The Role of the UF Deep Brain Stimulation Cognitive Rating Scale (UF-DBS CRS) in Clinical Decision-Making: Comparing Patients who do and do not Proceed to Surgery

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INTRODUCTION

Deep Brain Stimulation (DBS)

- Powerful treatment for medication-refractory symptoms of both Parkinson's disease (PD) and Essential tremor (ET)
- Delivers high frequency electrical st several target sites (i.e. globus palli nucleus, thalamus)
- Candidacy is typically determined b teams including neuropsychology
- Neuropsychology's recommendation actionable (OK to proceed to surger

Deep Brain Stimulation in Individual With Parkinson Dise
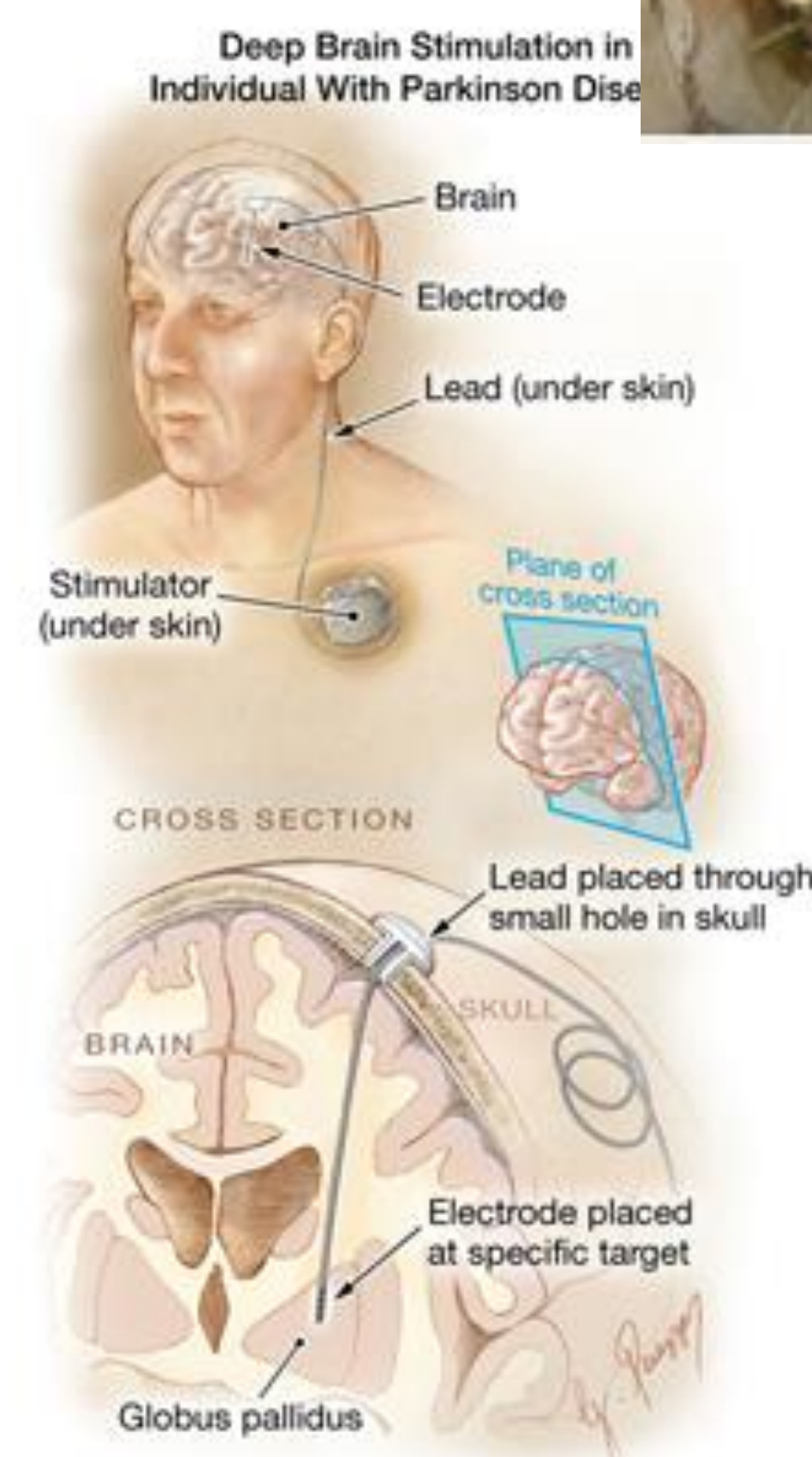
The UF DBS Cognitive Rating Scale (UF-DBS CRS)

