LSVT Global Public Webinar

Title: LSVT LOUD® and LSVT BIG® Year in Review: Research and Clinical Updates in 2020

Panelists: Heather Hodges, MA, CCC-SLP
Laura Gusè, MPT

Date Presented: December 16, 2020

Contact Us:
Web: www.lsvtglobal.com Email: info@lsvtglobal.com
Phone: 1-888-438-5788 (toll free), 1-520-867-8838 (direct)

LSVT LOUD® and LSVT BIG® Year in Review: Research and Clinical Updates in 2020

Laura Gusé, MPT
Chief Clinical Officer, LSVT BIG
LSVT Global, Inc.

Heather Hodges, MA, CCC-SLP
Faculty, Consultant, CE Administrator
LSVT Global, Inc.

LSVT GLOBAL Innovation in Science. Integrity in Practice.

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Instructor Biographies

Laura Gusé, MPT

Ms. Gusé has extensive experience treating people with neurodegenerative disorders in various practice settings. She was LSVT BIG certified in 2009 and now serves as Chief Clinical Officer of LSVT BIG. Ms. Guse' oversees the training, curriculum and product development related to LSVT BIG, and has helped to create many of the current LSVT BIG treatment tools, webinars, and courses. She has spoken at many national and international conferences on topics related to LSVT BIG.

Heather Hodges, MA, CCC-SLP

Ms. Hodges received her master's degree in Speech, Language, and Hearing Sciences from the University of Colorado. She has been part of Dr. Ramig's research team since 2004. She is a consultant, expert clinician, and training and certification faculty with LSVT Global. In addition to studying neurogenic voice and speech disorders and being LSVT LOUD certified since 2006, Ms. Hodges also worked for 13 years at an outpatient hospital specializing in diagnosing and treating dysphagia, dysphonia, and upper airway disorders.

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Supported by

- National Institutes of Health - National Institute Deafness and Communication Disorders (NIH-NIDCD)
- Office of Education-National Institute for Disability and Rehabilitation Research (OE-NIDRR)
- Coleman Institute
- Hearst Foundation
- Axe-Houghton Foundation
- Family of Lee Silverman
- Davis Phinney Foundation
- Parkinson Alliance
- Supported by NIH grants: R01DC01150, R21 RFA-NS-02-006 R21DC006078, R21NS04371 R43DC010956, R43DC010498, R43DC00741

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Disclosures

- All LSVT® faculty have both financial and non-financial relationships with LSVT Global.
- Non-financial relationships include a preference for LSVT LOUD® as a treatment technique.
- Financial Relationships include:
  Ms. Gusé is an employee of LSVT Global and Ms. Hodges is a consultant of LSVT Global. Both receive lecture honorarium and travel reimbursement.

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Plan for Webinar

- Logistics
- Presentation of Content
- Address your questions
- Survey

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Information to Self-Report CE Activity

- This LSVT Global webinar is NOT ASHA or state registered for CEUs for speech, physical and occupational therapy professionals, but it may be used for self-reported CEU credit as a non-registered/non-preapproved CEU activity.
- If you are a speech, physical or occupational therapy professional and would like to self-report your activity, e-mail webinars@lsvtglobal.com to request a certificate after completion of the webinar which will include your name, date and duration of the webinar.
- Licensing requirements for CEUs differ by state. Check with your state PT, OT or Speech licensing board to determine if your state accepts non-ASHA registered or non pre-approved CEU activities.
- Attendance for the full hour is required to earn a certificate.

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Learning Objectives

At the end of this webinar, participants will be able to:

- Briefly review foundational LSVT LOUD and LSVT BIG research
- Provide a rationale for how LSVT research supports and benefits clinicians and patients
- Describe new LSVT BIG and LSVT LOUD research in 2020
- Summarize future research and clinical innovations

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Polling Question
Who are you?

- Speech Therapist
- Physical or Occupational Therapist
- Person with Parkinson's disease (PD)
- Family/friend of person with PD
- Other

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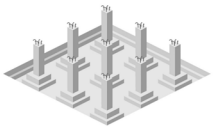
Our Mission

To empower people with Parkinson's to restore and maintain their highest levels of functional communication, mobility and independence with ADL's through scientifically supported rehabilitative treatment programs:

- **LSVT LOUD®** Speech and voice therapy
- **LSVT BIG®** Physical and occupational therapy

LSVT GLOBAL

Research is essential to provide the strong foundation we need as therapists!



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We are in this together!
The research is there to help YOU.

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How does LSVT research benefit people with Parkinson's disease?

1. Offers clear expectation of treatment requirements (i.e., protocol) and potential therapeutic outcomes
2. Gives confidence that repetition of training and calibration are required to drive brain changes
3. Allows people with PD or family to advocate for practices that prioritize and offer evidence-based therapy treatments
4. Protects physical, financial and emotional resources by participating in treatments with efficacy versus potentially ineffective treatments

"Knowledge is Power!"

