

Hesitation Phenomena and Second Language Development

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Overview

- Hesitation phenomena
- Levelt's monitor model
- Hesitation phenomena in L2 speech
- Cross-linguistic Corpus of Hesitation Phenomena
 - Purpose
 - Description
 - Some results
- The cognitive status of hesitation phenomena

A Compact Introduction to Types of Hesitation Phenomena

- Saddleback Presidential Forum
- August 16, 2008
- Barack Obama



A Compact Introduction to Types of Hesitation Phenomena

Well, in my own life I'd break it up in stages, when I had a difficult youth. My father wasn't in the house. I've written about this. You know there were times where I've experimented with drugs, and I drank in my teenage years. And what I trace this to is a certain selfishness on my part. I was so obsessed with me, and the reasons that I might be dissatisfied, that I couldn't focus on other people. And I think the process for me of growing up was to recognize that it's not about me, it's about ...

Absolutely. But look, you know, when I find myself taking the wrong step, I think a lot of the times it's because I'm trying to protect myself, instead of trying to do God's work. And so that I think is my own failure

A Compact Introduction to Types of Hesitation Phenomena

Well, **i- i- i-** in my own life **I'd-** I'd break it up in stages, when **uh** I had a difficult youth. **Uh** my father wasn't in the house, **uh** I've written about this, **uh there- uh uh** you know there were times where **uh** I've experimented with drugs, and I drank, **uh yeah** in my teenage years, **a-nd wh-** what I trace this to is **uh** a certain selfishness on my part, **I-** I was so obsessed with me, and **you know the-** the reasons that I might be dissatisfied, that **I- I- w-** I couldn't focus on other people. And **uh y-you know** I think the process for me of growing up was to recognize that it's not about me, it's about ...

it's about- absolutely, **so- so- but-** but look, **you know, th- the uh wh- when I uh wh-** when I find myself **um** taking the wrong step, I think a lot of the times it's because I'm trying to protect myself, instead of trying to do God's work. **And- and- an-** and so that I think **is-** is my own failure

Overview of types of HP

- Silent pauses: Long pauses, not articulatory or juncture pauses (longer than 0.3-1.0 sec)
 - what I trace this to is _ uh a certain selfishness on my part
- Filled pauses: articulations that take some conventionalized form (e.g., *uh/um* in English, *e-to/ano-* in Japanese)
 - I'd break it up in stages, when uh I had a difficult youth.
- Lengthenings: prolongation of one or more syllables of a word so that its duration is excessively (?) long in its context
 - A:nd uh y- you know I think the process for me of growing up was to recognize that it's not about me

Overview of types of HP

- Repeats/restarts: repetition of a single word or sequence of words
 - I- **I** was so obsessed with me ...
- False starts: beginning of an utterance that is abandoned
 - when I uh **wh- when I** find myself um taking the wrong step ...
- Self-corrections: a sequence of words which is to be understood as a substitution of an immediately preceding sequence
 - I- I- w- **I couldn't** focus on other people.
- Lexical fillers: various fixed expressions used as hesitation devices
 - **Well**, i- i- i- in my own life ...

Overview of types of HP

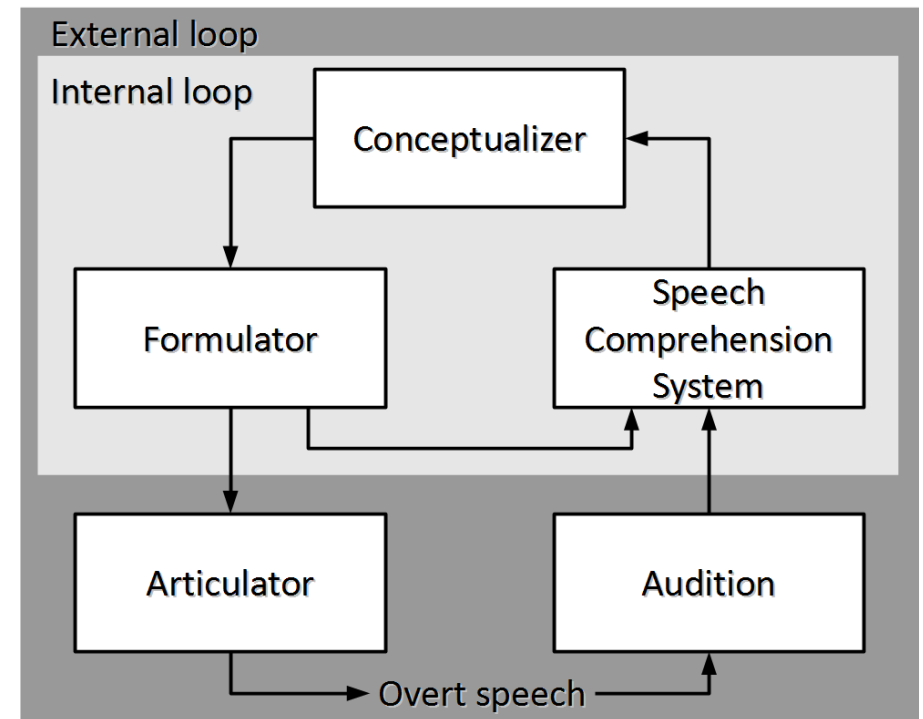
- Researchers categorize these in different ways leading to some confusion over terminology
- Research on HP usually leaves out lexical fillers.
- Speech errors (blends, transpositions, etc.) are not HP, though they may be closely connected phenomena

Models/accounts of HP in speech

- Indicative of syntactic processing, lexical search
 - Maclay and Osgood 1959
 - Goldman-Eisler 1961
- Used for interpersonal reasons
 - Turn-holding (Sacks et al 1974)
 - Mitigation/Face-saving (Brown and Levinson 1987)

Levelt's model of speech production

- Levelt 1983, 1989
- Modular system
- Two perceptual loops: internal and external
- Loops detect speech errors and initiate repair sequences
- Sequence: *reparandum*, *editing phase*, and *repair*
- Overt or covert sequences
- In this system, all HP are part of a repair procedure: e.g., pauses as part of editing phase, self-corrections as repairs
- Extended for L2 speech by Kormos 1999, 2000



Levelt's Model of Speech Production

th- the uh wh- when I uh wh- when I find myself

The diagram illustrates the production of the sentence "th- the uh wh- when I uh wh- when I find myself". It shows three instances of the model: 1) "th-" with a diagonal line from below labeled "reparandum"; 2) "the" with a vertical line from below labeled "editing phase"; 3) "uh wh-" with a diagonal line from below labeled "repair".

I- w- Ø I couldn't focus on other people.

The diagram illustrates the production of the sentence "I- w- Ø I couldn't focus on other people.". It shows three instances of the model: 1) "I-" with a diagonal line from below labeled "reparandum"; 2) "w- Ø" with a vertical line from below labeled "editing phase"; 3) "I couldn't focus on other people." with a diagonal line from below labeled "repair".

what I trace this to is Ø uh a certain selfishness

The diagram illustrates the production of the sentence "what I trace this to is Ø uh a certain selfishness". It shows three instances of the model: 1) "what I trace this to is" with a diagonal line from below labeled "reparandum"; 2) "Ø uh" with a vertical line from below labeled "editing phase"; 3) "a certain selfishness" with a diagonal line from below labeled "repair".