| 1 | 2 | 3 | 4 | 5 |
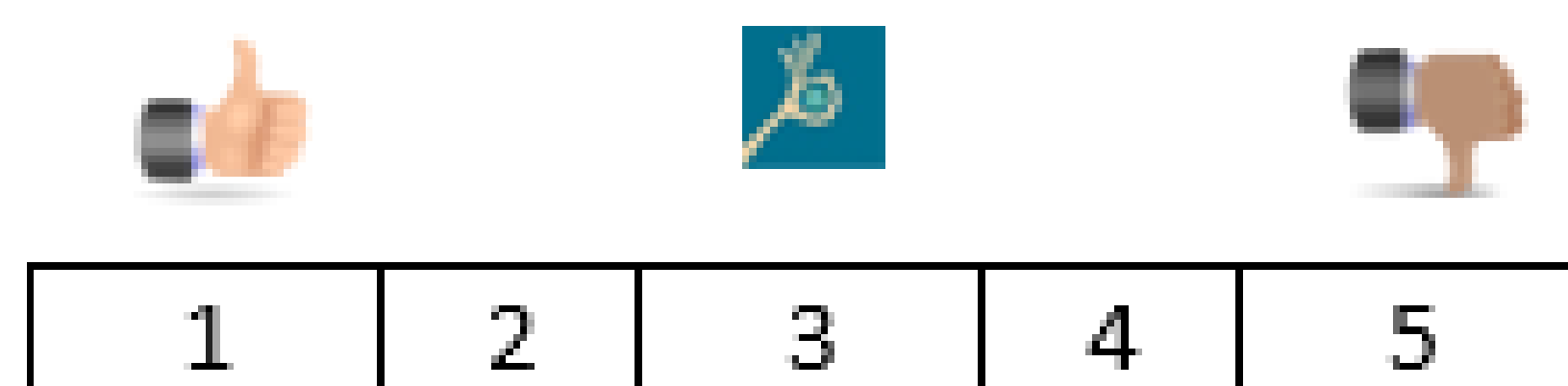
- Clinician-rated 5-point Likert scale ranging from 1 (least) to most (5) cognitive concern for surgery
- Used to communicate neuropsychology's concern using clinical judgement that is based on objective neuropsychological testing
- Higher scores intended to indicate cognitive contraindications to DBS which consist of abnormal profiles in ET/PD and/or global impairment
- We have previously validated strong construct validity, with higher (worse) scores associated with deficits in delayed memory, executive functioning, and language domain composite scores (average Z score)
- Has been implemented in our Fast Track DBS program for the past 6 years and is well-received by the consensus conference team

