

# The Effects of Group Singing on the Vocal Parameters of Adults with Mild-Moderate Stage Parkinson's Disease

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## Introduction

- Parkinson's Disease (PD) is a progressive neurological disorder characterized by motor, cognitive and speech difficulties.
- Most individuals with PD will experience a voice or speech disorder at some point in the disease progression, with individuals commonly experiencing reduced vocal loudness.
- Treatment often involves a combination of pharmacological intervention, physical therapy and speech therapy.
- The Lee Silverman Voice Treatment (LSVT) is the most common, evidenced based voice therapy for this population. It emphasizes high phonatory-respiratory effort to improve vocal intensity<sup>1</sup>.



## Methods

### Participants

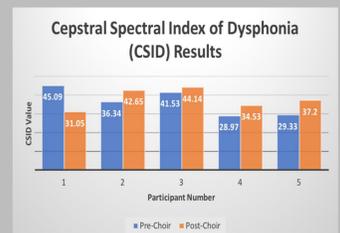
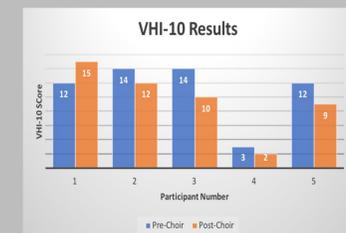
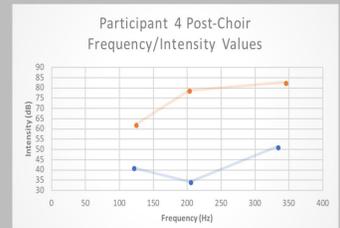
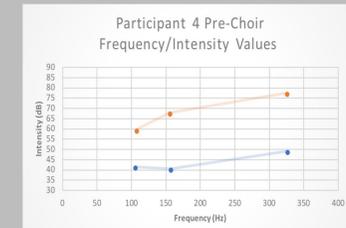
	1	2	3	4	5	Mean (SD)
Age	72	67	71	66	71	69.4 (2.7)
Race	Caucasian	Caucasian	Caucasian	Caucasian	Caucasian	
Gender	Female	Female	Male	Male	Male	
Years since diagnosis	3	1	20	16	1	8.2 (9.1)
Reported Symptoms	Moderate	Mild	Mild	Mild	Mild	
Hoehn and Yahr Stage	3	2	3	2	3	
PD Medications	Carbidopa-Levodopa	Carbidopa-Levodopa	Carbidopa-Levodopa	Carbidopa-Levodopa	Carbidopa-Levodopa	
Formal Musical Experience	Yes	Yes	No	Yes	No	
Hearing Loss # of rehearsals	Yes 9	Yes 9	Yes 9	No 8	Yes 5	8 (1.7)

### Intervention

- Participants were asked to attend nine, 1-hour rehearsals between pre- and post- testing. 3 of 5 participants met this criterion.
- Rehearsals were led by a graduate student choir director from the Department of Music along with 2 graduate students from the CSCD department providing consultative services.
- In addition to singing musical pieces, the choir director engaged the participants in various vocal warm ups including, but not limited to: clavicular stretches, pitch glides, sustained phonation, singing scales on different vowels, singing learned phrases with various dynamics and sustaining a note while increasing/decreasing intensity (Messa di voce).
- All assessments and rehearsals took place at the Roselle Center for the Arts.

## Assessments

- Participants were recorded producing 3 pitches on an /a/ - lowest pitch, habitual pitch and highest pitch - at their minimum and maximum intensities, as well as reading "The Rainbow Passage". The recordings were analyzed using PRAAT and Analysis of Dysphonia in Speech and Voice.
- Voice Handicap Index-10 (VHI-10) a 10-question survey used to assess voice related quality of life.
- Parkinson's Disease Questionnaire - 39 (PDQ-39) is a self-report questionnaire which assesses PD health related quality of life over the last month.
- Big Five Index - assesses personality across 5 dimensions: openness, conscientiousness, extraversion, agreeableness and neuroticism.



## Study Rationale

- The majority of LSVT research is conducted by its authors or associated groups. Outside research has demonstrated its efficacy but not the long-term maintenance of improvements<sup>2</sup>.
- A few research studies have begun to investigate the effectiveness of using group singing therapeutically for the PD population.
- The principal investigators founded the "Neuro Notes Parkinson's Choir" as a collaboration between the departments of Music and Communication Sciences and Disorders (CSCD). All participants were recruited from the choir.
- The primary aim of this pilot study is to investigate the effects of group singing on vocal frequency and intensity. Additional investigations involve changes in acoustic measures of dysphonia, self-reported voice handicap, PD symptom severity and the influence of personality traits on improvement.
- A parallel study investigates the impact of group singing on psychosocial health<sup>3</sup>.

## Results

### Vocal Parameters

- Analyzable data for participant 4 revealed increased maximum frequency as well as frequency/intensity ranges. 2 additional participants increased their overall vocal range at post-choir testing.

### VHI-10

- VHI-10 scores for 4 participants lower at post-choir testing, 2 of which reduced to within normal limits<sup>4</sup>.

### Acoustic Measurements of Dysphonia

- CSID values for 4 participants decreased, indicating an increased degree of dysphonia.

### PDQ-39 and Personality Surveys

- Minimal detectable changes observed for specific subtests for 3 participants. There were no significant improvements for the group as a whole.

### Influence of Personality

- There were no statistically significant correlations between personality type and changes for other measurements.

## Conclusions

- Group singing may provide benefits for the perception of a voice impairment and the vocal parameters of adults with PD.
- This study provides some evidence indicating group singing can affect the vocal parameters of frequency and intensity for people with PD.
- Contrary to previous studies, there was an inverse relationship between VHI-10 and CSID values<sup>5</sup>.
- The majority of participants self-reported improved feelings regarding their vocal handicap.
- Randomized controlled trials with larger sample sizes are necessary to compare group singing to current evidence-based therapeutic interventions.

## References

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