Characteristics of HP in L2 production

- Speech rate (Cucchiari et al 2010, Wu 2008, but see Trofimovich and Baker 2006, 2007)
- Silent pause duration and rate (Cucchiari et al 2010, Riazantseva 2001, Tavakoli 2011, Trofimovich and Baker 2007)
 - Age of arrival influences development (Trofimovich and Baker 2006)
- Filled pause rate (Rieger 2003, but see Wu 2008)
- Distribution (Rieger 2003)
- Differences between read and spontaneous speech (Cucchiari et al 2010)

Characteristics of 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)
- My current research is a partial attempt to address this critique

Cross-linguistic Corpus of Hesitation Phenomena (CCHP)

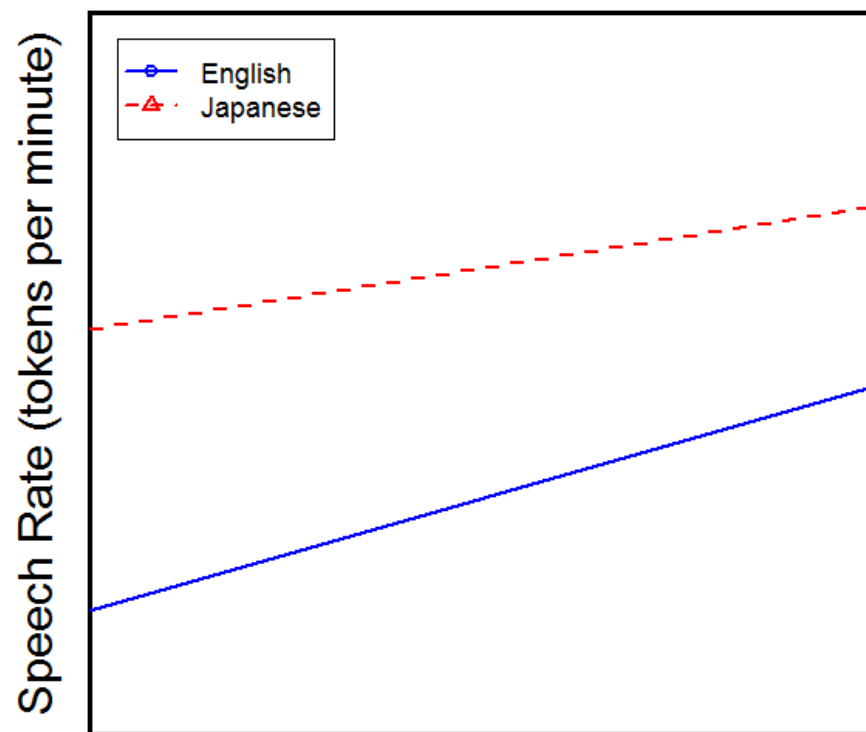
- Participants: L2 learners of varying proficiency levels
 - Ideal approach: longitudinal study
 - Difficult with current 1-year funding
- Elicitation tasks
 - Spontaneous speech: picture description, topic narrative
 - Reading aloud
 - Performed in both L1 and L2
- Demographic information: age, gender, L2 proficiency
- Annotation
 - Transcripts, HP, word & pause intervals, (F1,F2) for FPs
 - Two annotators, one checker
- Native speaker ratings of fluency and accent

CCHP Results: Basic Statistics

- Participants: 10 Japanese L1, English L2 speakers
- Fully annotated parts of corpus
 - 7,237 words
 - 71.7 minutes
- Spontaneous speech only
 - 4,191 words
 - 47.7 minutes

CCHP Results: Speech Rate

- Consistent with Cucchiarini et al 2010, Wu 2008, but contra Trofimovich and Baker 2006, 2007
- However, speech rate effects may be due to individual variation.
- Not really HP, but useful to help interpret later results

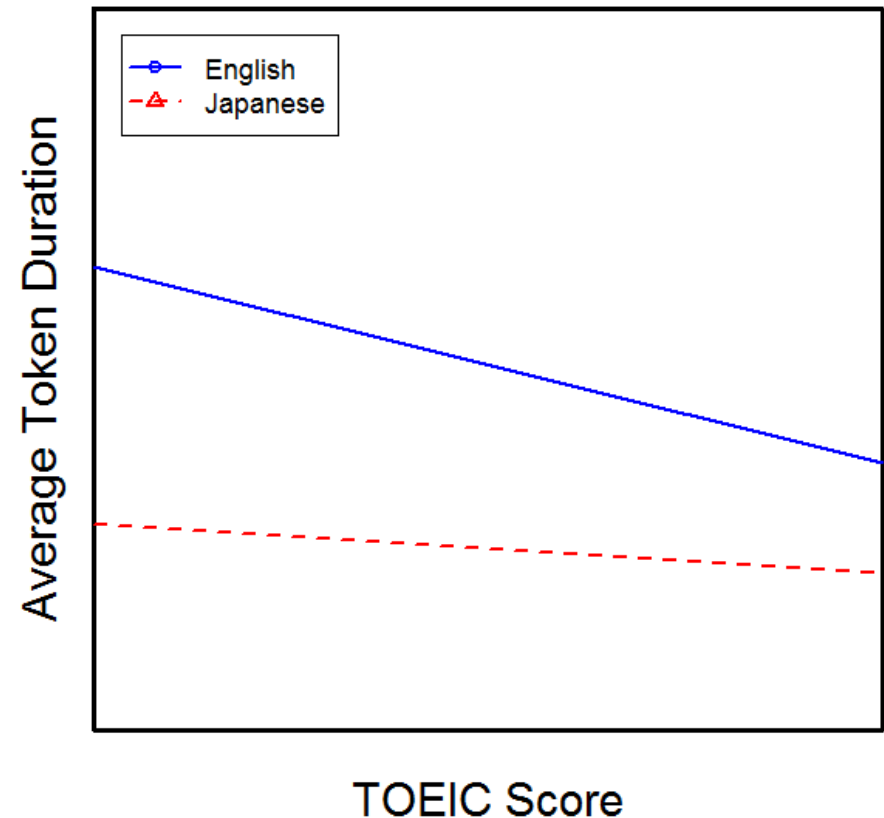


TOEIC Score

TOEIC	$F(1,68) = 21.3$	$p < 0.001$
LANGUAGE	$F(1,68) = 131.1$	$p < 0.001$
TOEIC * LANGUAGE	$F(1,68) = 1.9$	n.s.