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6 key reasons LSVT research supports therapists!

1. Provides therapists with assurance they are providing patients with a treatment that works, based upon **strong research evidence to support its efficacy**
2. **Gives therapists confidence** in providing an intensive treatment which has sufficient repetition of practice and which includes sensory calibration, resulting in lasting changes as demonstrated clinically and in published research
3. Shows through **multiple Randomized Controlled Trials** (RCT) *(3 for LSVT LOUD; 2 for LSVT BIG)* the cause and effect relationship between the treatment delivered and the outcomes measured. The RCTs controlled for factors that influence treatment outcomes, such as attention, dosage, bias, etc.

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6 key reasons LSVT research supports therapists!

4. Dispels concern of research bias when similar improvements post LSVT LOUD and LSVT BIG have been published from multiple laboratories and countries providing **external validity of research results**.

5. Supports core components of LSVT LOUD and LSVT BIG as solid neural-based treatments by having **application in other neurological populations**, such as stroke, MS, cerebral palsy.

6. Offers confidence that **technology** does not diminish the effectiveness of LSVT LOUD

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30+ year LSVT journey from invention to scale-up

Phase I, II Invention

1987-89: Initial invention; Pilot data Lee Silverman Center
1989-91: Treatment development OE-NIDRR

Phase III Research

1991-94: Treatment follow-up OE-NIDRR
1990-95: Treatment Efficacy NIH R01 RCT
1995-00: Underlying Mechanism NIH R01 RCT
2002-07: Distributed effects NIH R01 ← LSVT BIG development began
2007-12: Target/mode NIH R01 RCT ← LSVT BIG RCT published

Phase IV, V Clinical Implementation

2001-02: LSVT Companion Coleman Institute
2002-04: LSVT Companion NIH & MJ FOX Foundation NIH R21
2002-04: LSVT Virtual Therapist Coleman Institute
2004-06: LSVT Virtual Therapist NIH R21
2004: LSVT Down Syndrome Coleman Institute
2006: Technology Enhanced Clinician Training NIH SBIR
2009: Telehealth Delivery of Software Enhanced LSVT NIH SBIR
2010: Independent Delivery of Software Enhanced LSVT NIH SBIR
2010-pres: Application Beyond PD
1993-present: Global LSVT LOUD Training & Certification Courses

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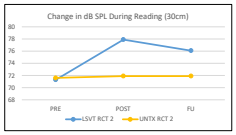
Evidence for LSVT LOUD

3 Randomized Controlled Trials

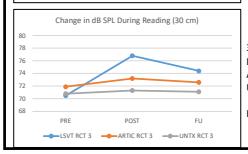
1st RCT; n=45
LSVT: Voice/respiratory target
RESP: Respiratory target
Pre, Post, 6 mos, 12 mos, 24 mos

Ramig et al., 1995; 1996, 2001a



2nd RCT; n=30
LSVT: Voice/respiratory target
UnTx: No treatment
Pre, Post, 6 mos

Ramig et al., 2001b



3rd RCT; n=64
LSVT: Voice/respiratory target
ARTIC: Articulatory target
UnTx: No Treatment

Ramig et al., 2018

Study Designs
- Matched dosage
- Matched intensity
- Matched homework
- Matched therapists' enthusiasm
- Repeated measures for reliability
- Uncued tasks
- Data collected by someone other than therapist

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What does this research tell us? What we do in therapy matters!

- Not just activity or speech instruction *in general*; **Specific activity matters**
- Thus far our research would suggest voice (respiratory/laryngeal) is special versus respiratory or articulatory targets
- Voice focus and sensory calibration addresses sensorimotor integration deficits affecting self-perception of normal vocal loudness in people with PD
- LSVT LOUD may provide a cortically driven enhancement of speech network (sensorimotor and auditory)

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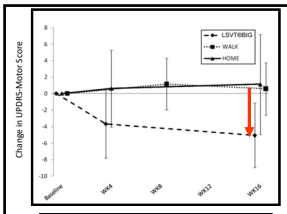
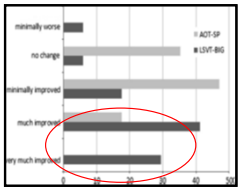
Evidence for LSVT BIG

2 Randomized Controlled Trials



1st RCT; n=60
LSVT BIG: 20
Nordic Walk: 20
Home Exercise: 20
Pre, Post, 16 weeks

Ebersbach et al., 2010



2nd RCT; n=34
AOT-SP: 17
LSVT BIG: 17
Pre, Post, 16 weeks

Ebersbach et al., 2014

Study Designs
- Blinded data analysis
- Uncued gait tests
- Data collected by someone other than therapist

70.6 % of patients reporting to be "much improved" or "very much improved" in LSVT BIG

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What does this research tell us? What we do in therapy matters!

