

Background

Studies of diseases of the basal ganglia (BG) report a critical relationship between BG function and expressive language performance [1]. The BG are connected to the cerebral cortex via a family of cortical-BG-thalamic-cortical circuits that are distinguished by their unique function [2]. Extensive connections exist between most areas of the cerebral cortex, particularly the frontal lobes that are critical to expressive language production [3]. Despite the current extensive knowledge of BG-cortical connections, less is known about how discourse production is influenced by diseases of the BG.

Discourse is the production of complex and structured verbal output that follows an expected form [4]. Diseases of the BG such as Parkinson's disease (PD) may result in disruptions of the temporal organization of discourse production. Global coherence or the relationship of the meaning or content of an utterance to the general topic is one such aspect of discourse that relies on temporal organization [5]. Therefore, it could be hypothesized that disruption of BG-cortical connections caused by diseases of the BG such as PD may result in disordered global coherence. Disorders of global coherence have been observed in individuals with significant frontal lobe damage [6, 7]. Less is known about the influence of disease of the BG on global coherence despite their strong connections with the frontal cortex.

Purpose: To examine the effects of Parkinson's disease on global coherence.

Hypothesis: Individuals with PD will exhibit differences in global coherence when compared to matched controls.

Methods

Participants: 12 subjects with idiopathic PD (Hoehn & Yahr Stage 2-3) and 12 age, education, ethnicity and gender matched neurologically intact controls.

Procedure:

Standardized Assessments: Mini-Mental Status Exam, Boston Naming Test, Wechsler Memory Scale-Logical Memory I.

Narrative Discourse Collection: Each subject was instructed to discuss three topics: a typical day, a memorable vacation, and their family, for a minimum of 3-minutes. Standardized verbal cues were provided to continue narratives when the 3-minute minimum was not achieved. All narratives were audio-taped.

Measures of Global Coherence: Global coherence was defined as the relationship of the meaning of the content of each communication unit to the established topic of the narrative [8]. Each narrative sample was divided into communication units to allow assignment of a rating of global coherence. All communication units were expected to relate to the specified narrative topic in order to maintain global coherence. Global coherence was rated on a 5-point scale with the higher numbers indicating a higher degree of coherence.

Statistical Analyses: Non-parametric tests were completed for group comparisons of the (1) cognitive and language measures and (2) global coherence ratings.

Results

No significant differences were observed on baseline cognitive and language measures (MMSE, WMS-LMI, BNT) (Table 1). No significant differences were observed in global coherence across the three narratives (typical day, $p=.15$; vacation, $p=.69$; family, $p=.17$) (Figure 1). Intra-group comparisons of individuals with PD by Hoehn & Yahr stage also did not yield any significant differences (Figure 2).

Table 1. Demographic, Cognitive, and Language Comparisons for PD and Controls.

Variable	PD subjects		Controls		T	p
	M	SD	M	SD		
Age	71.8	13.2	72.6	13.5	-0.14	>.05
Education	12.0	1.3	12.8	2.8	-0.94	>.05
Parkinson Years	3.6	4.6				
H & Y stage	2.4	.5				
BNT	52.8	6.7	51.8	8.4	.31	>.05
MMSE	28.6	1.4	28.8	1.7	-.26	>.05
WMS-LMI	27.5	11.5	30.6	14.4	-.58	>.05

Figure 1. Global Coherence Ratings for PD and Control Participants

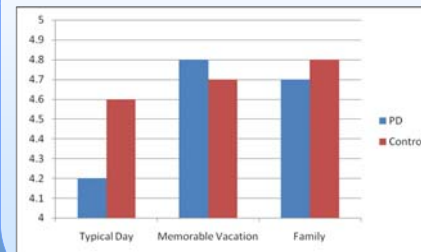
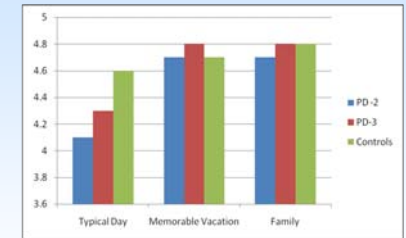


Figure 2. Global Coherence Ratings for PD H&Y-2, PD H&Y-3, and Control Participants



Conclusions

In this pilot study of individuals in relatively early disease states, we observed no statistically significant differences in global coherence. It is possible that because the individuals in this study were functioning at a relatively early disease state, global coherence was relatively spared. Additional studies with individuals functioning at later disease states are required to adequately characterize the influence of PD on global coherence and other aspects of expressive language performance.

References

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