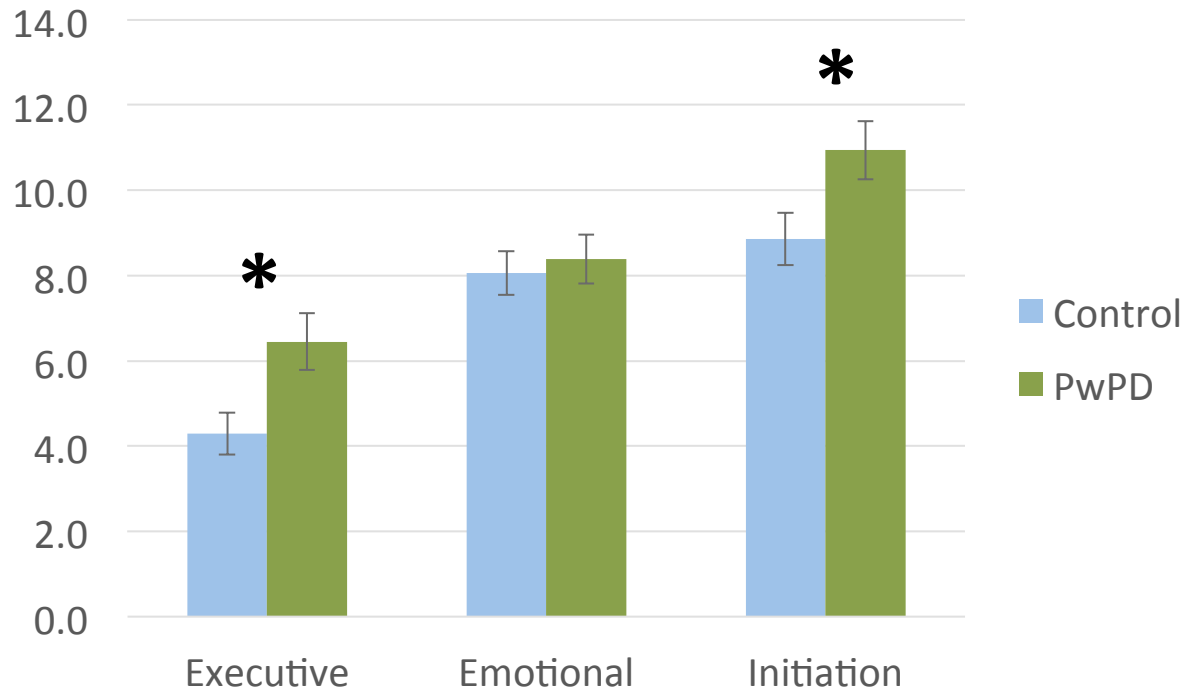
# Results- Multidimensional apathy

## PwPDs vs CRFPDs

- Comparing PwPDs' and CRFPDs' ratings on apathy subtypes (DAS)
  - No significant difference observed
- Comparing Controls and Informants ratings on apathy subtypes (DAS)
  - No significant difference observed