OBJECTIVES

In the current study, we investigated **differences between subgroups of patients who did (DBS+) or did not (DBS-) proceed to surgery** in terms of baseline UF DBS-CRS scores (which are based on neuropsychology's clinical judgement), cognitive domain composites (derived from objective neuropsychological testing), and demographic factors.
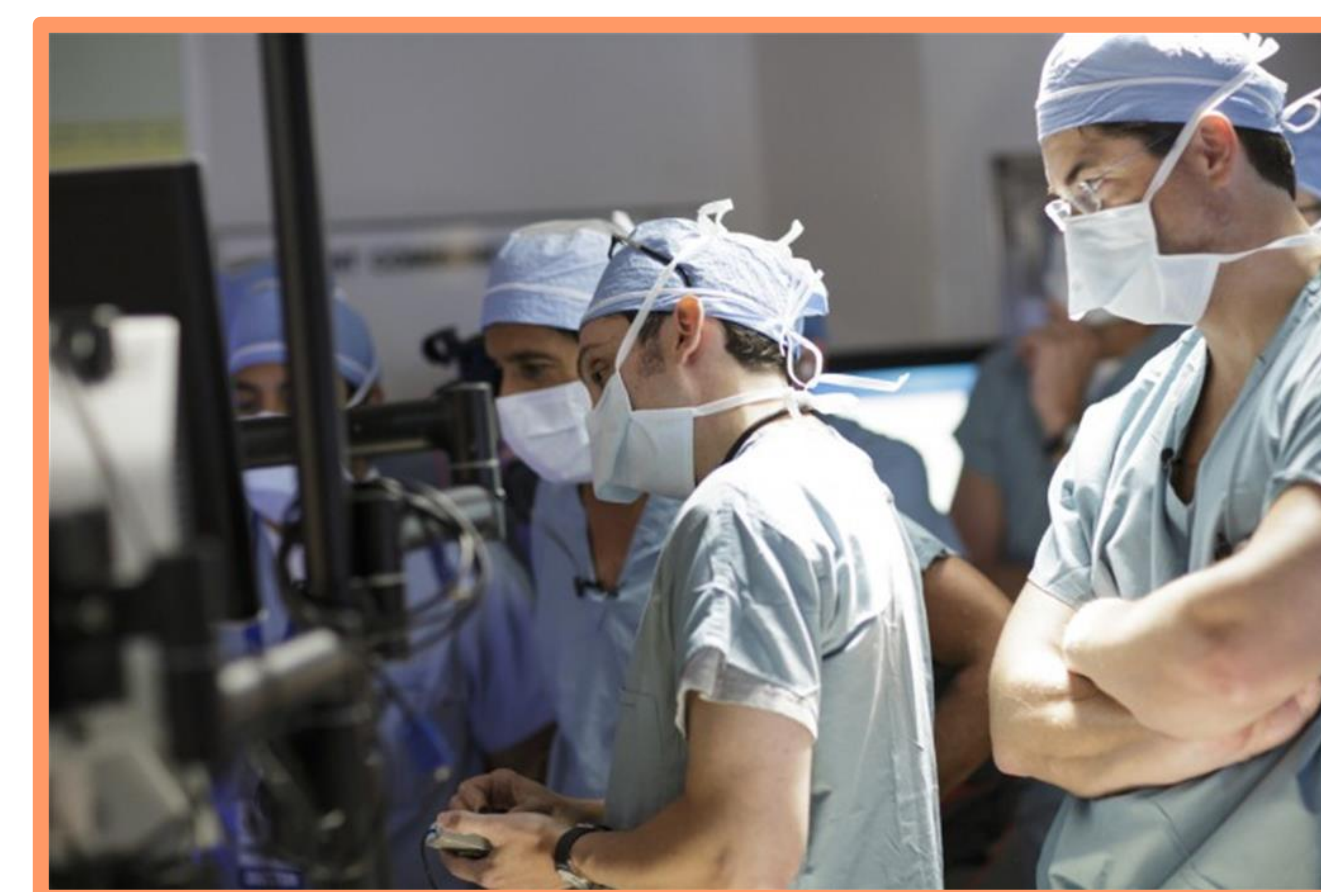
MATERIALS & METHODS

- Retrospective chart review of patients' routine pre-surgical neuropsychological workup as part of the Fast Track program at the Fixel Center for Neurological Diseases
- Sample included
- Deep Brain Stimulation Cognitive Rating Scale (DBS-CRS) scores were assigned by the attending neuropsychologist (Dawn Bowers, Ph.D. ABPP-CN) in conjunction with Neuropsychology post-doctoral fellows
- Cognitive domain composites were created from the following tests and calculated as the average Z score across tests within each domain, normed for age and education where possible:

