

Individual cognitive factors in speech rate tracking: A pilot study

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Listeners track speech rate to make predictions about timing and so interpret durational cues to prosodic boundaries [1]. Thus, individual differences in temporal predictive ability have potential implications for our understanding of conversational dynamics. We examine how variations in metrical sensitivity [2], working memory [3] and executive functions [4] predict listeners' ability to tap along to isochronous tone sequences and, using a novel *Pick Up Speech* task, to track and predict perceived speech rate.

Our pilot studies had two broad goals. First, we developed and refined our *Pick Up Speech* task, where participants read written texts (poetry and prose) aloud, in time with pre-recorded versions, and continue reading at the same rate from when the audio is silenced until it returns. Two circular statistics – consistency and accuracy – were calculated to assess participants' performance (Figure 1). The task worked well, with performance neither at floor nor ceiling, and with between-participant variation on both consistency and accuracy.

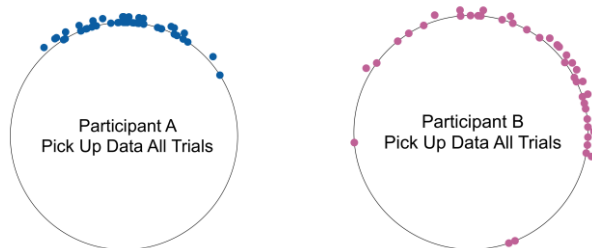


Figure 1: Pick Up Speech *circular response data for two participants. Participant B, compared to Participant A, is both less consistent (0.65 vs 0.92) and less accurate (0.92 vs 0.40). NB: 1 = optimal consistency; 0 = optimal accuracy.*

Our second goal was to gauge between-participant variation on four predictor tasks. Standard tasks – “arrow span” for working memory; “Wisconsin card sort” for cognitive flexibility – showed adequate performance variability, the Wisconsin after the basic task was made more challenging for our (neurotypical) participants. Poor performance in a dichotic listening test of auditory attention led us to adopt the Test of Attention in Listening (TAIL) task, where participants varied in their ability to assess if two tones differed in frequency and location. Finally, the first version of our limerick task, requiring line-by-line detection of metrical irregularities, was too challenging; a second version, requiring a single response per limerick, produced results appropriately varied between floor and ceiling levels. Ongoing full-scale data collection (which has been pre-registered) will assess how performance on predictor tasks correlates with finger tapping and *Pick Up Speech* rate-tracking outcomes.

References

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