CCHP Results: Token Duration

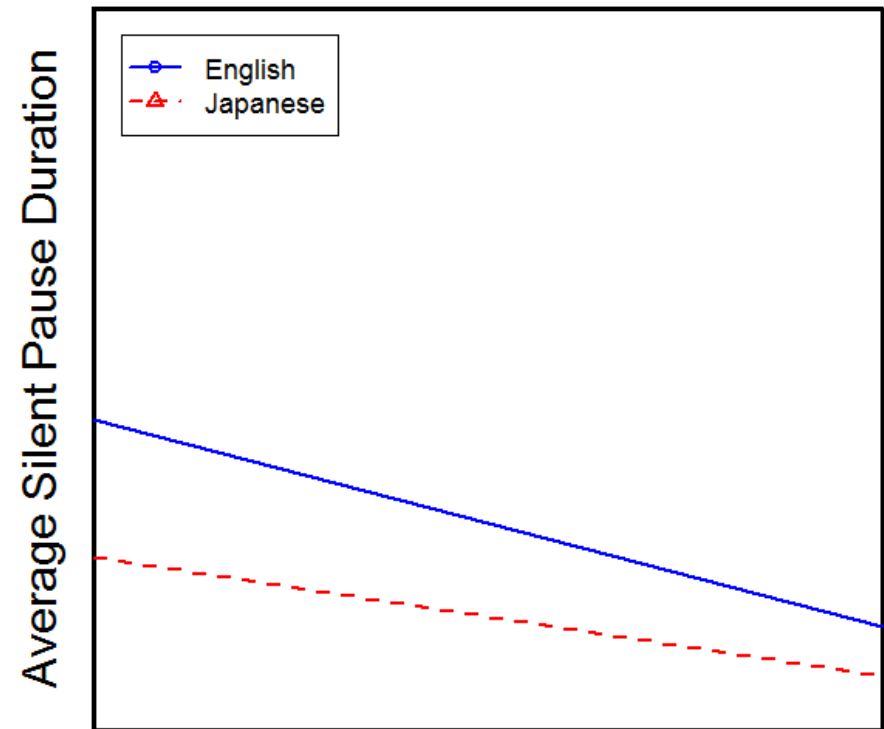
- Not much existing work on token duration in L2 speech production
- But, for comparison, articulation rate (phonemes per sec) is higher in read vs. spontaneous speech (Cucchiaroni et al 2010)



TOEIC	$F(1,68) = 7.9$	$p < 0.01$
LANGUAGE	$F(1,68) = 68.8$	$p < 0.001$
TOEIC * LANGUAGE	$F(1,68) = 3.0$	$p = 0.09$

CCHP Results: Silent Pause Duration

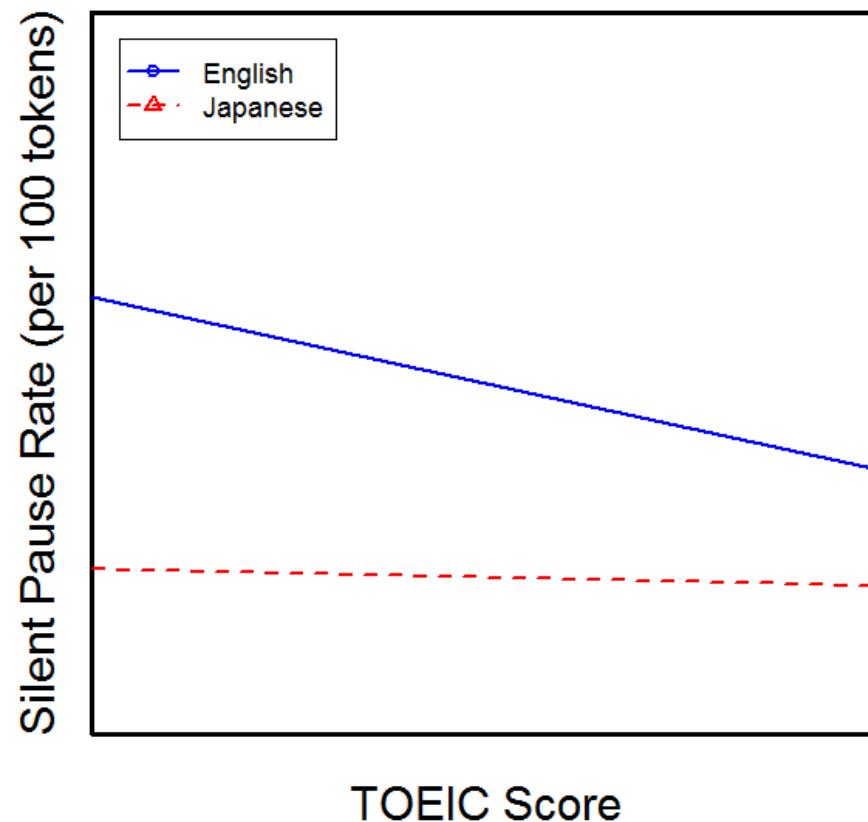
- Consistent with Cucchiarini et al 2010, Riazantseva 2001, Tavakoli 2011, Trofimovich and Baker 2007
- Silent pause duration effects may be due to individual variation.



TOEIC	$F(1,68) = 13.4$	$p < 0.001$
LANGUAGE	$F(1,68) = 17.2$	$p < 0.001$
TOEIC * LANGUAGE	$F(1,68) = 1.0$	n.s.

CCHP Results: Silent Pause Rate

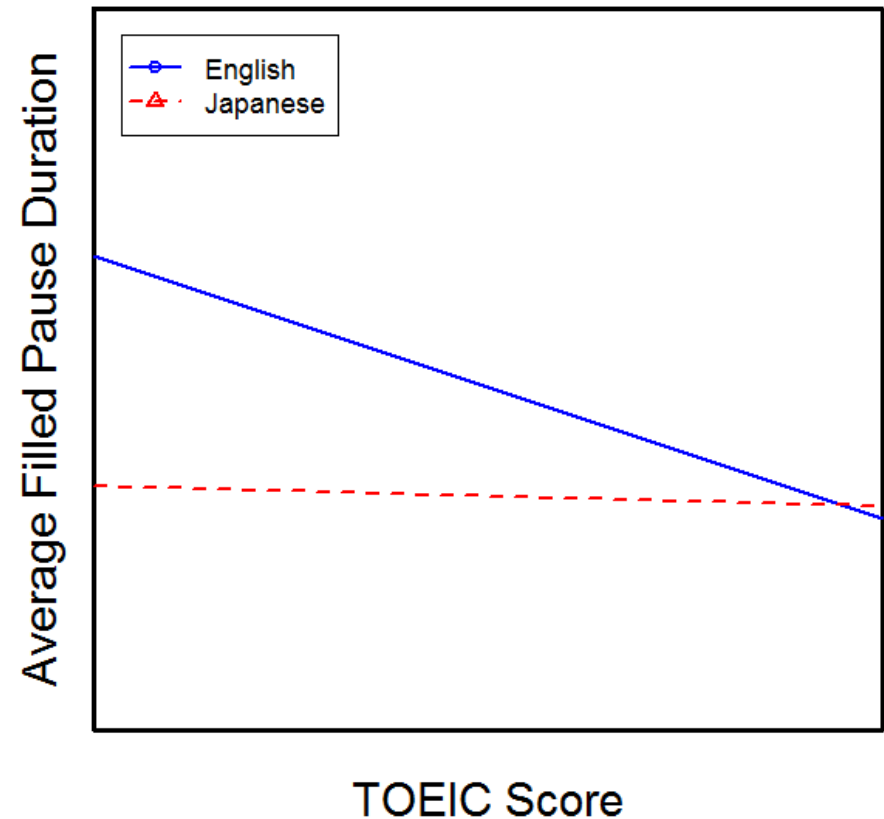
- Consistent with Cucchiarini et al 2010, Riazantseva 2001, Tavakoli 2011, Trofimovich and Baker 2007



