



Speech Language Pathologists' Approximations of Speech Intelligibility in Dysarthria

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Background

- Measuring speech intelligibility is a critical part of dysarthria assessment and treatment
- Many SLPs forgo formal assessments utilizing **orthographic transcriptions** due to limited time, funding, or resources [1,2]
- Instead, SLPs prefer using quicker informal assessments, such as intelligibility **estimations** [1,2]
- The validity of intelligibility estimates are not well understood
- This study evaluates estimations in relation to orthographic transcriptions and VAS

Orthographic Transcriptions

- The percent of correctly transcribed words [3]
- Considered a gold-standard intelligibility method

Visual Analog Scale (VAS) Ratings

- Measured on a continuous scale from "cannot understand anything" to "understand everything" [4, 5]
- Commonly used in research

Estimations

- An approximation of the percent of intelligible speech [6, 7, 8]
- Commonly used in clinical settings, but rarely in research

Results & Discussion

Q1 Are SLP measures of speech intelligibility (SLP estimations and VAS ratings) predictive of naïve listener orthographic transcription scores?

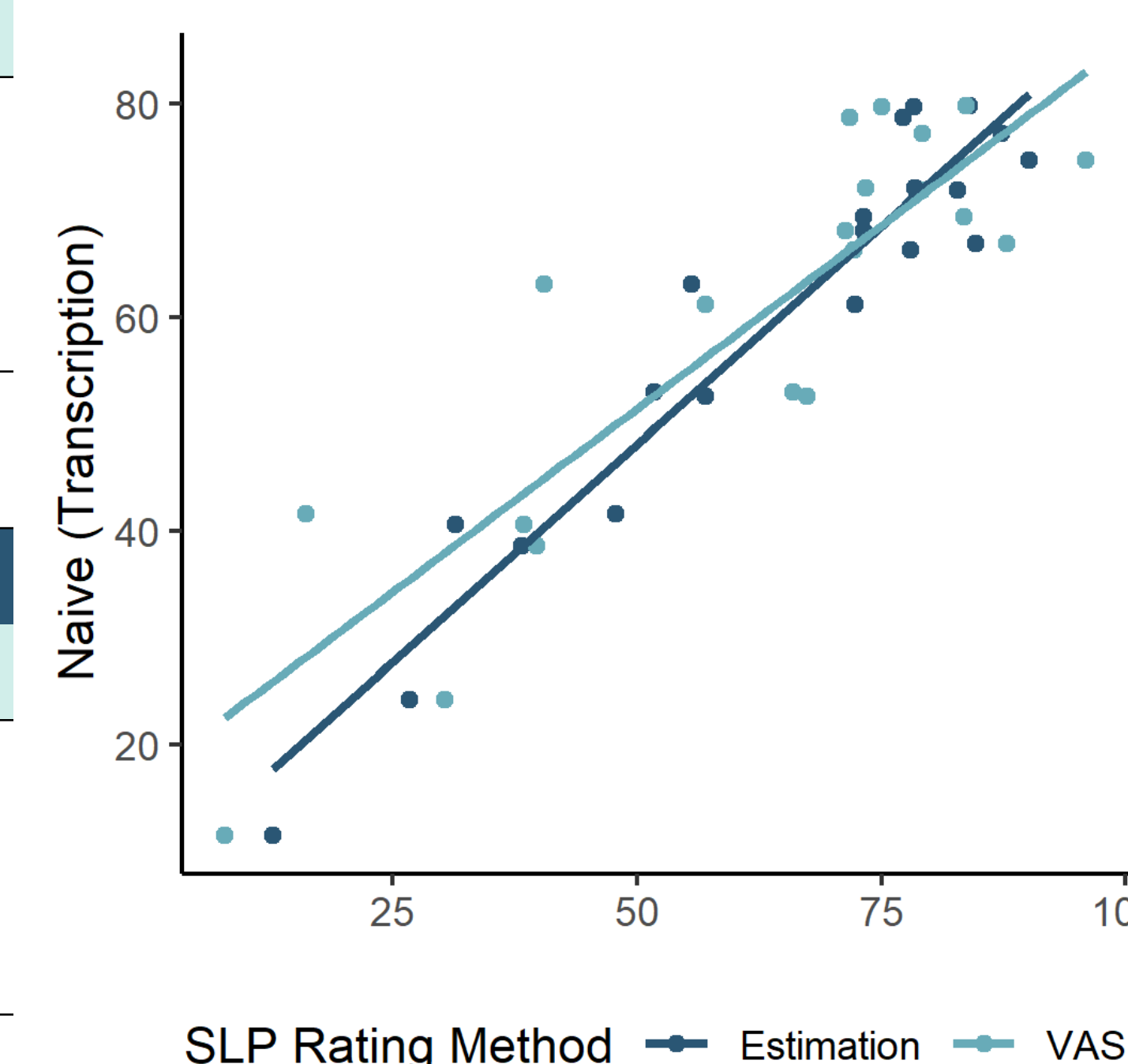
Model 1: SLP Estimations

	EST	SE	t-value	p-value
Intercept	7.229	4.028	1.795	.0895
Estimation	.817	.059	13.742	<.001
R^2	.913	$R^2_{adjusted}$.908	

Model 2: SLP VAS Ratings

	EST	SE	t-value	p-value
Intercept	17.124	5.195	2.895	.0097
VAS	.687	.089	7.698	<.001
R^2	.767	$R^2_{adjusted}$.754	

Note: EST = Estimate; SE = standard error; VAS = visual analog scale



Q4 How reliable are SLP intelligibility measures (VAS ratings and estimations), as determined by intra-rater and inter-rater agreement?

Intra-rater

- VAS**
- $r = .87^*$
- Estimation**
- $r = .85^*$

* $p < .001$

Inter-rater

- VAS**
- Single: $ICC(A, 1) = .54^*$
 - Average: $ICC(A, 21) = .96^*$
- Estimation**
- Single: $ICC(A, 1) = .56^*$
 - Average: $ICC(A, 21) = .96^*$

* $p < .001$

Participants & Procedure



Speakers

- 20 speakers with dysarthria
- Age (years); $M = 65.3, SD = 14.2$
- Parkinson's disease, amyotrophic lateral sclerosis, cerebellar ataxia, Huntington's disease [9]