# Results- Multidimensional apathy

## PwPD vs Control



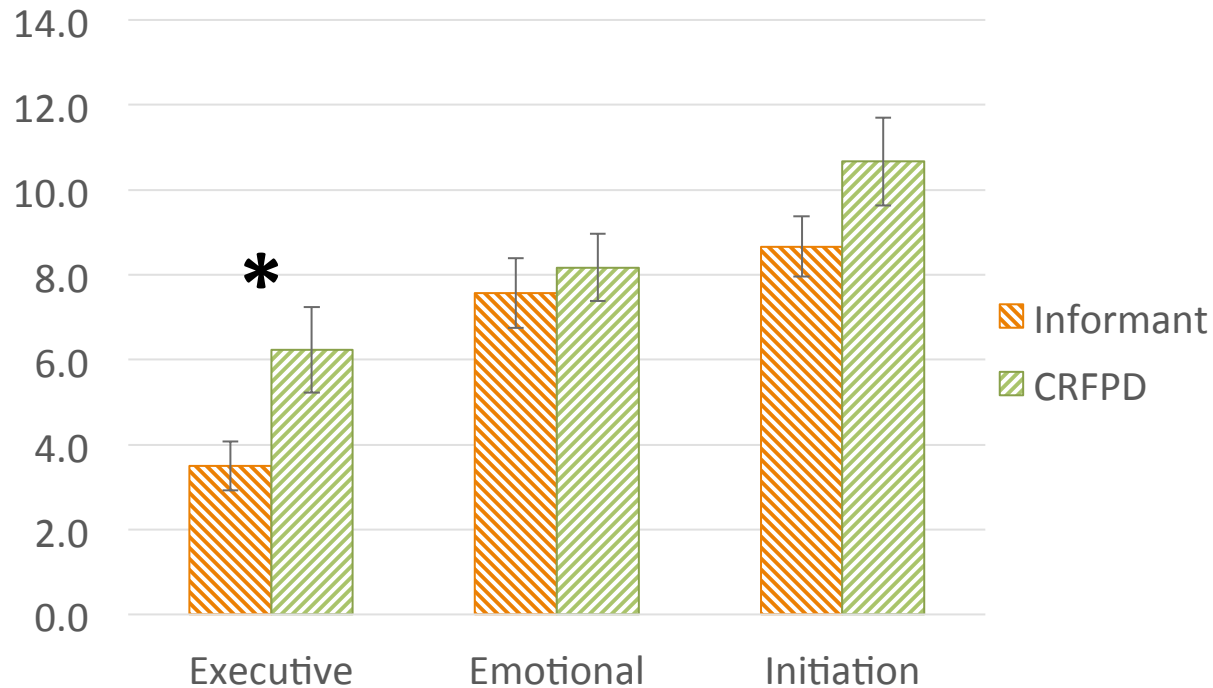
**Executive  
Apathy**



**Initiation  
Apathy**

# Results- Multidimensional apathy

## CRFPD vs Informant



**Executive  
Apathy**

# Results- Multidimensional apathy

## Other variables

	≥1 Subscale	No Subscales	p-value
HY (Mean, SD)	1.5 (0.7)	2.4 (1.1)	.59
LIADL (Mean, SD)	6.1 (1.1) <sup>†</sup>	7.3 (1.1) <sup>††</sup>	<b>.007</b>
Disease duration (Mean, SD)	4.2 (3.1)	4.7 (3.3)	.58
Age of Onset (Mean, SD)	64.7 (13.8)	70.2 (5.8)	.35
On-Off-No medication state (%)			
On (N=13)	30.8%	69.2%	
Off (N=11)	36.4%	63.6%	
No Medication (N=6)	33.3%	66.7%	

LIADL=Lawton Instrumental Activities of Daily Living; HY=Hoehn & Yahr scale;