TOEIC	$F(1,68) = 4.9$	$p < 0.05$
LANGUAGE	$F(1,68) = 79.0$	$p < 0.001$
TOEIC * LANGUAGE	$F(1,68) = 3.4$	$p = 0.07$

CCHP Results: Filled Pause Duration

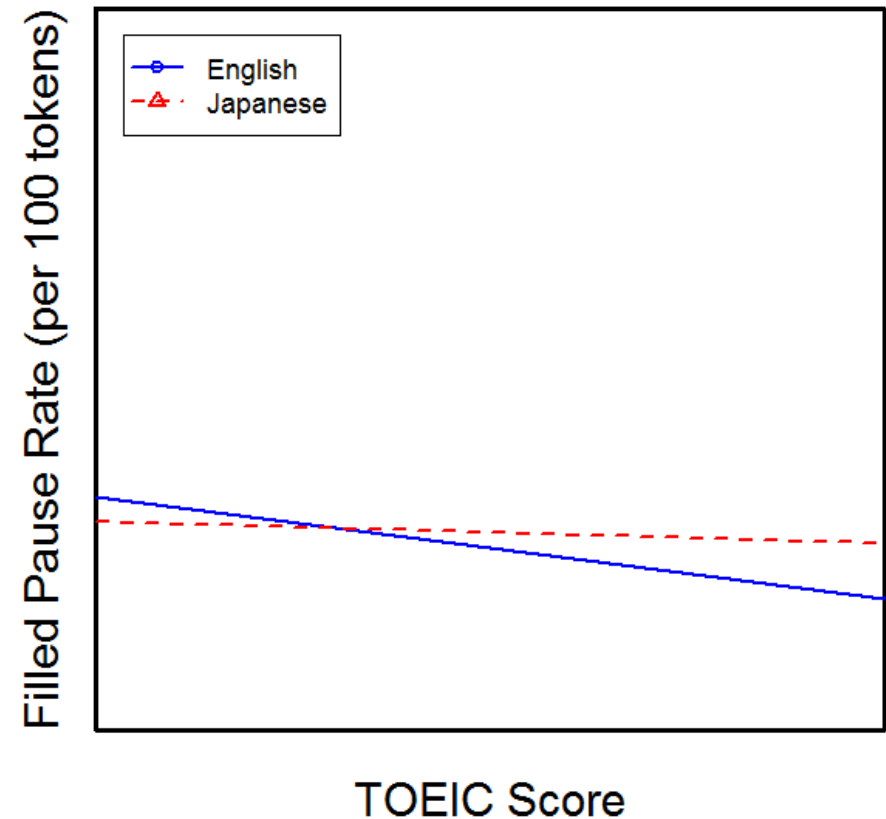
- Novel observation
- But, FP duration higher in read vs. spontaneous speech (Cucchiari et al 2010)



TOEIC	$F(1,61) = 5.6$	$p < 0.05$
LANGUAGE	$F(1,61) = 23.4$	$p < 0.001$
TOEIC * LANGUAGE	$F(1,61) = 5.7$	$p < 0.05$

CCHP Results: Filled Pause Rate

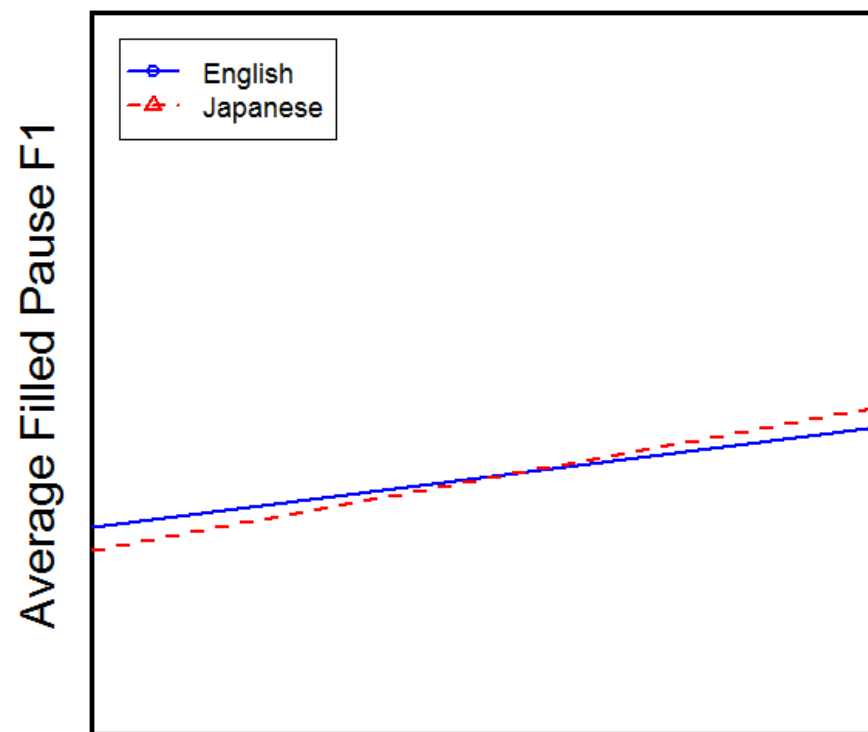
- Contra Rieger 2003, but consistent with Wu 2008 (and presumably other similar studies which have not reported an effect for FP rate)



TOEIC	$F(1,68) = 1.1$	n.s.
LANGUAGE	$F(1,68) = 0.0$	n.s.
TOEIC * LANGUAGE	$F(1,68) = 0.5$	n.s.

CCHP Results: Filled Pause F1

- Moving from Japanese /ε/ to English /ə/.
- Novel observation
- F1 change in L1 suggests a backwards influence of L2 FP forms on L1.

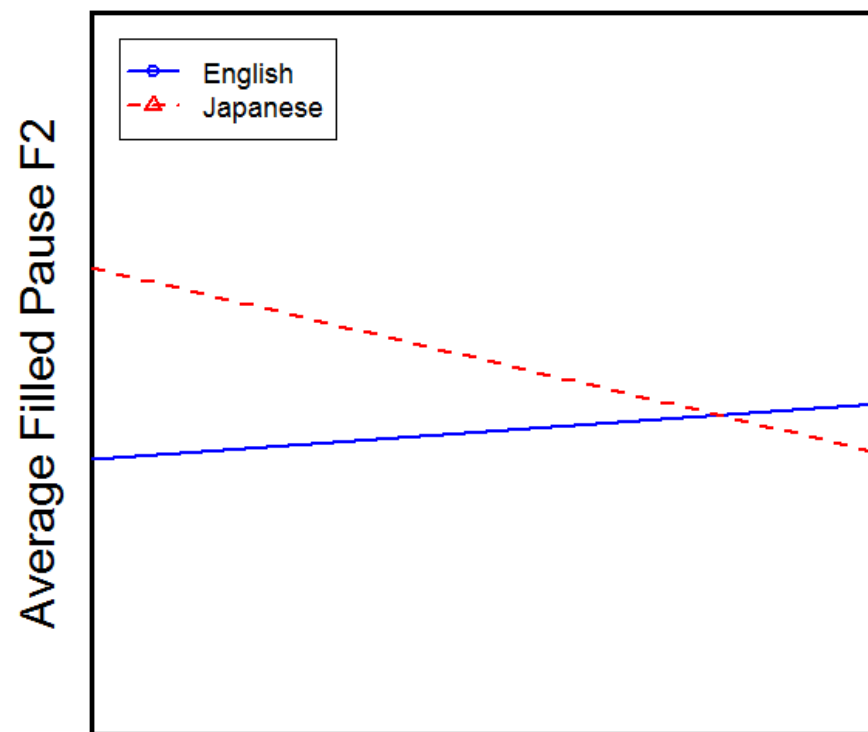


TOEIC Score

TOEIC	F(1,68) = 6.0	p<0.05
LANGUAGE	F(1,68) = 0.0	n.s.
TOEIC * LANGUAGE	F(1,68) = 0.2	n.s.