Speech Stimuli

- Grandfather Passage

Intelligibility ratings collected from SLP and naïve listeners via Qualtrics



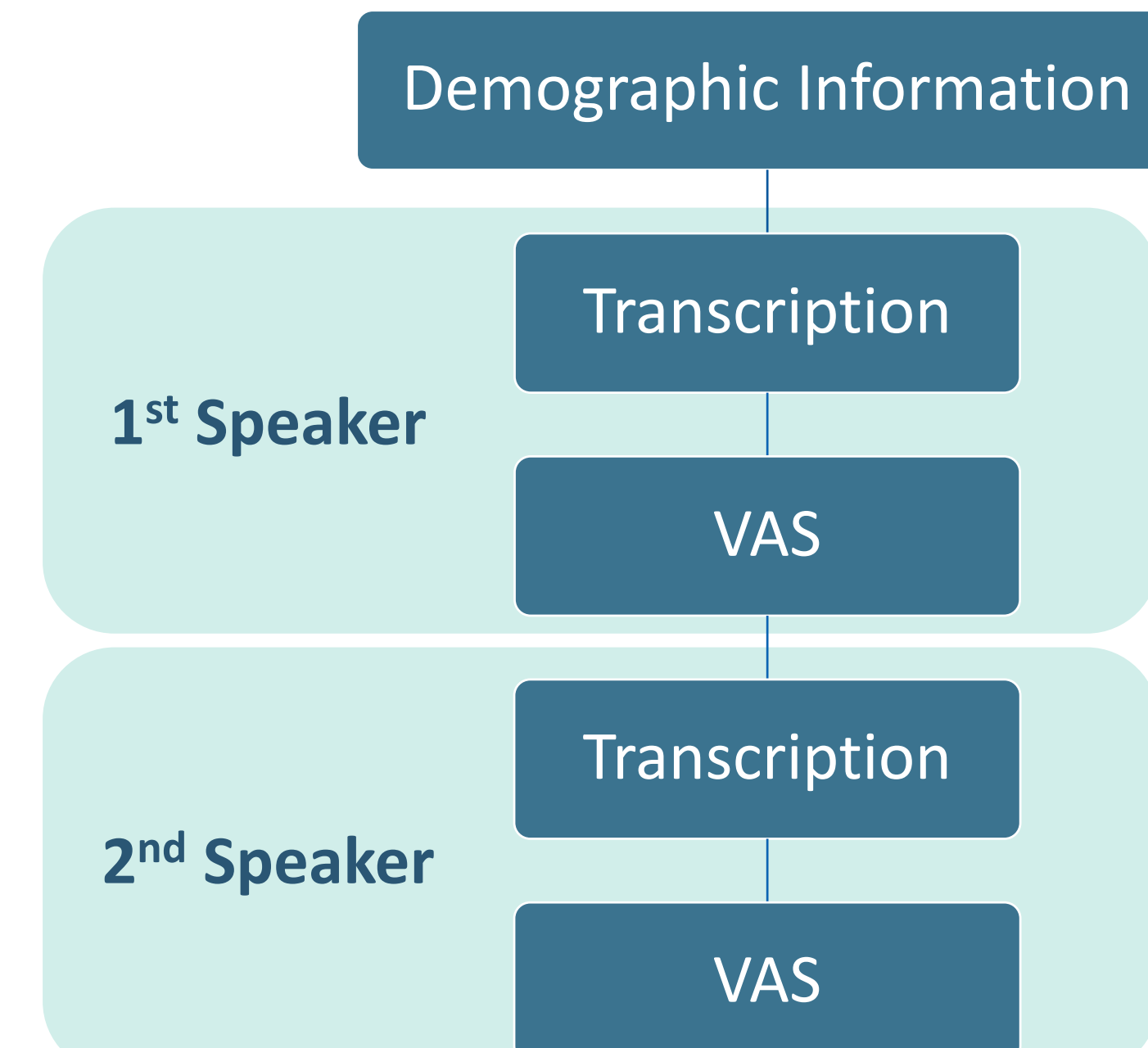
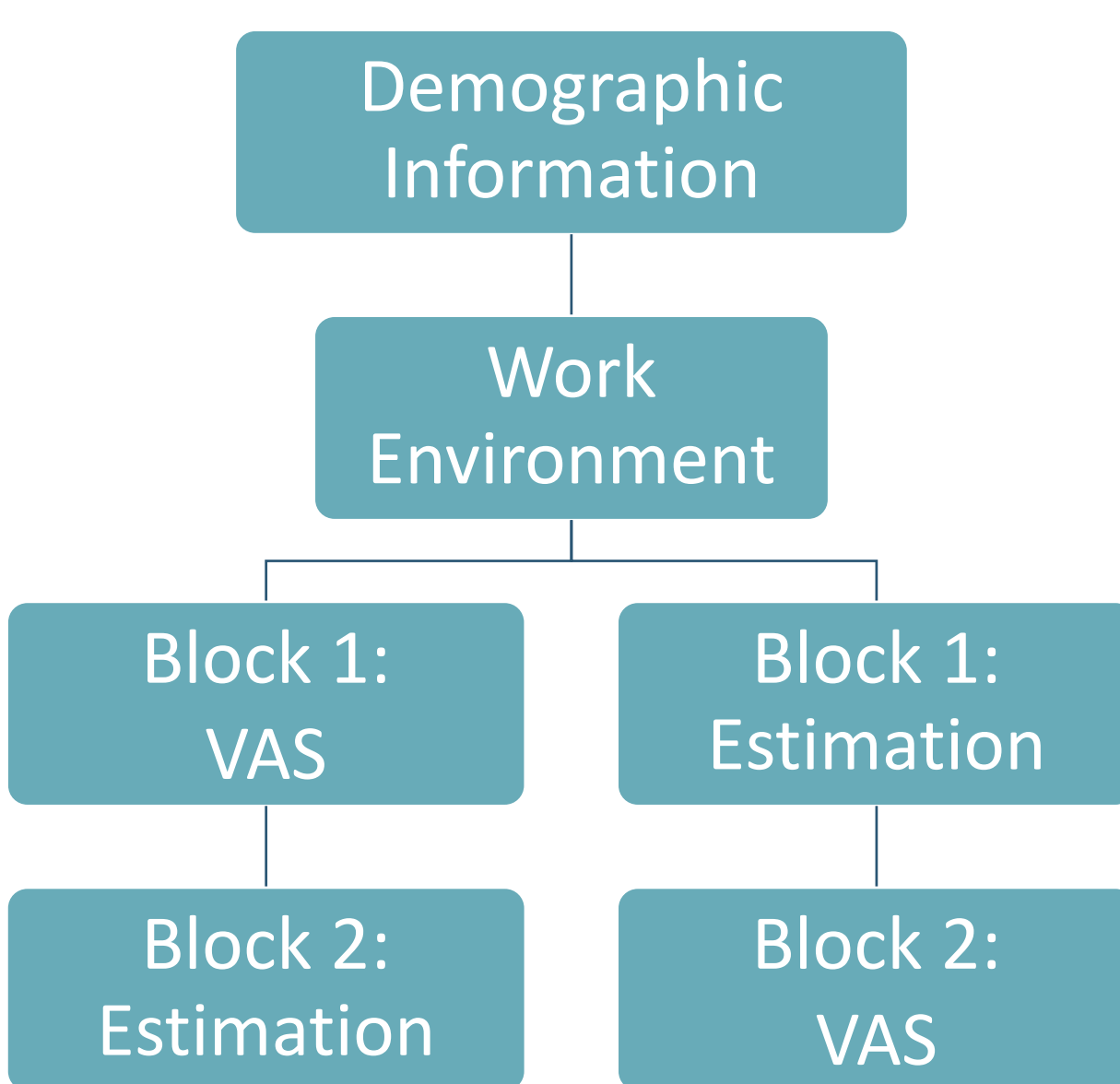
SLP Listeners

