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Introduction

In previous work, we demonstrated that whereas traditional WAB-R (Kertesz, 2007) aphasia type classification did not distinguish among primary progressive aphasia (PPA) and apraxia of speech (AOS) classifications, relative performance across WAB-R composite scores had good agreement with consensus diagnosis of the semantic (svPPA) and agrammatic variants of PPA (with or without AOS; agPPA), and primary progressive AOS (PPAOS)(Clark et al., 2019). Other variants, such as logopenic (lvPPA), had no characteristic profile. The current study examined the performance of these metrics longitudinally.

Methods

Participants included 69 adults (35 female) diagnosed with svPPA, agPPA or PPAOS. All participants underwent comprehensive clinical evaluation between two and seven visits at approximately one-year intervals.

The WAB-R was one component of the assessment battery. In addition to traditional scoring, performance ratios were calculated between: the auditory comprehension and naming and word-finding composite scores (Comprehension:Naming ratio); the auditory comprehension composite score and fluency rating (Comprehension:Fluency ratio); and the rating of information communicated during the spontaneous speech tasks relative to the naming composite score (Information Content:Naming ratio).

As described by Clark et al (2019), the relative size of these three ratios yields a profile that is either flat (all ratios are roughly equivalent), has a "dip" (the Comprehension: Fluency ratio is smaller than the other two ratios), or has a "peak" (the Comprehension: Fluency ratio is larger than the other two ratios). For the current study, meaningfully different was defined as a difference of 0.20 or greater between both Comprehension:Naming and Information Content:Naming ratios (in the same direction) and the Comprehension:Fluency ratio (Figure 1). Ratio profile agreement between first and final visits was assessed, relative to diagnosis.

Results

Table 1 illustrates maintenance of the dip and peak profiles between timepoints, with only one profile evolving into an unclassifiable profile. In contrast, fewer than half of flat profiles remained flat at the final visit.

Conclusions

The findings suggest that the "dip" and "peak" profiles had good specificity for the semantic and agrammatic variants, respectively. The flat profile had excellent sensitivity for PPAOS, but also overidentified svPPA at initial visit. The flat profile also overidentified agPPA, although a proportion of participants indeed evolved from PPAOS (flat profile) to agPPA (peak profile) over time. However, this does not account for those with agPPA who continued to display a flat profile at their final visit. This observation affirms what has been argued by many groups, that a single aphasia instrument such as the WAB-R, in the absence of other measures, is not well-suited for distinguishing among the variants of PPA (Botha et al., 2015; Leyton et al., 2011; Mesulam et al., 2009; Vandenberghe et al., 2005), nor for tracking disease progression over time, as shown in this study. Nonetheless, these ratio profiles add value beyond the AQ and often reflect, when present, the proportionate deficits seen in PPA. Future studies will explore agreement of profiles at interval visits" and/or "the predictive value of profiles and relative difference of ratios for estimating disease trajectory.

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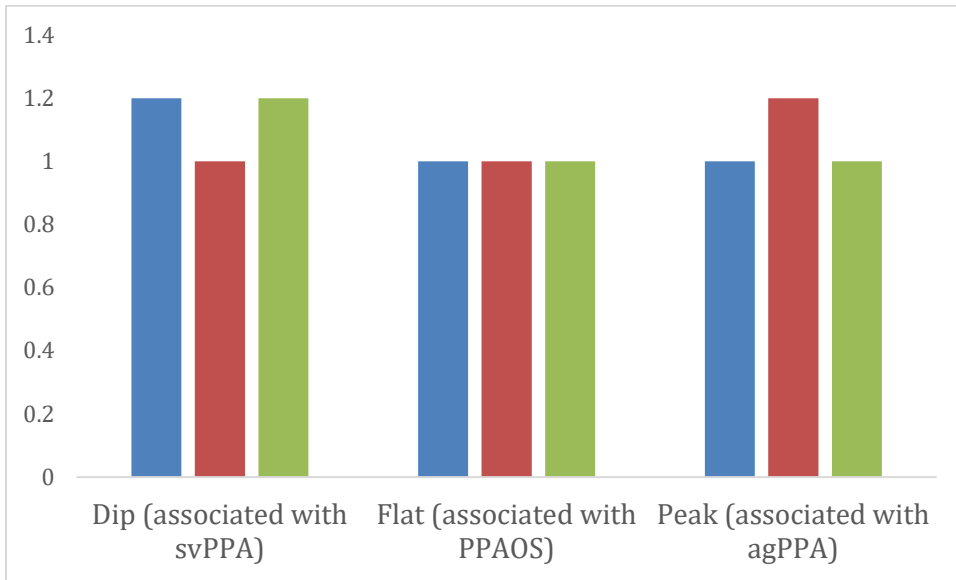
Acknowledgments

Figure 1. Idealized WAB-R Ratio Profiles. Blue: Comprehension:Naming; Red: Comprehension:Fluency; Green: Information Content:Naming

Table 1. **Agreement between first and final visit WAB profiles. Listed diagnosis indicates the consensus diagnosis at the final visit. Shaded cells are those with agreement between first and final visit. Underlined designations indicate that the WAB-R profile agreed with the consensus diagnosis.**

	Dip at Final Visit	Flat at Final Visit	Peak at Final Visit	Unclassified Profile at Final Visit
Dip at 1st Visit	svPPA svPPA svPPA svPPA svPPA 6 svPPA			1 svPPA
Flat at 1st Visit	svPPA svPPA 3 svPPA	agPPA agPPA PPAOS agPPA PPAOS agPPA PPAOS agPPA PPAOS agPPA PPAOS agPPA PPAOS agPPA PPAOS agPPA PPAOS agPPA PPAOS agPPA 22 PPAOS agPPA	agPPA agPPA agPPA agPPA agPPA agPPA agPPA agPPA agPPA agPPA agPPA agPPA agPPA agPPA agPPA agPPA agPPA agPPA 20 agPPA agPPA	1 agPPA
Peak at 1st Visit			agPPA agPPA agPPA agPPA agPPA agPPA agPPA agPPA agPPA agPPA agPPA 13 agPPA agPPA	
Unclassified Profile at 1st Visit			1 agPPA	2 svPPA agPPA

svPPA: Semantic variant; PPAOS: Primary Progressive Apraxia of Speech; agPPA: Agrammatic Variant with or without Apraxia of Speech;