Delayed Memory	WMS-III Logical Memory Delayed Recall
	HVLT Delayed Recall
Executive Function	Boston Naming Test
	Semantic Fluency (Animals)
Language	Judgment of Line Orientation
	Facial Recognition Test
Visuospatial	WAIS-III Digit Span Forwards,
	Digit Span Backwards
Working Memory	Stroop Color-Word Interference
	Trail Making Test B
	Letter Fluency (FAS)

- Review of meeting notes from DBS consensus conference meetings (for team recommendations) as well as medical charts ≥ 1.5 years from consensus conference dates (to determine whether the patient proceeded to surgery)
- Screened for inclusion (*diagnosis of ET or PD, candidate for first-time DBS*) and exclusion (*additional movement disorders diagnoses, combined ET-PD diagnosis, history of neurosurgery*) criteria

RESULTS

Figure 1. Frequency of UF-DBS CRS scores by group*

DBS+
M: 2.5
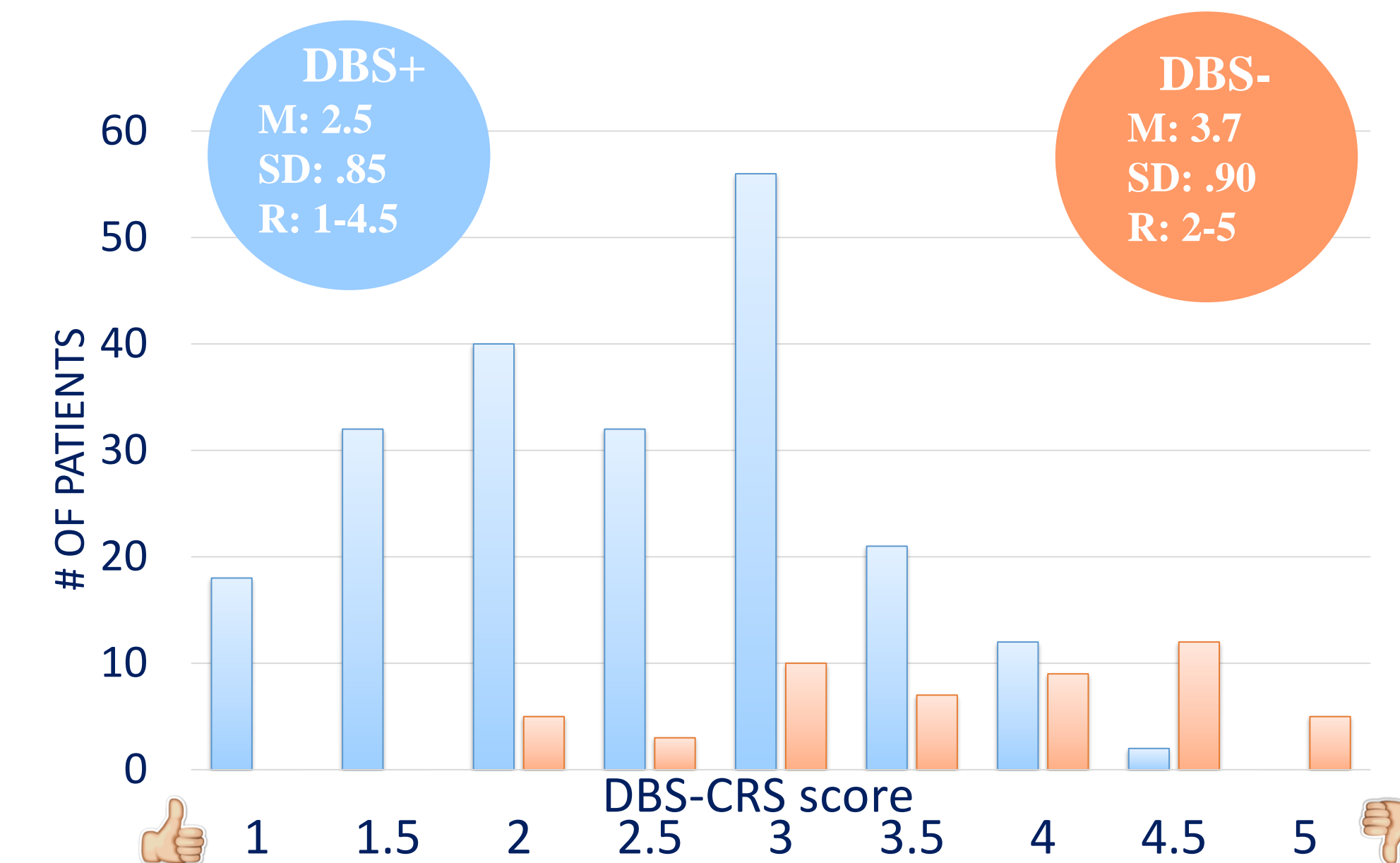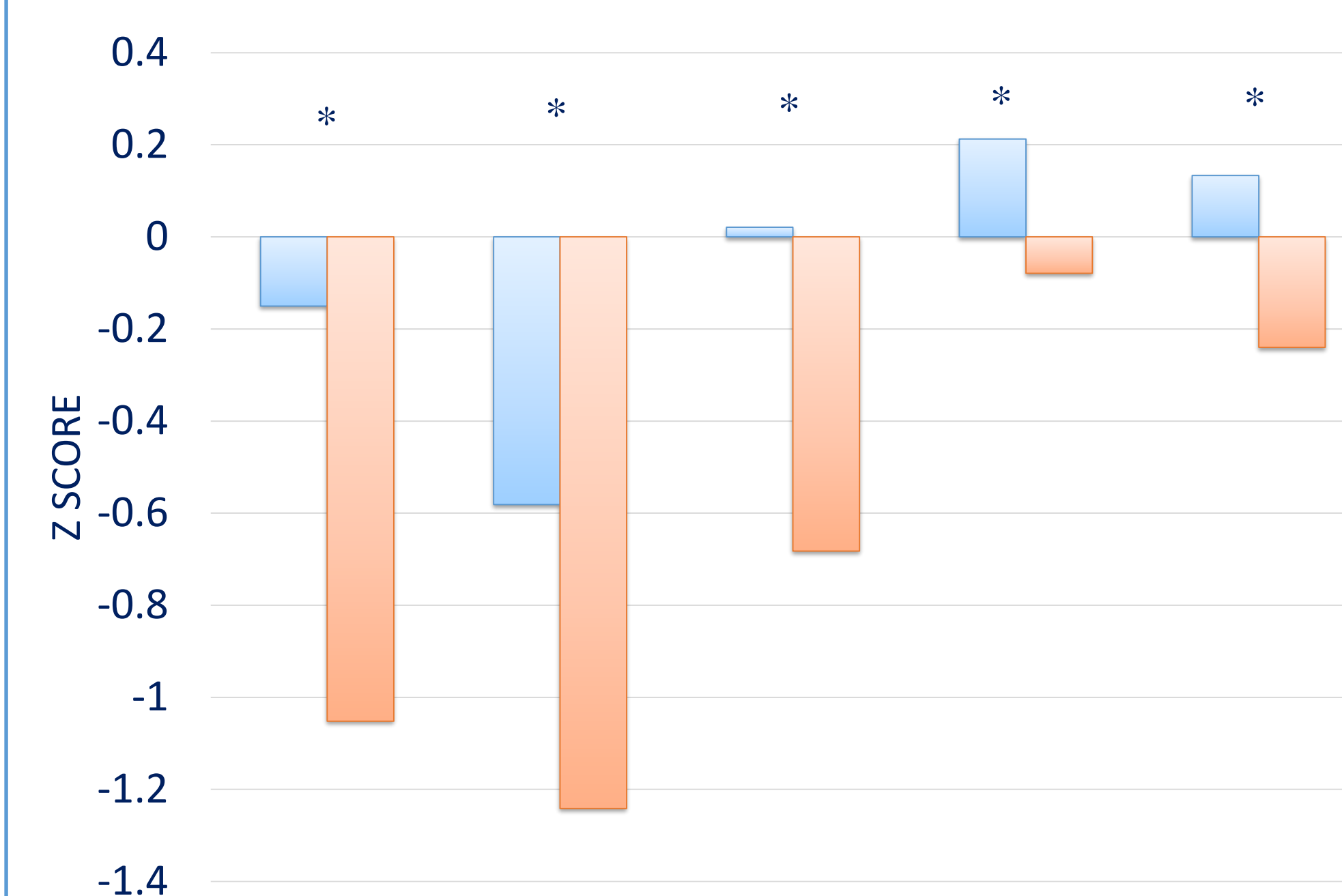SD: .85
R: 1-4.5