- For mobility and function in daily life with PD:
  - Training amplitude improves speed and efficiency of gait and transfers
  - Intensive training and adequate repetition of practice is needed for re-calibration of the sensory motor system and for the patient to perceive changes in function
  - Low intensity or unsupervised exercise programs may not be as beneficial in improving mobility or motor function in people with PD

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Quantitative clinical assessment of motor function during and following LSVT-BIG® therapy.

Flood et al., 2020

Objective: To evaluate gait, balance, and fine motor control using wearable sensors with testing before, during and after LSVT BIG in 12 people with Parkinson's.

Methods: Functional mobility was examined using features derived from accelerometry recorded during five instrumented clinical tests:

10m walk, Timed-Up-and-Go, Sit-to-Stand, quiet stance and finger tapping

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"The possibilities of monitoring people with PD with wearable sensors presents new possibilities for investigating levels of engagement in activities of daily living, prior to, throughout, and after LSVT BIG."

Open Access Link:
https://jneuroengrehab.biomedcentral.com/articles/10.1186/s12984-020-00729-8

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Results

- Accelerometry data captured significant improvements in 10m walk and Timed-Up-and-Go times with LSVT-BIG® ($p < 0.001$), as well as increased stride length.
- Gait speed and stride length increased, though no change was observed with measures of asymmetry or stride variance.
- The total number of Sit-to-Stand transitions significantly increased with LSVT-BIG® ($p < 0.001$), corresponding to a significant increase in speed.
- PD subjects undergoing LSVT BIG® showed significant improvements in 10m walk ($p < 0.001$) and Timed-Up-and-Go times ($p = 0.004$) over a four-week period when compared to non-exercising PD controls, who showed no week-to-week improvement in any task examined.
- Gains were maintained at follow up.
- No change in measures related to postural or fine motor control was observed with LSVT-BIG®.

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Clinical Relevance

- Validates previous findings relate to improvement in speed of walking and sit to stand as a result of this amplitude-based therapy.
- Demonstrates the potential for wearable sensors to objectively quantify changes in motor function in response to therapeutic exercise interventions in PD.
- Features of gait and balance not captured by conventional clinical scores can be illustrated on a continuous numerical range (as opposed to ordinal number scale), allowing those with PD to track subtle improvements in their progression.

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2 LSVT-BIG therapy in Parkinson's disease: physiological evidence for proprioceptive recalibration.

Objective: To assess proprioceptive impairment in persons with PD (PwPD) as compared to matched controls and to probe potential recalibration effects of LSVT BIG on proprioception.

Methods: 11 PwPD underwent LSVT BIG. They were assessed after 4 weeks of LSVT BIG and at 8 weeks. Measured accuracy of pointing and of their position sense. Secondary outcome measures: motor part of the MDS-UPDRS, the nine-hole-peg test, spiral drawing on a computer (writing speed and amplitude) and the PDQ-39 questionnaire on quality of life.

Open Access Link:
https://bmcneurol.biomedcentral.com/articles/10.1186/s12883-020-01858-2

Peterka et al., 2020

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Results

- After a 4 weeks protocol of LSVT-BIG therapy and even more so after an additional 4 weeks of continued training, performance in these pointing tasks improved significantly.
- Two measures of proprioceptive performance showed clear impairment in PwPD as compared to matched healthy controls.
- PwPD who had engaged in LSVT BIG were able to move their arm more precisely.
- Performance under dual task conditions was virtually identical to performance without dual task.
- Significant improvement of quality of life as indicated by the PDQ-39 questionnaire.
- Changes of the MDS-UPDRS III and 9-Hole Peg Test did not reach significance.

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Clinical Relevance

- The findings concur with the theory of altered sensorimotor integration in PwPD.
- Lends support to the hypothesis that LSVT BIG retunes proprioception through calibration training, especially when significant improvements were seen in accuracy of movement regardless of dual task condition.
- This is the first study to indicate a probable physiological mechanism of a symptom-specific, amplitude-based behavioral intervention in PwPD.
- Continuous practice, even after LSVT BIG is important for consolidation and lasting improvements.

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3 Outcomes Following LSVT BIG in a Person with Idiopathic Normal Pressure Hydrocephalus: A Case Report

Objective: Document functional outcomes of LSVT BIG in 62 year-old man with idiopathic Normal Pressure Hydrocephalus (iNPH) diagnosed 16 years earlier

Methods: Received LSVT BIG + 5 tune up visits 7 months later. Outcome measures: Berg Balance Scale (BBS), Timed Up and Go (TUG), TUG manual, TUG cognitive, Activity Specific Balance Confidence Scale (ABC scale) , Five Time Sit to Stand (5TSTS) and timed floor transfer

Results: BBS improved 20 points. ABC scored improved 45.9%, both > minimal detectable change. Scores declined at 4 month follow up, but BBS improved again with tune up sessions. Floor transfer speed improved 3.16 seconds. No changes in TUG, TUG cognitive or TUG manual or 5TSTS speed. No longer used assistive device for community ambulation, reported fewer falls, faster gait, and less fear of stairs.