- 21 Medical SLPs
- Age (years)
- $M = 33.8, SD = 10.2$
- Experience (years)
- $M = 8.7, SD = 9.6$



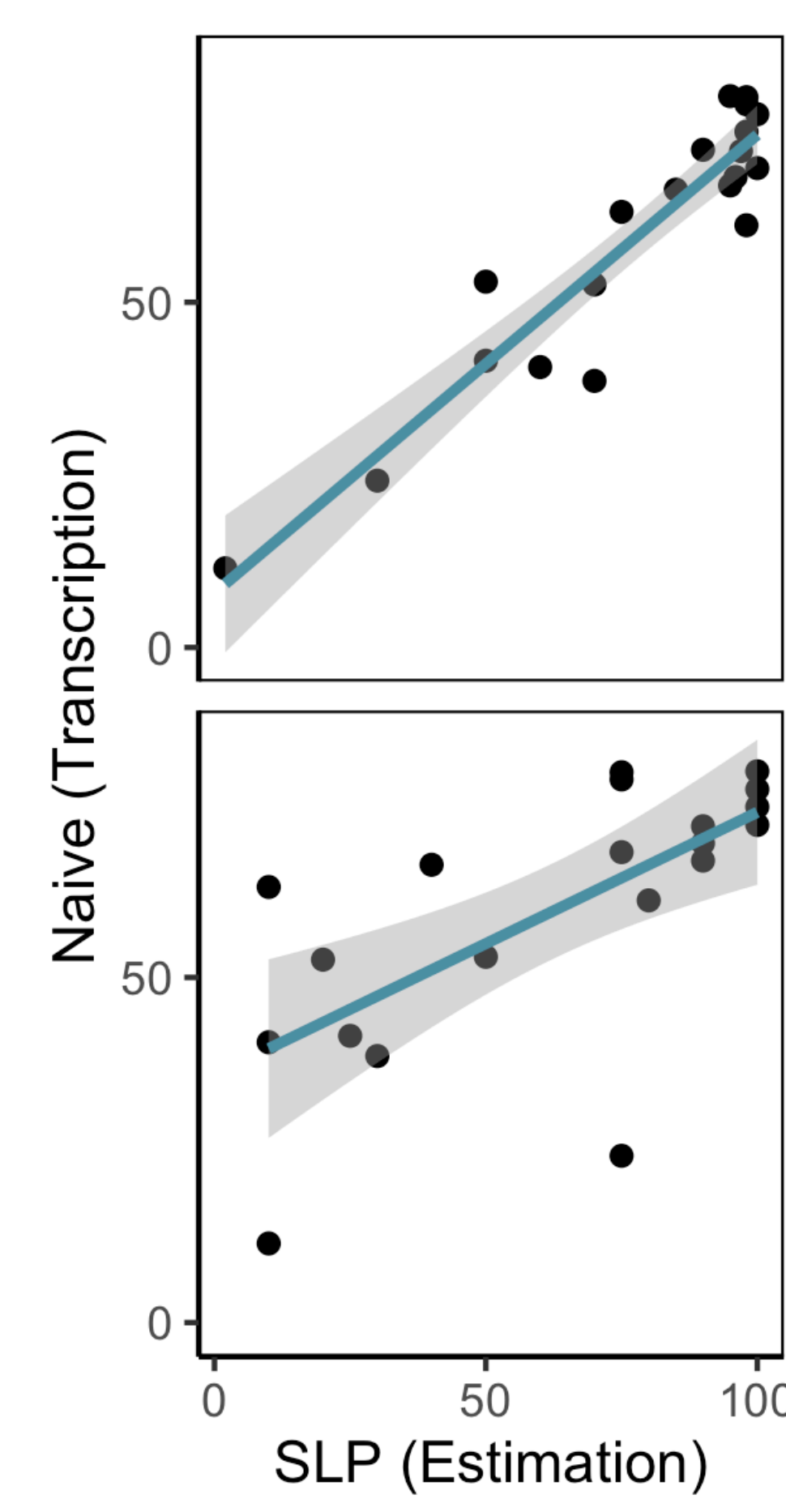
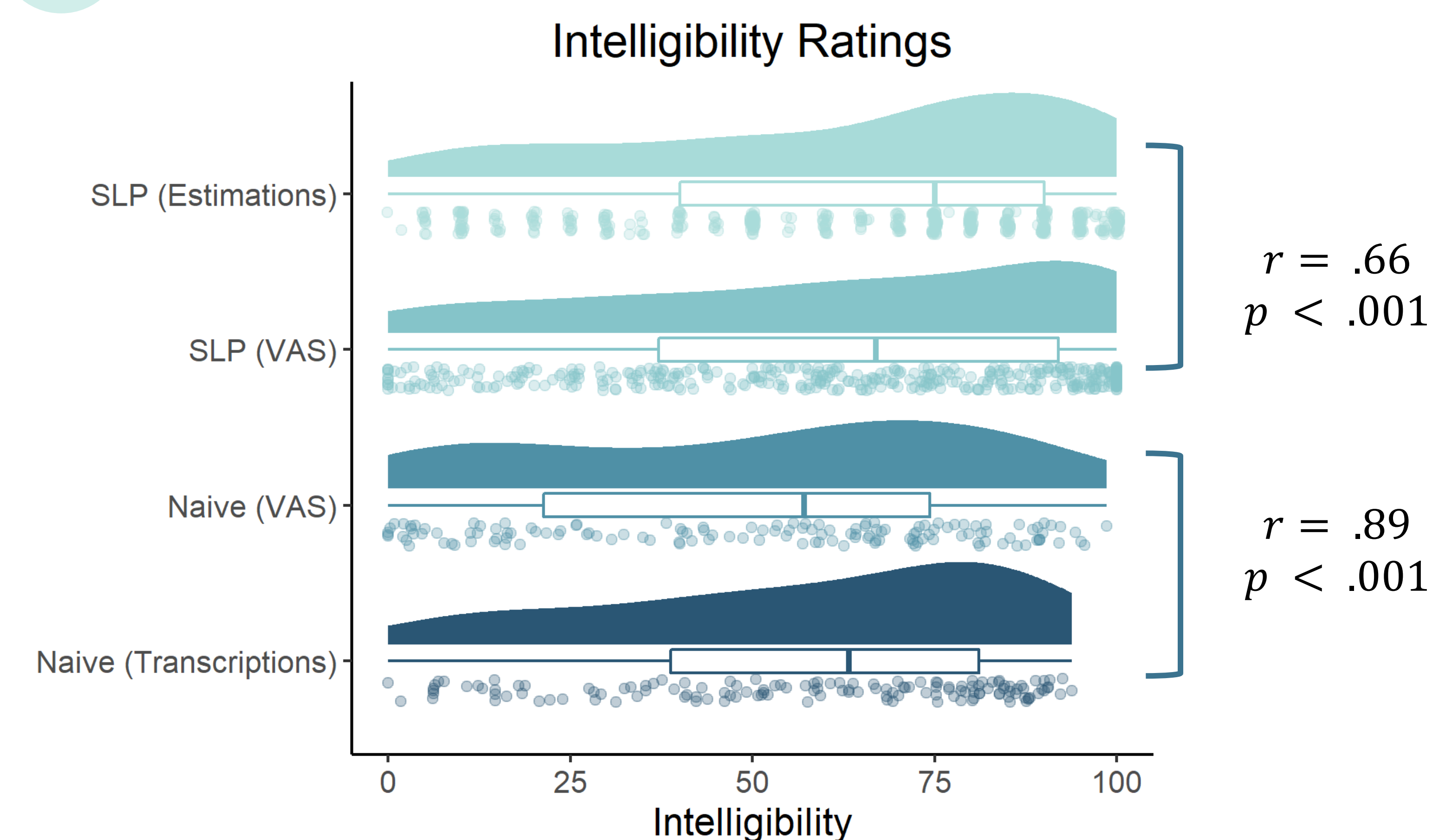
Naïve Listeners

- 70 Listeners
- Age (years)
- $M = 34.8, SD = 13.9$



Q2 Is there a strong relationship between SLP intelligibility **estimations** with SLP **VAS** intelligibility ratings?

Q3 Is there a strong relationship between naïve listener **transcription** scores with naïve listener **VAS** intelligibility ratings?



- Q1:** Both SLP estimations and VAS ratings were significant predictors of naïve listener transcription scores
- Q2:** SLP estimation and VAS ratings had a positive, yet moderate, correlation
- Q3:** Naïve listener transcription scores were strongly correlated with naïve listener VAS intelligibility ratings
- Q4:** *Intra-rater* reliability for the SLP intelligibility ratings were good; *Inter-rater* reliability for the SLP intelligibility ratings were moderate

Limitations & Future Work

- Current findings are based on aggregate data across SLPs
- Individual variability exists (see left figure)
- Consider inter-SLP differences that impact intelligibility ratings
- Experience, perceived competence with dysarthria, work setting

References & Acknowledgements

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