DBS-
M: 3.7
SD: .90
R: 2-5

Figure 2. Comparison of composite Z-scores by group*

CONCLUSIONS

- Patients who did and did not go through with surgery were similar in all demographic and most clinical and disease variables including disease duration and severity and several measures of mood and motivation.
- **Those who did *not* proceed to surgery performed worse across all cognitive domain composites than those who did proceed to surgery.**
- Parkinson's patients who did not proceed to surgery had worse clinician-rated motor symptom severity in the medication-ON condition only than those who did.
- **These results support our previous findings that neuropsychology plays a large role in the DBS decision-making process at UF Health**

RESULTS

Table: Demographic & clinical variables by group

	DBS+ (n = 212)			DBS- (n = 52)			p
	M	SD	Range	M	SD	Range	
Age	66.2	8.9	38-83	68.0	9.4	41-83	.115
Education	14.9	2.6	6-21	14.8	2.9	7-21	.990
Disease duration (years)	12.2	10.7	0-58	11.6	11.6	0.5-71	.642
% Male		68.9%			75.0%		.387
% PD patients (vs ET)		70.4%			69.8%		.992
% taking antidepressant medication		33.2%			31.3%		.800
% taking antianxiety medication		38.7%			37.5%		.879
State Anxiety Percentile (STAI)	63.7	30.1	6-100	69.0	31.7	6-100	.162
Trait Anxiety Percentile (STAI)	57.7	31.5	3-100	68.6	29.9	11-100	.031*
Apathy symptoms (AS)	11.2	6.1	0-31	10.8	5.4	0-23	.846
Depressive symptoms (BDI-II)	9.3	6.7	0-33	10.2	8.1	0-31	.742
Dementia Screening (DRS-2) Total	136.2	4.9	119-144	130.1	7.9	100-144	< .001*
Unified Parkinson's Disease Rating Scale (UPDRS) Motor Score OFF Medication	38.1	9.7		41.5	12.6		.092
Unified Parkinson's Disease Rating Scale (UPDRS) Motor Score ON Medication	24.1	9.5		28.5	12.9		.046*
Tremor Rating Scale (TRS) Motor Score	34.9	12.2		29.3	7.7		.163
Tremor Rating Scale (TRS) Total Score	48.3	15.4		40.7	9.9		.094
DBS-CRS Score	2.5	.85	1-4.5	3.7	.90	2-5	< .001*

* = difference between groups is significant <.05.

FUTURE DIRECTIONS

- Can the UF DBS-CRS has predict post-operative outcomes including cognitive and quality of life variables?
- Can inter-rater reliability in assigning UF-DBS CRS scores (which relies heavily on clinical judgment) be achieved, and at what levels of training?

ACKNOWLEDGEMENTS

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