Fillmore et al., 2020

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Clinical Relevance

- Therapists may wish to consider the use of the LSVT BIG program in persons with iNPH
- A longer program and/or regular tune-up sessions may be necessary for best outcomes.

Limitations and Future Directions

- There is very limited generalizability of the findings of this study due to a single-case study design.

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4 Feasibility of the Lee Silverman Voice Treatment –BIG in Stroke

Objective: Examined feasibility, acceptability and preliminary clinical effect" of LSVT BIG for individuals with chronic stroke

Methods: Waitlist cross over design. 5 enrolled/completed the LSVT BIG protocol. Primary outcomes: feasibility and acceptability. Secondary outcomes: preliminary clinical effect on occupational performance (COPM) and upper extremity motor function (Wolf Motor Function Test).

Proffitt et al., 2020

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Results

- 28% recruitment rate. 100% of in-clinic LSVT BIG sessions completed.
- 4/5 rated COPM higher post intervention and made clinically relevant improvements. Able to personalize and progress their treatment as they would with individuals with PD.
- Several participants self-reported practicing related activities during the home program component (e.g., attempting to open drawers in the bathroom in addition to the kitchen).
- For the three participants who experienced greater difficulty with mobility prior to participation in the LSVT BIG intervention, all self-reported improvements in mobility around the house.

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Clinical Relevance

- It is feasible to deliver the LSVT BIG in the chronic stroke population.
- Individuals post stroke who complete the LSVT BIG Program demonstrate clinically significant improvements in a variety of functional outcomes.

Limitations and Future Directions

- Larger sample sizes are necessary for generalizability of LSVT BIG in the stroke population.
- Further research is necessary to determine the feasibility of LSVT BIG in the stroke population.
- Future directions for research should incorporate telehealth as a means of implementing the intervention.

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5 Use of Occupation-Based Measures in LSVT BIG Research: A Case Study

Objective: Determine the effects of LSVT BIG on occupational performance in a 73-year-old subject with PD.

Methods: Used Canadian Occupational Performance Measure (COPM) and Performance Assessment of Self Care Skills (PASS) to measure changes. Researchers and the participant selected the five functional tasks of opening medications, placing groceries in cabinet, sweeping, folding laundry, and performing sit to stand and the three hierarchy tasks of grocery shopping, preparing a meal, and washing dishes.

Henderson et al., 2020

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Results

- A clinically meaningful change on the COPM is reflected by a change score of 2 points or greater in either satisfaction or performance ratings
- The client perceived a clinically meaningful change in perceived performance of opening medications, standing and walking, buying groceries, and preparing a meal goals.
- The client also demonstrated a clinically meaningful change in her satisfaction with her performance of standing and walking, buying groceries, and preparing meal goals.
- No change was noted from pre- to postintervention for the client's PASS safety subscores as she was at ceiling preintervention.
- Change scores from the PASS also suggest improvements in occupational performance with an increase in independence in 3/5 occupations (taking out the garbage, changing bed linens, and sweeping) and an increase in adequacy on 2/5 occupations (sweeping and dressing).

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Clinical Relevance

•LSVT BIG protocol aligns with the scope of occupational therapy practice by requiring individuals to identify specific and meaningful activities to engage in throughout the intervention and capitalizes on known principles of neuroplasticity.

•Previous to this study, measures of occupational performance have never been utilized in research of LSVT BIG.

- Future research is needed!
  - Randomized controlled trial with a 3- to 6-month follow-up to determine the efficacy of LSVT BIG on occupational performance with the PD population.
  - Determine causality of identified improvements in occupational performance and time course of improvements.

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NEW RCT Data-Intelligibility

The effects of intensive speech treatment on intelligibility in Parkinson's disease: a randomised controlled trial

Levy, E., Moya-Galé, G., Chang, Y., Freeman, K., Forrest, K., Brin, M. F., & Ramig, L.A. (2020). The effects of intensive speech treatment on intelligibility in Parkinson's disease: A randomised controlled trial. The Lancet's EClinicalMedicine, 24, 1-11. https://doi.org/10.1016/j.eclinm.2020.100429

Objective. To test the hypothesis that intensive speech treatment improves intelligibility in people with Parkinson's disease in a randomized controlled trial.

Methods. Subjects from the Ramig et al., 2018 RCT were used for this study including those treated with LSVT LOUD (N=19), LSVT ARTIC (N=19) and Untreated (N=19) people with Parkinson's disease.

Blinded listeners (n=117) orthographically transcribed one sentence selected from subjects' recorded self-generated narrative speech. Ten-talker babble noise was added to the samples to simulate "real-world" background noise conditions.
The primary outcome was pre- to-post change in transcription accuracy (TA).