CCHP Results: Filled Pause F2

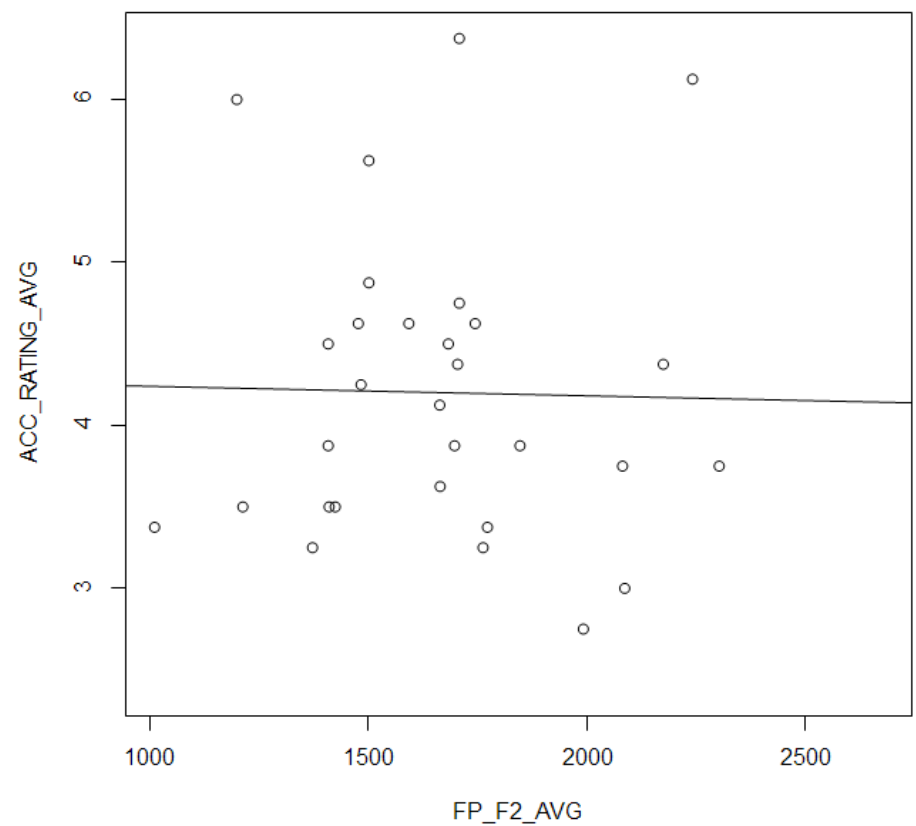
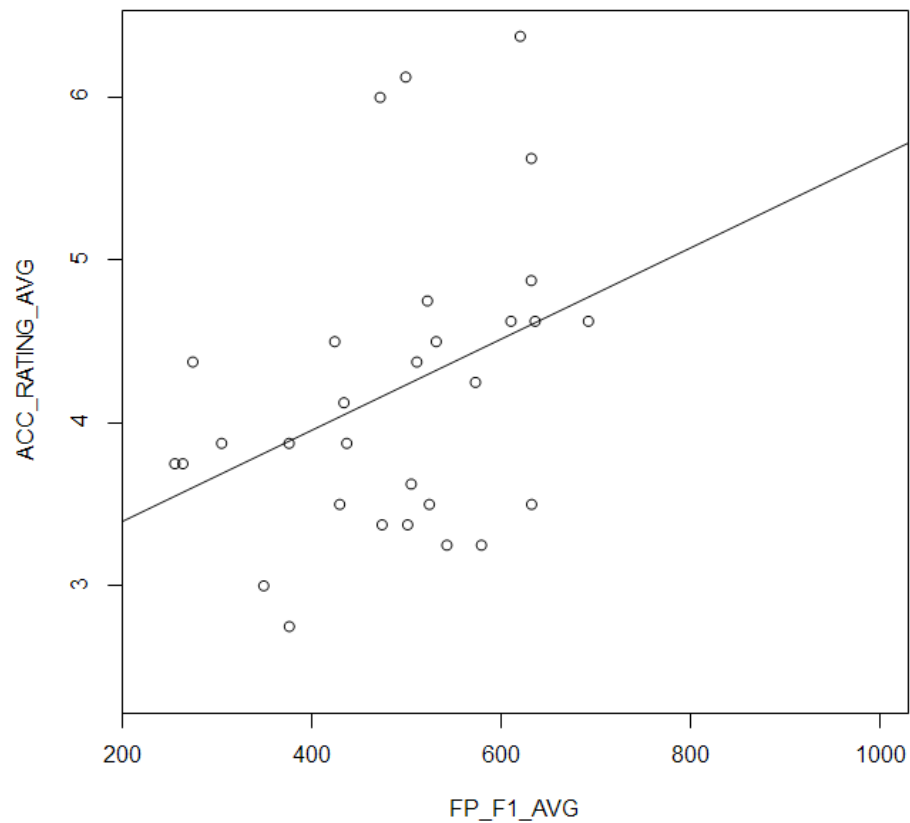
- Novel observation.
- Learners consistently back their vowels, but only high level learners lower the vowel



TOEIC Score

TOEIC	$F(1,68) = 1.9$	n.s.
LANGUAGE	$F(1,68) = 7.8$	$p < 0.01$
TOEIC * LANGUAGE	$F(1,68) = 3.9$	$p = 0.05$

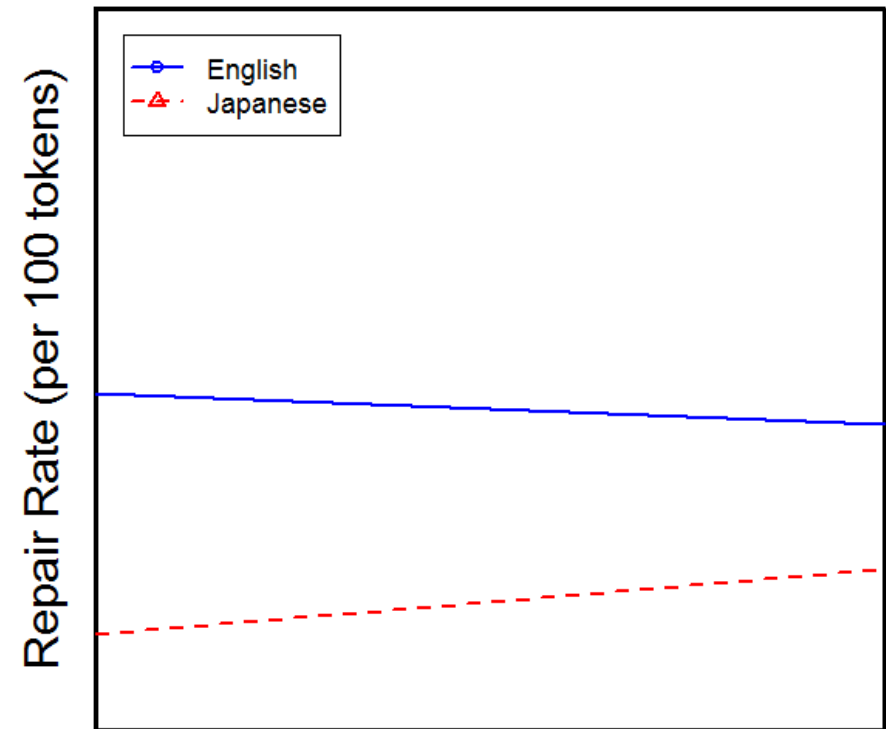
CCHP Results: Accent Ratings



(from Rose 2011a)

CCHP Results: Repair Rate

- Speakers consistently repair more in L2 (cf., Cucchiarini et al 2010).

