The Effect of Intentional Speech on Prosody in Parkinson Disease

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Purpose
Prosody contributes to overall intelligibility and speech naturalness. Impaired prosody in adults with Parkinson’s disease (PD) is marked by limited intonation, decreased variation in intensity, and abnormal timing (Skorda et al., 2010).

We examined the effects of SPEAK OUT® with The LOUD Crowd® on prosody in reading and monologue.

Participants
40 adults with idiopathic PD
• Age: median 69 yrs, range 47–83
• 25 men, 15 women
• No history of DBS
• No history of recent speech therapy

20 healthy adults (controls)
• Age: median 73 yrs, range 60–79
• 12 men, 8 women

Study Design
SPEAK OUT® (individual sessions) with The LOUD Crowd® (group maintenance sessions) focuses upon intentional speech, defined as a purposeful and deliberate cognitive focus upon increasing attentiveness to speech production.

The treatment consisted of 12 40-minute individual sessions 3 times per week for 4 weeks, plus at least one group maintenance session.

Participants with PD were assessed three times at baseline and at two follow-up assessments: within one week and six weeks after completing the individual sessions. Controls were assessed on the same time-line.

Acoustic Measures of Prosody
Measures were calculated in Praat from 45 seconds of monologue and a 160-word edited version of The Caterpillar passage (Patel et al., 2013). Values were calculated per speech run—an utterance bounded by pauses ≥ 200 ms (Lam & Tjaden, 2016) and averaged together.

• Variation of Frequency ($f_{o}$AD in Hz)
• Variation of Intensity (SPLAD)
• Rate of Articulation (syll/sec)
• Variation of Rate of Articulation

Mean difference between rate of articulation of a speech run and the rate of the preceding speech run (Baese-Berk & Morrill, 2015)

Results
Speaking with intent increased the variation of frequency and intensity in the PD group in monologue compared to baseline.

($f = 13.33, p < .0001, \Delta f = 3.62, p < .0004$)

Speaking with intent slowed the rate of articulation in the PD group in monologue and in reading compared to baseline.

($t = 11.45, p < .0001 \text{ (reading); } t = 10.10, p < .0001 \text{ (monologue)}$)

Speaking with intent improves prosody
• Gains in $f_{o}$AD (equivalent to an increase in semitones of ~ 4.5 in men and 8 in women) is greater than reported post-LSVT (Rami et al. 1995). No comparison data available for SPLAD.
• Gains in SPLAD similar to Boutsen et al. (2018) and equivalent to gains achieved with use of clear speech (Lam & Tjaden, 2016).
• Decrease in articulation rate in reading consistent with effect of clear speech in PD (Lam & Tjaden, 2016). No comparison data available for monologue.
• Increase in variation in rate of articulation a novel finding.

References:


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This study has been approved by the Institutional Review Board of Lehman College | CUNY and The Western Inf.

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