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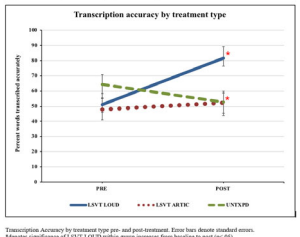
Results. Between-group differences of changes from baseline to post in Transcription Accuracy (TA) indicated significantly greater increases following LSVT LOUD than following LSVT ARTIC (d=0·26, 95% CI 0·01−0·51; p=0·04) and UNTXPD (d=0·43, 95% CI 0·22−0·63; p=0·0002).

Figure 2 **Transcription accuracy by treatment type**



Transcription Accuracy by treatment type pre- and post-treatment. Error bars denote standard errors.
*denotes significance of LSVT LOUD within group increases from baseline to post ($p<.05$)
γ denotes significance of UNTXPD within group decreases from baseline to post ($p<.05$)

Levy, E., Moya-Galé, G., Chang, Y., Freeman, K., Forrest, K., Brin, M. F., & Ramig, L.A. (2020). The effects of intensive speech treatment on intelligibility in Parkinson's disease: A randomised controlled trial. The Lancet's EClinicalMedicine, 24, 1-11. https://doi.org/10.1016/j.eclinm.2020.100429

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NEW Crowdsourcing Study

Using Crowdsourced Listeners' Ratings to Estimate the Functional Impact of Intensive Voice Treatment for Hypokinetic Dysarthria: A Feasibility Study

Nightingale, C., Swartz, M., Ramig, L. O., & McAllister, T. (2020). Using crowdsourced listeners' ratings to measure speech changes in hypokinetic dysarthria: A proof-of-concept study. American Journal of Speech-Language Pathology, 29(2), 873-882. https://doi.org/10.1044/2019_AJSLP-19-00162

Objective. To evaluate real-world listeners' ratings of speech pre/post LSVT LOUD intervention using online crowdsourcing technologies.

Methods. Stimuli were drawn from a previously published study (Sapir, Spielman, Ramig & Fox, 2007). Productions of words pre/post LSVT LOUD from people with Parkinson's disease were included.

Pre/post samples of the words "key" and "stew" were randomly paired. Thirty-six online naïve listeners rated which paired sample that they perceived as "more clearly articulated."

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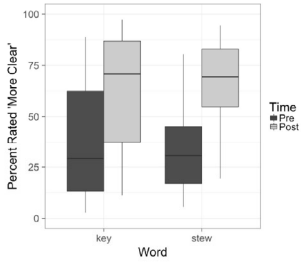
Results. Mixed-effects logistic regression indicated that words elicited post-treatment were significantly more likely to be rated "more clear."



Boxplots showing percentage of "more clearly articulated" ratings for tokens elicited at the PRE and POST time points, separated by word. Middle bars represent medians, boxes represent the interquartile range (25th to 75th percentile), and whiskers extend to the most extreme non-outlier data point.

Nightingale, C., Swartz, M., Ramig, L. O., & McAllister, T. (2020). Using crowdsourced listeners' ratings to measure speech changes in hypokinetic dysarthria: A proof-of-concept study. American Journal of Speech-Language Pathology, 29(2), 873-882. https://doi.org/10.1044/2019_AJSLP-19-00162

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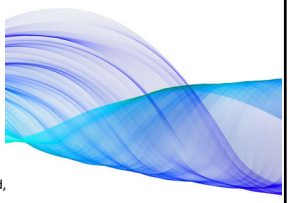
Ongoing Research

Building a Data Base for Automatic Speech Recognition in Parkinson's Disease



Lorraine Ramig, Ph.D., CCC-SLP, Bob MacDonald, Ph.D., Heather Hodges, M.A., CCC-SLP, Pan-Pan Jiang, Ph.D., Ona Reed, M.A., SLP-CF, Jennifer Spielman, M.M., M.A., CCC-SLP, and Julie Cattiau, M.S.

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Project Euphonia

Project Euphonia is an early-stage research project initiated by Google to increase accessibility to automatic speech recognition (ASR) by speakers with impaired speech associated with disorders such as Amyotrophic lateral sclerosis (ALS), Down Syndrome and Parkinson's disease (PD). The goal is to allow these speakers with disordered speech to interact with everyday technology (e.g., smart devices, computers, phones) to maintain their independence, safety and enhance communication and quality of life. Project Euphonia has a commitment to make technology work better for everyone.

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Step ONE

The first step in this process is to teach speech recognition algorithms to understand disordered speech. While there is a vast literature on automatic speech recognition algorithms (**Ghahremani et al, 2014; Ortmanns, Ney, & Aubert, 1997**), to teach these algorithms to understand disordered speech, they need sufficient speech samples from disordered speakers (**Young & Mihailidis, 2010; Codreanu, 2019**).

