

“The Caterpillar”:

A Novel Reading Passage for Assessment of Motor Speech Disorders

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Caterpillar Passage:

Do you like amusement parks? Well, I sure do. To amuse myself, I went twice last spring. My most MEMORABLE moment was riding on the Caterpillar, which is a gigantic roller coaster high above the ground. When I saw how high the Caterpillar rose into the bright blue sky I knew it was for me. After waiting in line for thirty minutes, I made it to the front where the man measured my height to see if I was tall enough. I gave the man my coins, asked for change, and jumped on the cart. Tick, tick, tick, the Caterpillar climbed slowly up the tracks. It went SO high I could see the parking lot. Boy was I SCARED! I thought to myself, “There’s no turning back now.” People were so scared they screamed as we swiftly zoomed fast, fast, and faster along the tracks. As quickly as it started, the Caterpillar came to a stop. Unfortunately, it was time to pack the car and drive home. That night I dreamt of the wild ride on the Caterpillar. Taking a trip to the amusement park and riding on the Caterpillar was my MOST memorable moment ever!

Brief synopsis of the purpose of the study with some background information and research questions

The purpose of the development of the “Caterpillar Passage” was to augment current motor speech assessment protocols. The authors developed this passage to express the need for a passage tailored to motor speech impairment. The article described the design and development of the passage and documented the performance of people with motor speech disorders and healthy individuals.

The following criteria was used to design the “Caterpillar Passage”:

- Passage length that was suitable to achieve clinical efficiency
- Comprehensive phonotactic coverage to examine speech repertoire
- Words/sentences that examine respiration, phonation, prosody, articulation and resonance
- Insertion of isolated speech motor tasks for a comparison with connected speech
- Contemporary vocabulary and simple syntax as to not overload cognition, and focus on speech production abilities
- “Caterpillar Passage” was designed to build upon “My Grandfather”
- Includes tasks that examine deficits within and across the subsystems of speech
 - Example: adding sentences of varying length to assess breath support and fatigue
- Uses complex words to assess range of sound classes
- Inclusion of a nasal sentence vs oral sentence to assess velopharyngeal function
- Inclusion of tasks that required prosodic variability (e.g., statements vs questions)
- Inclusion of tasks that look at motor planning
 - Includes: words of increasing length, repeated words, and complex words. Important for Apraxia

Research questions:

- Is “The Caterpillar” passage comparable to the “My Grandfather” passage in terms of evaluating speech?

Methodology to include ages and number of participants, outcome variables, predictor variables

- 15 adults (8 men, 7 women; mean age = 51) with motor speech impairment
 - 10 diagnosed with dysarthria
 - 5 diagnosed with apraxia of speech
 - acoustic data for one not included
- 7 healthy participants (2 men, 5 women; mean age = 41)
- All participants:
 - English speakers, adequate hearing and cognitive skills
 - Reading at 5th grade level or higher

The new passage called “The Caterpillar” and compared it to “My Grandfather” using many different parameters including....

- a. Repertoire of phonemes
- b. Passage length and complexity
- c. Mean length of utterance (MLU)
- d. Word familiarity
- e. Reading level
- f. Prosodic variations
- g. Words of increasing length
- h. Word repetition
- i. Oral vs nasal sounds

Outcome Variables (Dependent Variables)

- overall passage reading rate (words/second)
- frequency of pauses
- Average F0 (intensity) across passage
- F0 (intensity) range across passage
- Peak F0 (intensity) of stressed words
- Number of multisyllabic/complex words with error
- Number of words of increasing length with error
- Number of words with attempted revisions
- Number of words inconsistently repeated

Predictor Variables (Independent Variables)

- none

Outcomes

- Both passages were comparable in passage length and complexity, MLU, word familiarity and reading level.
- “The Caterpillar” assessed a larger repertoire of phonemes, included more prosodic variations, built in more word repetitions, incorporated a longer nasal sentence, and tasks that looked at motor planning such as words of increasing length, repeated words, and complex words
- “The Caterpillar” is more relevant than “My Grandfather” in both the context of the message and language utilized.

- a. "Banana oil!" - "My Grandfather"
- b. "...his voice is just a bit cracked and quivers a trifle." - "My Grandfather"

Clinical relevance. What is your group's take away message? If an intervention or study or assessment instrument do you recommend it?

There were some limitations to the study which are seen in the following areas:

- The control group was not age matched to the experimental group
- The experimental group did not include hypokinetic, hyperkinetic or ataxic dysarthrias
- No statistical analyses were conducted to generate statistical differences between "The Caterpillar" and "My Grandfather"
- There was no clear separation between the different parameters to differentially diagnose the types of dysarthrias

However, we learned the value of assessing all areas of the speech system (i.e., respiration, phonation, resonance, articulation, and prosody) during a motor speech exam. Each subsystem can be efficiently assessed through the use of a well balanced/designed passage such as "The Caterpillar" passage. We would recommend the use of the "Caterpillar Passage" for its efficiency and multiple aspects of speech that it assesses.

Clinical implications

- It is up to the clinician's discretion to determine which passage they feel best fits their client.
- The "Caterpillar Passage" provides more information than the "My Grandfather" passage that may be useful in determining severity or type of dysarthria.
- Would be useful for pre- and post- measures during both evaluation and treatment.
- Phonetically balanced and representative of everyday speech while still controlling the context.