Verbal Time Estimation in Cluttering
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What is cluttering?

1. Cluttering is a fluency disorder characterized by a rate that is perceived to be abnormally rapid, irregular, or both for the speaker, and…
   a. This rate problem *causes* one or more of the following:
   b. An excessive number of disfluencies
   c. The frequent placement of pauses and odd prosodic patterns
   d. Inappropriate/excessive degree of coarticulation, especially in multisyllabic words
   e. (St. Louis, Raphael, Myers & Bakker, 2003)
2. Clutterers are typically unaware of their symptoms (Daly & Burnett, 1996; St. Louis, Myers, Bakker & Raphael, 2007)

Background

1. Stutterers are poor estimators of time (e.g., Ringel & Minifie, 1966; Barasch, Guitar, McCauley & Absher, 2000; Ezrati-Vinacour & Levin, 2001)
2. Most studies compared stutterers to non-stutterers and found that, in general, *all* subjects *overestimated* time
3. Subjects with more disfluencies had *longer* overestimates

Rationale and Purpose

1. People with fluency disorders (i.e., stutterers) are poor estimators of time
2. Clutterers have an inability to monitor their own speech and may be unaware of auditory input in the form of feedback
3. Clutterers may be trying to speak faster than their systems can handle (Myers, 1996)
4. Clutterers may have difficulty planning (estimating time of) utterances
5. Hypothesized that clutterers are poorer estimators of time than controls
6. A difficulty in estimating speech time could be at least one of the factors that influence a person to produce cluttered speech
Participants

1. 6 clutterers (5 M & 1 F; ages 22 to 57 [Mean = 36.0 yr]) and 6 nonclutterers, matched for age and sex
2. Screened prior to study
   a. Templin-Darley Test of Articulation
   b. Peabody Picture Vocabulary Test
   c. Daly Predictive Cluttering Inventory
   d. St. Louis & Atkins Self Awareness of Speech Index
   e. St Louis Inventory of Life Perspectives and Speech/Language Difficulty
   f. Measured rate in SPM in reading and conversation
   g. Perceptual ratings of rate, articulation, language, and fluency by subject, experimenter, and friend of subject
   h. Hearing screening
   i. All clutterers previously treated for cluttering diagnosis
   j. All controls WNL for speech and language

Procedure

1. Using a computer and a mouse, participants estimated the length of time they expected it would take them to say something, then said same thing aloud, as follows:
   a. Each participant was given a verbal prompt, e.g. “Do you prefer cats or dogs, and why?”
   b. Participant held the mouse button down for the exact amount of time they thought it would take them to answer the question, released the mouse button, and then said the same thing aloud
2. Estimated time was viewable to experimenter only and was written down, with the actual time being extracted later
3. Participant rated each utterance on a scale of 1-5 on how accurately what they said aloud matched what they thought they would say during their estimate
4. Experimenter kept track of utterance ratings until reached each participant rated 50 utterances with 4/5 or 5/5 ratings for accuracy
5. Participants were first trained, then continued into experimental task
6. Experimenter also conducted a timing control with pre-recorded sentences to ensure participants were able to start and stop a timer corresponding respectively with the beginning and end of an utterance

Group Results

1. T tests for independent samples indicated that clutterers’ mean estimated times in seconds (M = 2.95, SD = 1.95) were not statistically different than controls’ mean estimated times (M = 2.11, SD = 0.54), t(10) = 1.40, p = .19.
2. Clutterers’ mean actual times (M = 2.43, SD = 0.79) were also not statistically different than controls’ mean actual times (M = 1.93, SD = 0.44), t(10) = 1.36, p = .20.
3. Clutterers’ mean difference between estimated and actual times ($M = 0.52$, $SD = 0.59$) were also not statistically different than controls mean difference between estimated times ($M = 0.18$, $SD = 0.10$), $t(10) = 0.9$, $p = .39$.

Trends

1. Two thirds (or 4) of the participants each group overestimated
2. One-sixth (or 1) of the participants in each group underestimated
3. One-sixth (or 1) of the participants in each group were fairly accurate
4. Both clutterers and controls overestimated time overall
5. More variability in estimated times than actual times in both groups
6. Clutterers showed greater difference between estimated and actual times
7. Clutterers were more variable in both estimated and actual times

Individual Results - Clutterers

1. 5 out of 6 clutterers showed statistically significant differences between their mean estimated and actual times
2. Four clutterers had significantly longer estimated times than actual times.
3. One clutterer had significantly longer actual times than estimated times, and for one clutterer there were no significant differences

Individual Results - Controls

1. A different 5 out of 6 controls evidenced statistically significant differences between their mean estimated and actual times
2. Four controls had significantly longer estimated times than actual times
3. One control had a significantly longer mean actual time than mean estimated time, and one had no significant difference between the two

Clutterer - Control Pairs

1. Comparing the differences between individual clutterer-control pairs with regard to the differences between estimated times (e.g., CL1 estimated versus CO1 estimated), 5 of the 6 pairs, evidenced statistically significant differences between estimated times.
2. 4 out of the 6 pairs showed statistically significant differences between actual times
3. 5 out of the 6 pairs also showed statistically significant differences between estimated minus actual times
4. One pair did not show any statistically significant differences in any of the differences of estimated, actual, or estimated minus actual times

Conclusions

1. Although the differences in estimated time, actual time, and estimated minus actual times between clutterers and controls, as groups, were not statistically significant, the trends that emerged suggested that clutterers’ perception of time was “off” in some manner
2. We speculate that clutterers require more formulation time than normal speakers. As speaking rates for both groups during the experimental tasks were comparable, it does not appear that clutterers spoke much faster during their answering, causing their actual times to be shorter. Additionally, most of the variability lies in the estimated times, not the actual times, suggesting that whatever occurred, occurred during the estimation portion of the experiment rather than the actual speaking portion.

3. Clutterers and controls, as groups, but not consistently so as individuals, both tended to overestimate their times. If this finding were to be replicated in future investigations, the implication to be drawn is that clutterers very likely do not talk fast because they cannot estimate their own speaking time. If controls had shown entirely different patterns than clutterers, then perhaps such a conclusion might be warranted.

References