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Collaboration

Because of our over thirty years of research on speech and voice in PD (e.g., **Ramig et al., 1995; Ramig et al., 2001a, 2001b; Ramig et al., 2018, Levy et al., 2020**), including years of gathering acoustic data on patients with PD and training them to use technology, as well as having access to a large PD community, our research team at LSVT Global was invited to collaborate on Project Euphonia.

On Demand Webinar
Building a database for automatic speech recognition in Parkinson's disease

https://blog.lsvtglobal.com/building-a-database-for-automatic-speech-recognition-in-parkinsons-disease/

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Recruitment

Project Euphonia Interest Form
https://docs.google.com/forms/d/e/1FAIpQLSeWrslavjCepFh7gQcxSYFd2h59kSIMZmJDyK8Nk3fhcM51lg/viewform

Thank you!

- Eli Pollard, World Parkinson Coalition
- Carol Walton, Parkinson Alliance
- Joanna Teters and David Kemp, Cure PSP (PSP, MSA, CBD)
- PMD Alliance
- Davis Phinney Foundation
- Michael Okun, MD, U Florida Health

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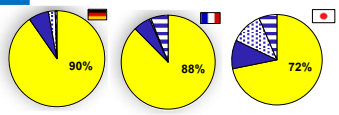
Update on LSVT LOUD research beyond American English

Global Implementation of Efficacious Voice Treatment for Parkinson disease: LSVT LOUD® in Germany, France, and Japan

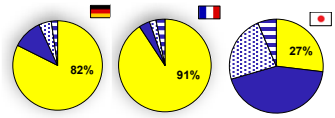
Lorraine Ramig, Ph.D., CCC-SLP, Thomas Brauer, Catherine Airiau, Masako Fujiu-Kurachi, Ph.D., and Cynthia Fox, Ph.D., CCC-SLP

Poster presented at ASHA 2019

Did you receive effective training in LSVT LOUD?



Are you confident in your delivery of LSVT LOUD?



Agree Neutral Disagree Not specified

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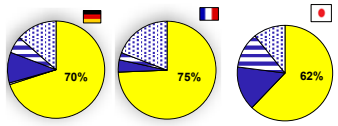
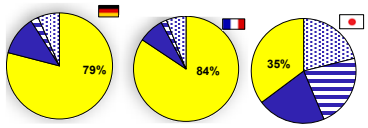
Do you have better treatment outcomes using LSVT LOUD than previous treatments you have used?



Better Worse No Change Don't Know Not Applicable

How many of your patients were satisfied with LSVT LOUD outcomes?



50-100% 25-50% 10-25% 0-10%

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Update on LSVT LOUD research beyond American English

De Paula Soares, M.F. (2019). A comparison of vowel production after two speech therapy approaches. In Sasha Calhoun, Paola Escudero, Marija Tabain & Paul Warren (eds.) Proceedings of the 19th International Congress of Phonetic Sciences, Melbourne, Australia 2019 (pp. 3021-3025). Canberra, Australia: Australasian Speech Science and Technology Association Inc.

Felipe Martínez, D. (2019). Efficacy of "Lee Silverman Voice Treatment" in people with hypokinetic dysarthria associated with Parkinson's disease: a review. Castilla-La Mancha university. Accessed on December 17, 2019 from: http://hdl.handle.net/10578/21578

Hsu, S.-C., McAuliffe, M.J., Lin, P., Wu, R.-M., & Levy, E.S. (2019). Acoustic and perceptual consequences of speech cues for Mandarin speakers with Parkinson's disease. *American Journal of Speech-Language Pathology, 28*(2), 521-535. https://doi.org/10.1044/2018_AJSLP-18-0020

Nakayama K, Yamamoto T, Oda C, Sato M, Murakami T, Horiguchi S. (2019). Effectiveness of Lee Silverman Voice Treatment® LOUD on Japanese-speaking patients with Parkinson's disease. *Rehabilitationn Research and Practice,* 1–7. doi.org/10.1155/2020/6585264

Saffarian A, Amiri Shavaki Y, Shahidi GA, Hadavi S, Jafari Z. (2019). Lee Silverman voice treatment (LSVT) mitigates voice difficulties in mild Parkinson's disease. *Medical Journal of the Islamic Republic of Iran, 33(5).* doi: 10.34171/mjiri.33.5. eCollection 2019

45

Update on LSVT LOUD research beyond PD

Alonso Moro, I. (2019). Lee Silverman Loud voice treatment in neurological pathologies: Review of its effectiveness in Parkinson's disease, cerebral palsy and acquired brain damage [Dissertation]. University of Valladolid. Accessed on December 16, 2019 from: http://uvadoc.uva.es/handle/10324/36934.

