Critical Review:
Can online assessments be used to obtain an accurate measure of speech intelligibility in individuals with dysarthria?

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This critical review examines the current evidence regarding the accuracy of assessing intelligibility of dysarthric speech over the internet. Access barriers to obtaining speech and language services such as remote location and physical disability may be reduced with an online service delivery model. Overall, current research suggests that assessment results achieved face-to-face are comparable to results achieved online, however, further examination of the influence of environmental controls, various dysarthric profiles, and clinician and client technical skills are required.

Search Strategy

Computerized databases including PubMed, Medline, Cochrane Library, and PsycINFO using the following search strategy: (dysarthria) AND (intelligibility) AND ((online) OR (telehealth) OR (telerehabilitation) OR (telespeech)).

Selection Criteria

Studies selected for inclusion in this critical review paper were required to investigate the impact of assessing intelligibility of dysarthric speech online on accuracy of results. No limits were set on ts c4 ( ) 14278612 560.88cm BT 0.0081 Tc 41 0 0 41 0 0 Tm /TT2.0 1 Tf [(he) 1 ( ) (s)

clinical criteria for both PCA (98.36) and k_w (0.79 good agreement).

Intrarater and interrater reliability was found to be comparable between environments at moderate to very good for both measures (ICC=~0.4-0.9).

It was concluded that there are comparable levels of agreement between the online and FTF environments and that the online assessment of hypokinetic dysarthria in Parkinson's disease appears to be reliable and valid. In particular, ratings of overall speech intelligibility may be made reliably online. A noted online challenge was an intermittently degraded audio signal, such as static, which was especially detrimental for transcribing those speakers with severe dysarthria. Independent control of equipment was not observed and may further contribute to technical difficulties. This study presents level I statistical evidence. Due to the limitations, this study only provides suggestive evidence that the online assessment of dysarthric speech intelligibility is accurate.

Hill, Theodoros, Russell, and Ward (2009) aimed to refine the Hill et al. (2006) study by reducing participant variability through a between groups randomized clinical trial research design. Similarly to Constentinescu et al. (2009)'s design, 24 speakers with mild to moderate dysarthria were simultaneously assessed for intelligibility in an online and FTF environment by two SLPs. The primary mode of assessment in which all instructions were given was determined randomly. The SLPs were randomized to assessment environments and blind to the participant's severity rating of dysarthria. Custom-built computer software and equipment, such as web cameras mounted on robotic arms were used on a low, readily available bandwidth (128 kb/s) for online assessment. The FTF SLP was responsible for assisting with headset microphone and orienting them to the online-SLP limiting the need for participant computer proficiency.

The sentence level section of the AIDS was administered and audio recorded in both environments to quantify speech intelligibility. A percentage level of agreement and paired-sample *t*-test analysis of scores obtained on the ASSIDS in the online and FTF environment revealed high agreement (95.83% at ±8.6%) and no significance difference between scores (t=1.38, p=0.17). Intraclass

Disorders. Philadelphia, PA: WB Saunders; 1975.

Draxler, C., & Jänsch, K. (2004). SpeechRecorder – A universal platform independent multi-channel audio recording software. In *Proceedings of the IVth International Conference of Language Resources and Evaluation*.

Duffy (2005). Motor speech disorder: Substrates, differential diagnosis and management (2nd