An Evaluation of Hesitation Phenomena as Measures of Second Language Proficiency and Fluency

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Overview

- Hesitation phenomena
  - Overview
  - HP in L2 speech
- Views of Fluency
- Crosslinguistic Corpus of Hesitation Phenomena
  - Description
  - Results
- Implications and Applications
- Accessing the CCHP
Overview of types of HP

• Long investigative history

• Types
  – Silent pauses (SP): longer than 0.3-1.0 sec
  – Filled pauses (FP): *uh/um* in English, *e-to/ano-* in Japanese
  – Lengthenings: prolongation of one or more syllables
  – Repeats/restarts: repetition of a sequence of words
  – False starts: beginning of an utterance that is abandoned
  – Self-corrections: a sequence of words that repairs an immediately preceding sequence
  – Lexical fillers: various fixed expressions used as hesitation devices
HP in L2 production

  - SP duration and rate: higher proficiency → shorter and fewer silent pauses
  - FP rate: higher proficiency → fewer filled pauses
  - Distribution: low and high proficiency speakers show different distribution of HP use
  - Differences between read and spontaneous speech

• Related
  - Speech rate: higher proficiency → faster rate
  - Mean length of runs: higher proficiency → longer runs
HP in L2 production

- As a whole, work has been quite comprehensive.
- However, individual works are limited in that many do not take individual variation into account (cf., de Leeuw 2007).
  - Exception: Derwing et al (2009) observed that both speech rate and pause rate in L1 and L2 production are correlated.
- My current research is a partial attempt to address this issue.
Fluency

• Segalowitz (2010) taxonomy of fluency types
  – Cognitive fluency (in speech planning)
  – Utterance fluency (in speech production/articulation)
  – Perceived fluency (from listener's perspective)

• De Jong et al (Forthcoming) investigated relationship between cognitive fluency and utterance fluency.

Research Questions

- What is the developmental trajectory of HP use in L2?
- What is the relationship between hesitation patterns in L1 and L2 speech?
- What relationships are there between utterance fluency (i.e., measures of HP) in L2 speech and perceived fluency ratings or more general L2 proficiency?
Crosslinguistic Corpus of Hesitation Phenomena – pilot (CCHPp)

- Participants: L2 learners of varying proficiency levels
- Elicitation tasks
  - Spontaneous speech: picture description, topic narrative
  - Reading aloud
  - Performed in both L1 and L2
- Demographic information: age, gender, L2 proficiency (self-reported TOEIC score)
- Annotation
  - Transcripts, HP, word & pause intervals
  - Two annotators, one checker
- Native English speaker (N=16) ratings of fluency for L2 speech
CCHPp Results: Basic Statistics

- Participants: 10 Japanese L1, English L2 speakers
- Fully annotated parts of corpus
  - 7,237 tokens (words)
  - 71.7 minutes
- Spontaneous speech
  - 4,191 tokens
  - 47.7 minutes
- Read speech
  - 3,046 tokens
  - 24.0 minutes

- 1,420 silent pauses
- 456 filled pauses
- 203 self-corrections
- 70 repeats
- 8 false starts
CCHPp Results: Analysis

Factors
- speech rate
- mean SP duration
- SP rate (per 100 tokens)
- SP rate (per minute)
- mean FP duration
- FP rate (per 100 tokens)
- FP rate (per minute)
- mean length of runs

Data collapsed by participant and L1-L2 difference was calculated

Factors correlated with:
- L2 Fluency Rating
- TOEIC score

Stepwise linear regression to find optimal combination of factors

Data evaluated by
- spontaneous speech
- reading aloud
CCHPp Results: Spontaneous Speech

L2 Fluency Ratings ($R^2 = 0.82$)
- Speech Rate (42%)
- SP Duration (22%)
- Mean Len Runs (21%)

TOEIC Scores ($R^2 = 0.82$)
- FP Duration (41%)
- Silent Pause Rate per min. (15%)
- Mean Len Runs (33%)
CCHPp Results: Reading Aloud

**L2 Fluency Ratings** ($R^2 = 0.77$)

- SP Rate per min. (47%)
- SP Rate per tok. (23%)
- Mean Len Runs (15%)

**TOEIC Scores** ($R^2 = 0.61$)

- Speech Rate (66%)
CCHPp Results: Summary

Spontaneous Speech
- Fluency
- TOEIC

Reading aloud
- Fluency
- TOEIC

Speech rate
Mean SP duration
SP rate (per 100 tokens)
SP rate (per minute)
Mean FP duration
Mean length of runs

At variance with Derwing et al (2009)
Verifies utility of factors investigated by De Jong and Perfetti (2011).

Possible application for automated fluency measurement
Not included in models (insufficient data)

Verifies utility of factors investigated by De Jong and Perfetti (2011).
Implications and Applications

- L2 oral fluency evaluation should focus on speech rate, SP rate and mean length of runs. Other correlating factors may be due to L1 speech characteristics.

- The 4/3/2 procedure (Nation, 1989)—already shown to effect gains in utterance fluency (De Jong and Perfetti, 2011)—may further effect gains in perceived fluency.

- A reading aloud task might be useful to evaluate fluency (focusing on SP rate and mean length of runs). This would be much easier to process than spontaneous speech.
Summary

- While much progress has been made on the study of L2 oral fluency, L1 fluency factors have not often been taken into account.
- The Crosslinguistic Corpus of Hesitation Phenomena allows us to account for L1 factors in the study of L2 utterance fluency and perceived fluency.
- Results show that speech rate, silent pause duration and mean length of runs are factors that correlate well with L2 oral fluency, but not with overall L2 proficiency.
- Results suggest different methods for measuring fluency through spontaneous speech or reading aloud tasks.
Further Work

• Repairs
  – Basic features of repairs (length, rate, etc.) did not correlate with oral fluency nor L2 proficiency at all.
  – However, other features might: clause location, linguistic structure of reparandum, type of repair (Levelt 1983, Kormos 1999)

• Filled Pauses
  – Only correlation was FP duration with L2 proficiency.
  – FPs are known to correlate with lexical frequency (Rose 2011) and contextual probability (Beattie and Butterworth 1979).
  – Check: effect of FP features on oral fluency is off-set by contextual lexical properties.
CCHP Public Corpus

- Assembling a larger (N=30), public version of the Crosslinguistic Corpus of Hesitation Phenomena is ongoing.
- When complete, audio files and annotated transcripts will be available for free download.
- Some files are already available for download: http://www.filledpause.com/chp/cchp
References


Rose, R. L. 2011. *Filled pauses in writing: what can they teach us about speech?* Poster Presentation at Production and Comprehension of Conversational Speech (PCCS) in Nijmegen, the Netherlands