Galgano, J., Tsang, G., & Ramig, L. A. (in preparation) Brief Report: Making Intensive Voice Treatment (LSVT LOUD) accessible for an individual with Autism Spectrum Disorder (ASD) and mixed dysarthria using a novel, pre-treatment protocol. *Journal of Autism and Developmental Disorders.*

Langlois C, Tucker BV, Sawatzky AN, Reed A, & Boliek CA. (2020). Effects of an intensive voice treatment on articulatory function and speech intelligibility in children with motor speech disorders: A phase one study. *Journal of Communication Disorders, 86:* 106003. doi:10.1016/j.jcomdis.2020.106003

Lowit, A., Egan, A. & Hadjivassiliou, M. (2020) Feasibility and Acceptability of Lee Silverman Voice Treatment in Progressive Ataxias. *Cerebellum.* https://doi.org/10.1007/s12311-020-01153-3

Moya-Gale, G., Galgano, J., Chang, Y., Ramig, L. Intensive Voice Treatment and a Young Adult with Cerebral Palsy: Acoustic and Perceptual findings. Manuscript in preparation.

Moya-Galé, G., Galgano, J., Ferrone, C., Chang, Y. M., & Ramig, L. A. LSVT LOUD® Applied to an Adult with Cerebral Palsy: Acoustic Findings. Manuscript submitted for publication.

On-Demand Webinar:
Beyond Parkinson's: Use of Evidence-based LSVT LOUD for Other Movement Disorders, Aging and Children
https://blog.lsvtglobal.com/beyond-parkinsons-use-of-evidence-based-lsvt-loud-for-other-movement-disorders-aging-and-children/

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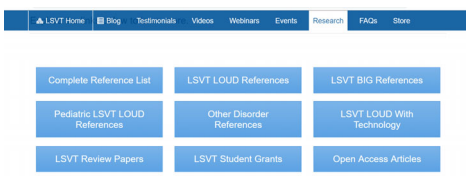
LSVT References

https://blog.lsvtglobal.com/research/



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Future LSVT LOUD Research

- Publication of RCT data comparing LSVT LOUD, LSVT ARTIC, Untreated and healthy control:
  - Speech intelligibility in noise (Schulz)
  - Facial expression (Borod)
  - Swallowing (Hodges & McFarland)
  - Language (Ramage)
  - PET imaging (Narayana)
- Continued technology-enhanced LSVT LOUD
- Impact of LOUD for LIFE maintenance groups on long-term outcomes

On-Demand Webinar:
Improved Verb Use Following Intensive Voice Treatment in Individuals with Parkinson's Disease

https://blog.lsvtglobal.com/improved-verb-use-following-intensive-voice-treatment-in-individuals-with-parkinsons-disease/

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Highlight Clinical Advances for Improving LSVT Accessibility

Rationale for LSVT Telepractice

- **Increase** — Increase accessibility to LSVT LOUD and LSVT BIG
- **Enhance** — Enhance feasibility of treatments' intense dosage (16 individual one-hour sessions in one month)
- **Increase** — Increase frequency of long-term follow-up
- **Diminish** — Diminish physical/mental burden of travel to clinics

- Extreme circumstances where in-person delivery of services is not possible
- Telepractice may be the only way for clinicians and clients to reach one another
- Allows us to not interrupt services for clients already enrolled
- Allows us to offer services to those in need
- Allows us to keep in touch with **maintenance groups** and potentially minimize feelings of social isolation, apathy and depression

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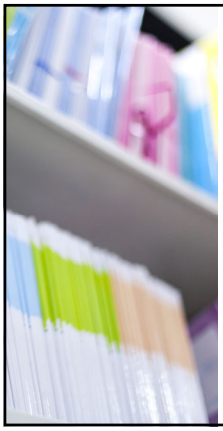

Research supporting LSVT LOUD in Telepractice

- Theodoros et al., 2006
- Tindall et al., 2008
- Howell et al., 2009
- Constantinescu et al., 2010
- Constantinescu et al., 2011
- Theodoros & Ramig, 2011
- Theodoros et al., 2016
- Theodoros et al., 2018

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Additional Telepractice On-Demand Webinars for LSVT Clinicians

- **Master Class LSVT LOUD Quantification with Telepractice**
- **Lessons learned from telepractice delivery of LSVT LOUD**
- **Lessons learned from telepractice delivery of LSVT BIG**
- **Telepractice in Private Practice and University Clinics for Adults with Neurological Disorders (2 hours)**
- **Telepractice Delivery of LSVT LOUD®: Logistics and Guidelines (2 Hours)**
- **Telepractice Delivery of LSVT BIG: Logistics and Guidelines**
- **Login to your Clinician Account → Webinars and Courses → On-demand Webinars**

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Additional Telepractice On-Demand Webinars for Anyone!