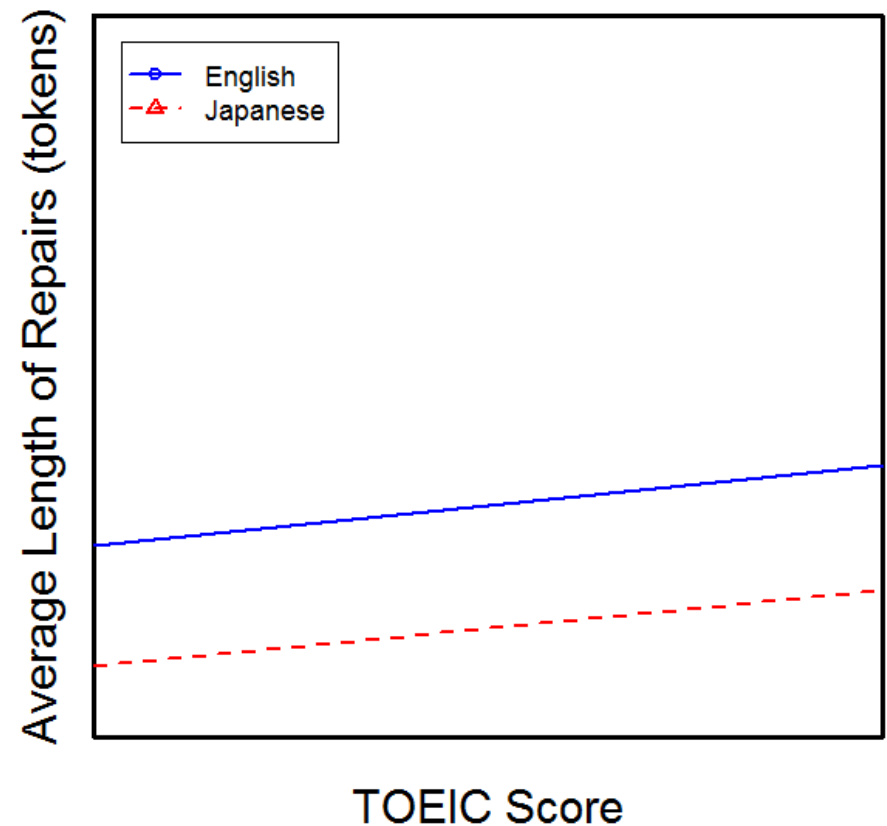


TOEIC Score

TOEIC	$F(1,68) = 0.1$	n.s.
LANGUAGE	$F(1,68) = 48.7$	$p < 0.001$
TOEIC * LANGUAGE	$F(1,68) = 0.8$	n.s.

CCHP Results: Repair Length

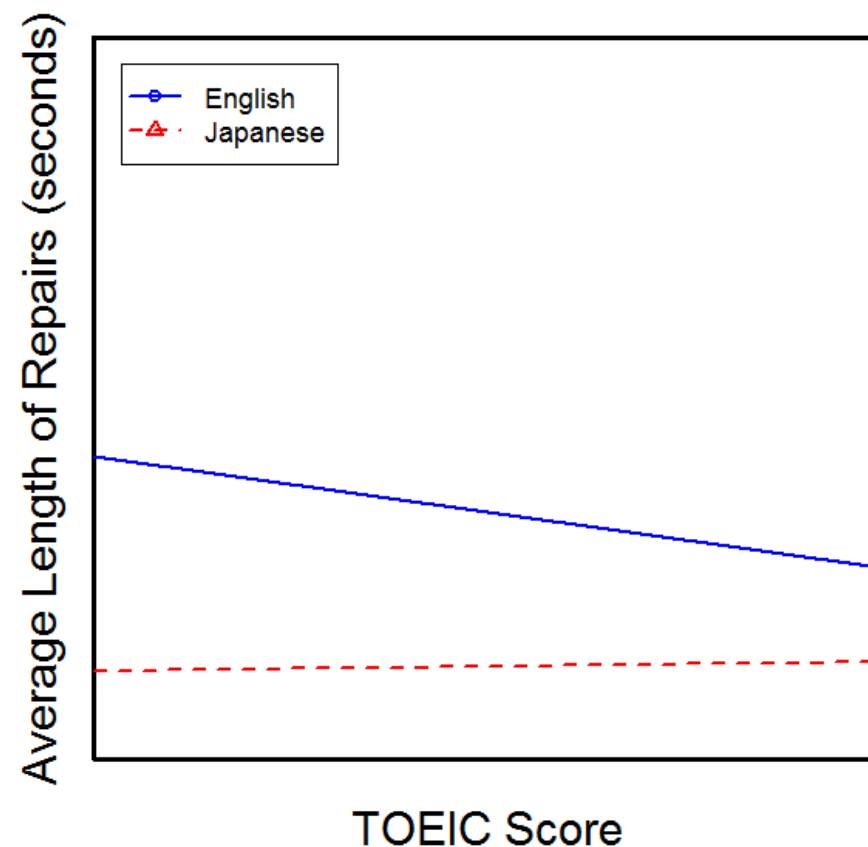
- The length of speakers' repair sequences (in tokens) is longer in L2.



TOEIC	$F(1,68) = 2.6$	n.s.
LANGUAGE	$F(1,68) = 20.8$	$p < 0.001$
TOEIC * LANGUAGE	$F(1,68) = 0.0$	n.s.

CCHP Results: Repair Length

- The length of speakers' repair sequences (per minute) is longer in L2.
- High-level speakers' repairs are not significantly shorter.
- (But even if they are shorter, this is likely caused by their higher speech rate.)