SD=standard deviation; n.s.=not significant

Significant difference highlighted in bold

† N= 9

†† N= 19

- Most common were

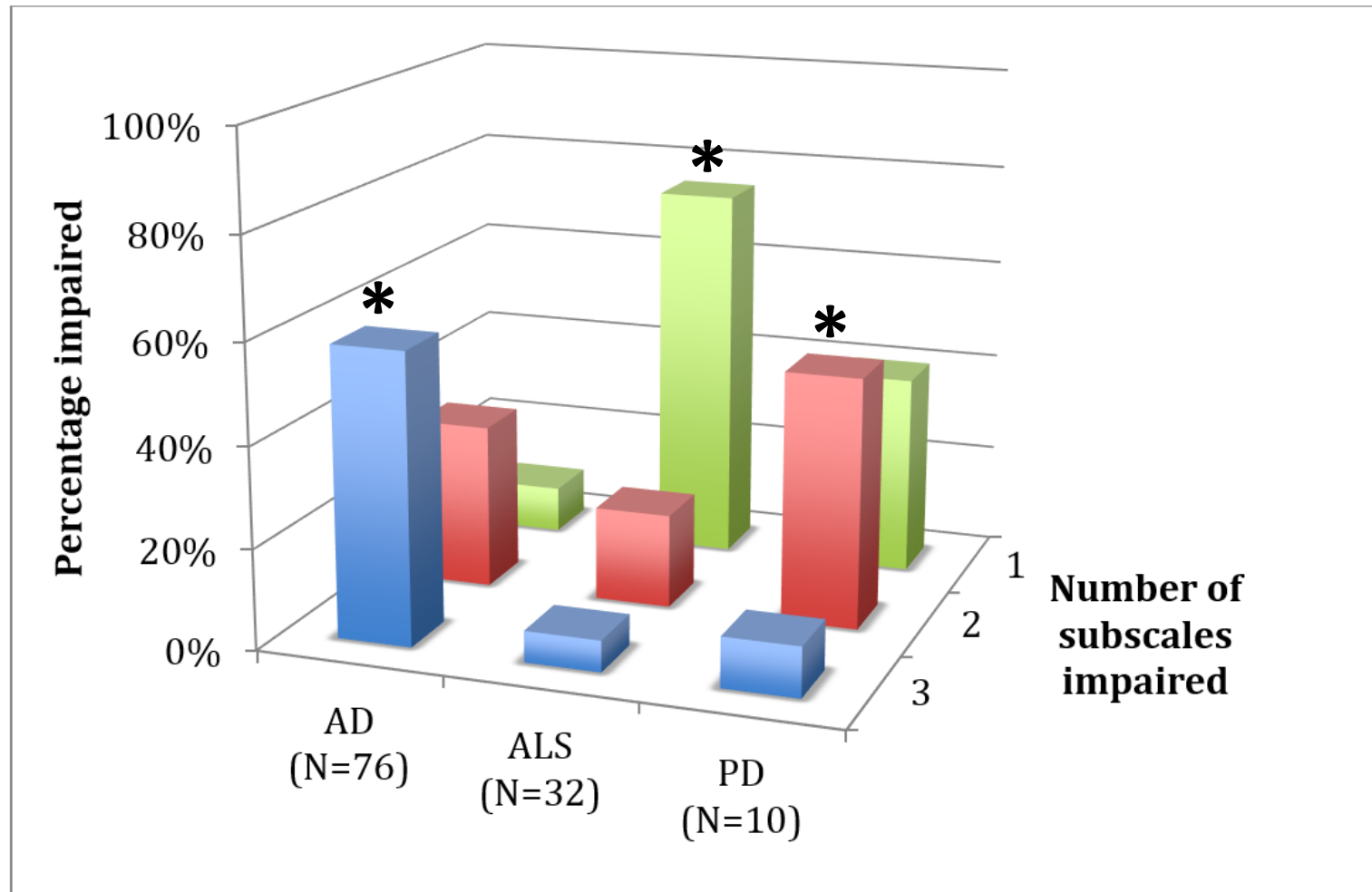
**Executive  
Apathy**



**Initiation  
Apathy**

# Results- Multidimensional apathy

## Comparison to other diseases



# Conclusions

- Persons living with PD showed a lack of motivation for planning, organising and attending (**Executive apathy**)
  - With a self reported lack of motivation to self generate thoughts or actions (**Initiation apathy**)
  - No awareness problems observed in relation to demotivation
- Slightly reduced everyday functioning when apathy is present



# Summary

- Apathy is complex and multidimensional, with impact on everyday functioning
- Three dimensional apathy is well-established and measurable
- Characteristic apathy profiles dependent on disease

# Future

- Increase recognition of apathy as complex and multidimensional
- Better detection of apathy subtypes can lead to improved design of interventions or management
- Underlying neural substrates of apathy subtypes and how they relate to functioning



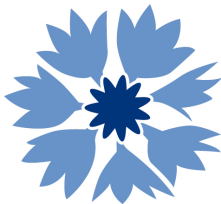
Anne Rowling  
Regenerative Neurology Clinic



# Thank you for listening!

And a great thanks to all who participated in the study.

**MND**  
Scotland



## Special thanks to:

Prof. Sharon Abrahams

Prof. John M. Starr

Dr Richard Davenport

Anne Rowling Regenerative  
Neurology Clinic



Centre for Cognitive Ageing  
and Cognitive Epidemiology

 @ratkorad



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