Telepractice Delivery of LSVT LOUD and LSVT BIG: What you need to know

Utilizing technology for safe and effective delivery of LSVT LOUD
https://blog.lsvtglobal.com/utilizing-technology-for-safe-and-effective-delivery-of-lsvt-loud-october-2020/

Telepractice in Private Practice and University Clinics for Adults with Neurological Disorders
https://blog.lsvtglobal.com/telepractice-in-private-practice-and-university-clinics-for-adults-with-neurological-disorders/

Blog.lsvtglobal.com → webinars

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After LSVT LOUD and LSVT BIG

What are LOUD for LIFE and BIG for LIFE?

- Community based **exercise group** for patients who have completed the LSVT LOUD protocol.

Purpose

- To help patients maintain the gains they made in therapy in a fun, motivating environment

Virtual LOUD for LIFE and Virtual BIG for LIFE

Same Class Structure as In Person Classes

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Rationale for Virtual LOUD for LIFE and BIG for LIFE

- **Increase** — Accessibility to LOUD for LIFE and BIG for LIFE Classes
- **Enhance** — Feasibility of more frequent attendance
- **Boost** — Saliency: Practice in home environment; Using internet for interaction with family
- **Diminish** — Physical/mental burden/fatigue of getting ready to go to, and travel to clinics

LOUD for LIFE and BIG for LIFE Training Courses for LSVT Certified Clinicians

LOUD for LIFE Online Training Course
For LSVT LOUD Certified Therapists
BIG for LIFE Online Training Course
For LSVT BIG Certified Therapists
Register through our your Clinician Account or through the LSVT store.

On Demand Webinars for the Public

BIG for LIFE® and LOUD for LIFE®: Group maintenance classes post LSVT treatments
https://blog.lsvtglobal.com/big-for-life-and-loud-for-life-group-maintenance-classes-post-lsvt-treatments/
Enhanced Solutions for Voice and Mobility Maintenance Classes: Virtual Discoveries in PD Care!
https://blog.lsvtglobal.com/enhanced-solutions-for-voice-and-mobility-maintenance-classes-virtual-discoveries-in-pd-care/
Additional On-Demand webinars available for providers. E-mail info@lsvtglobal.com for details.

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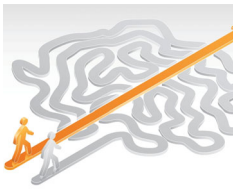
Summary



It is essential in our field that we develop research-based treatments that are based on solid evidence and theory.

HOWEVER, you can have the best model/theory in the world, but the crucial questions are:

- Can therapists learn how to correctly deliver the treatment?
- Can they implement it?
- Can patients participate in it?
- How can we pivot in treatment given the pandemic, but maintain treatment fidelity?

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How to Ask Questions

1. Type in the question box on your control panel
2. Raise your hand!
   - Click on the hand icon
   - Your name will be called out
   - Your mic will be unmuted,
   - Then you can ask your question out loud
3. Email info@lsvtglobal.com if you think of questions later!

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Opportunities to learn more about LSVT LOUD and LSVT BIG

- Monthly Live Webinars
- On Demand Webinars
- Website
- Blog
- Live Seminars
- LSVT Global Facebook Page
- Ask our experts!

FIND IT ALL AT
www.lsvtglobal.com

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LSVT GLOBAL

QUESTIONS??

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References

1. Flood, M.W., O'Callaghan, B.P.F., Diamond P., Liegey J., Hughes G., Lowery M.M. (2020). Quantitative clinical assessment of motor function during and following LSVT-BIG® therapy. *J Neuroeng Rehabil*, Jul 13;17(1):92. https://doi.org/10.1186/s12984-020-00729-8

2. Peterka, M., Odorfer, T., Schwab, M., Volkmann, J., & Zeller, D. (2020). LSVT-BIG therapy in Parkinson's disease: physiological evidence for proprioceptive recalibration. *BMC neurology*, *20*(1), 276. https://doi.org/10.1186/s12883-020-01858-2

3. Fillmore, S., Cavalier, G., Franke, H., Hajec, M., Thomas, A., & Moriello, G. (2020) Outcomes following LSVT BIG in a person with normal pressure hydrocephalus: A case report. *Journal of Neurologic Physical Therapy, 44*(3), 220-227. https://doi.org/10.1097/NPT.0000000000000319

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References

4. Proffitt, R., Henderson, W., Stupps, M., Binder, L., Irlmeier, B., & Knapp, E. (2020) Feasibility of the Lee Silverman Voice Treatment – BIG intervention in stroke. *OTJR: occupation, participation and health,* 1539449220932908. Advance online publication. https://doi.org/10.1177/1539449220932908

5. Henderson, W., Boone, A. E., Heady, J., Nettleton, M., Wilhelm, T., & Bliss, J. (2020). Use of occupation-based measures in LSVT BIG research: A case study. *OTJR: Occupation, Participation and Health, 40*(2), 131-137. https://doi.org/10.1177/1539449219886261

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