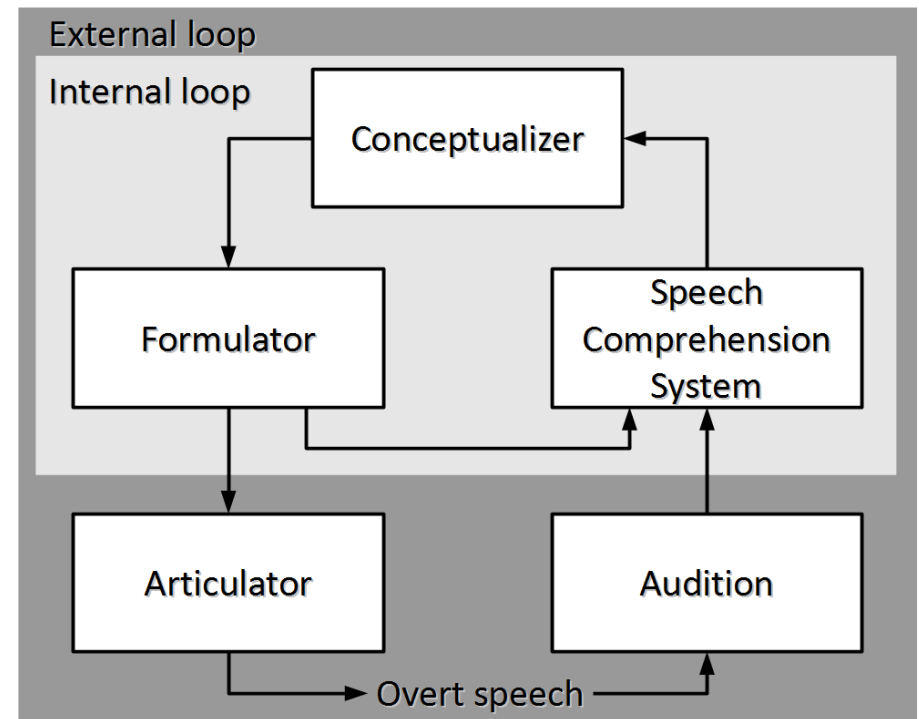
TOEIC	$F(1,68) = 0.5$	n.s.
LANGUAGE	$F(1,68) = 32.0$	$p < 0.001$
TOEIC * LANGUAGE	$F(1,68) = 1.3$	n.s.

Results Summary

- CCHP confirms that speech rate, token duration, and silent pause duration and frequency are reliable correlates of L2 proficiency.
- However, speech rate and silent pause duration variation may be explained by individual variation.
- CCHP does not confirm that FP rate is a reliable correlate.
- CCHP shows the novel observation that FP duration and FP vowel height (F1) are additional correlates.

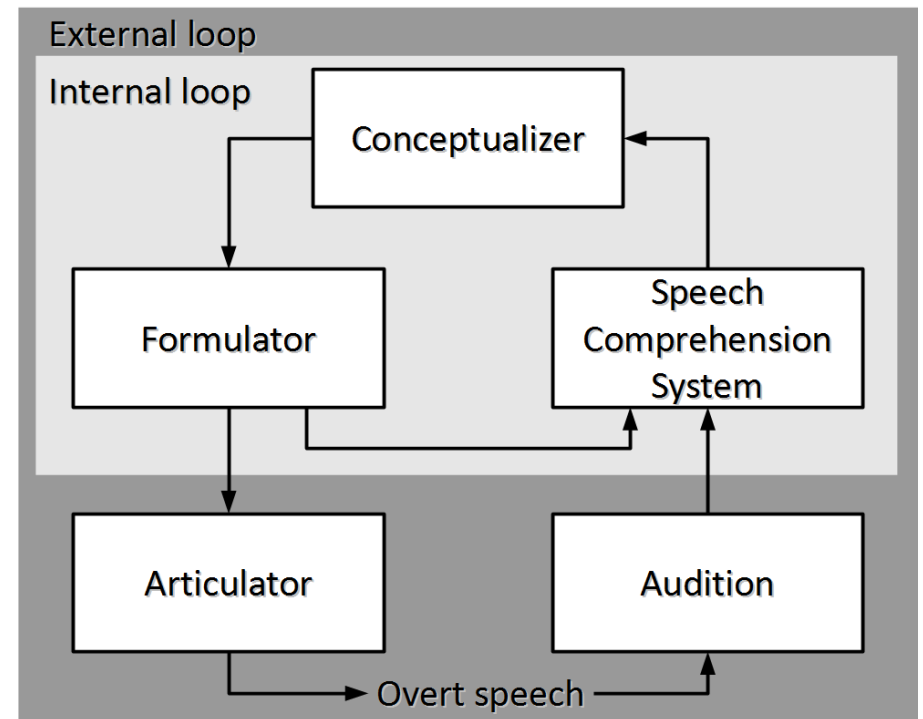
CCHP and Monitor Theory

- Low-level L2 speakers have limited linguistic resources.
- High cognitive burden at the conceptualizer and formulator levels
- Disengage the outer production-perception loop → longer and more frequent silent pauses



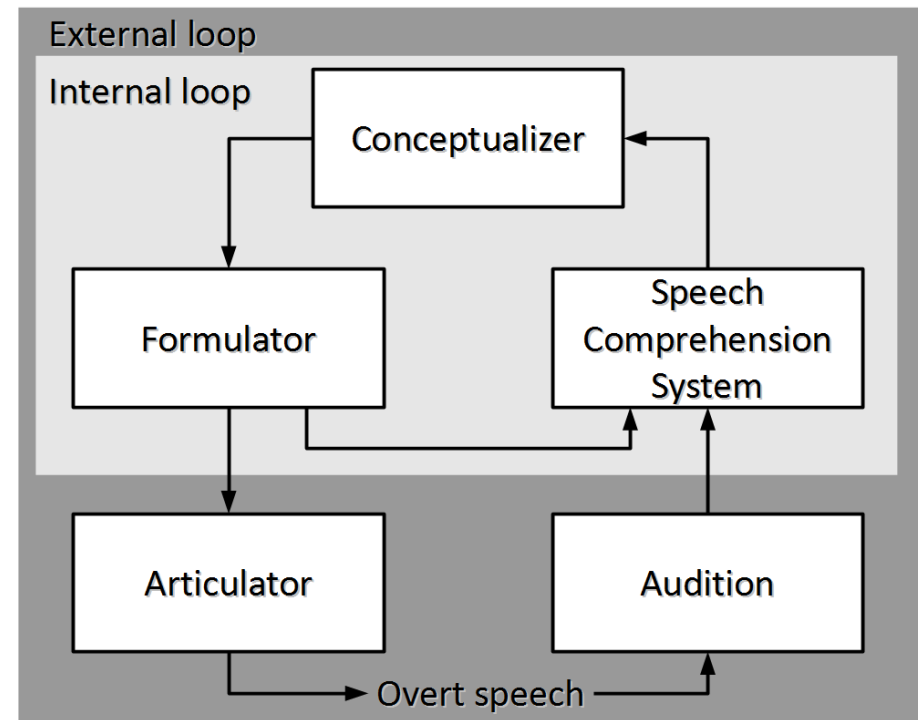
CCHP and Monitor Theory

- FP duration results suggest low-level speakers take longer to recover from external errors.
- However, repair length results are not consistent with this.
- Are high-level learners doing different kinds of repairs?
- Future work: do a detailed repair type analysis.



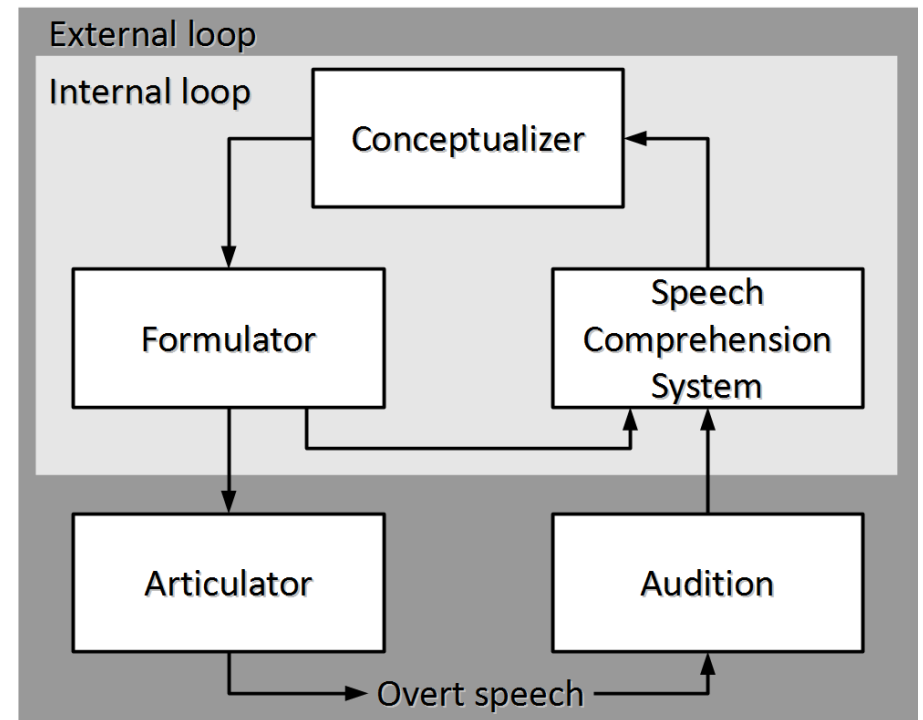
CCHP and Monitor Theory

- The FP vowel height effect is probably unrelated to the monitor theory.
- But there is independent evidence that hearers and speakers are largely unaware of their FPs (Lickley 1995, inter alia).



CCHP and Monitor Theory

- Do FPs go undetected in the outer perceptual loop?
- How do learners come to adopt conventionalized L2 FP forms?
- Does this fall out automatically from the progression of the learner's mastery of L2 phonology?



Cognitive Status of Filled Pauses

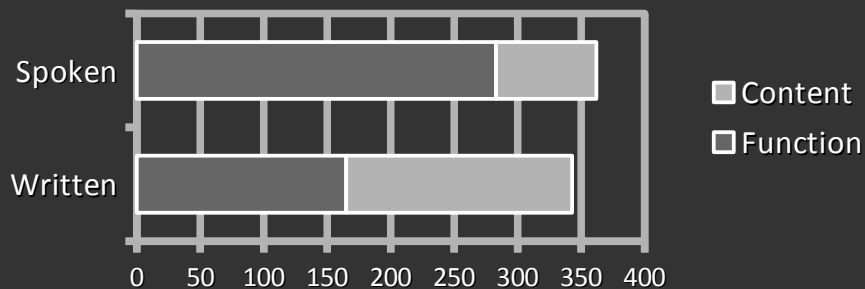
- FPs are words (Clark and Fox Tree 2002, Dirksmeyer 2011, Kjellmer 2003)
 - Conventionalized phonemic forms
 - Syntactically like interjections
 - Convey meaning: “I'm having some processing difficulty: Please wait...”
 - Open FP (uh): short wait
 - Closed FP (um): long wait
- FPs are not words (evidence is inconclusive: Corley and Stewart 2008)
 - FPs are not noticed
 - Other systematic phenomena are not words (e.g., clicks)

Cognitive Status of Filled Pauses

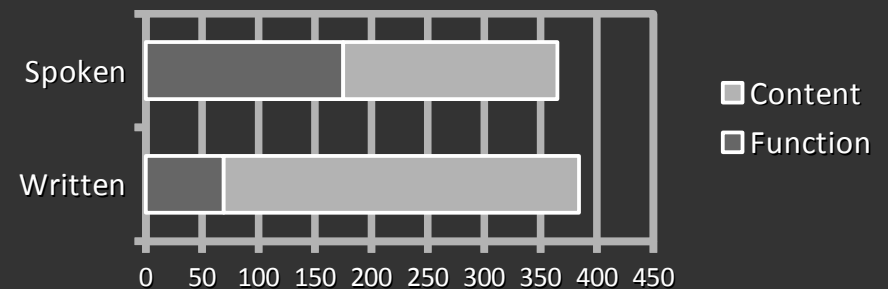
- Filled pauses coincide with lexical items in languages other than English, often demonstratives.
- Filled pauses are now commonly used in writing (e.g., blog entries, twitter)
 - Haynes 2011
 - Rose 2011b

Cognitive Status of Filled Pauses

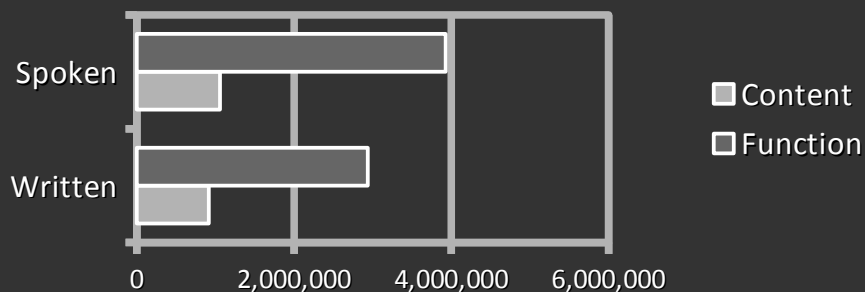
Ratio of Types of Word Following Clause Boundary FPs



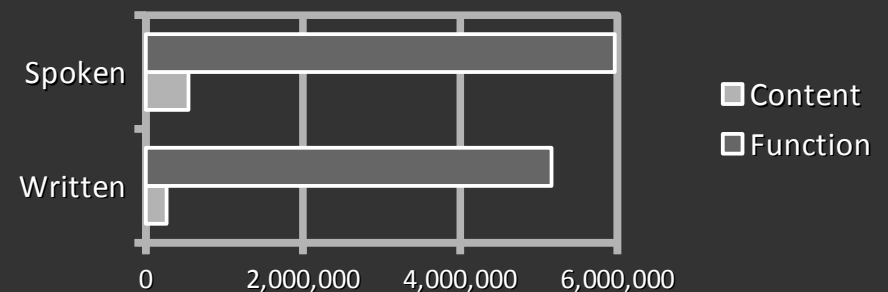
Ratio of Types of Word Following Clause-Internal FPs



Mean Frequency of Word Following Clause Boundary FPs



Mean Frequency of Word Following Clause-Internal FPs



(from Rose 2011b)

- Writers highlight whole clauses with FPs.
- Writers highlight clause-internal low-frequency content words with FPs.

Cognitive Status of Hesitation Phenomena

- Silent pauses
 - Universal, but
 - Pausing patterns vary across languages
 - Is this something that learners acquire independently?
 - Or does it fall out from the interaction of other features of the language (e.g., syntax and prosody, cf., de Jong 2011).
- Repairs
 - Vary cross-linguistically
- Lengthenings
 - Similar to FPs (Rose 2009)

Future Work with CCHP

- Deeper annotation
 - Syntactic structure
 - Part-of-speech information
 - Syllable and phoneme intervals
 - (F1,F2) measurements
- More speakers
- More L1-L2 combinations

Summary

- Previous work on Hesitation Phenomena has yielded many results, but conclusiveness sometimes limited by lack of L1 baseline data.
- CCHP addresses this gap and confirms that speech rate, token duration, and silent pause duration and frequency correlate with L2 proficiency. However, speech rate and silent pause duration effects may be due to individual variation.
- CCHP also shows that FP duration and FP F1 (but not F2) correlate with L2 proficiency—novel observations.
- The cognitive status of FPs and other HP remains an open question, though new media may point towards an answer.

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