



Teaching Beginning Readers to Decode Unfamiliar Words: Connected Phonation Is More Effective than Segmented Phonation

Webinar Tips



Close all programs & browsers to maximize bandwidth



Exit & re-enter the webinar if you experience an audio or video lag



Use the Questions feature for technical assistance (and to ask a question!)



The recording, slide deck & certificate will be sent by email tomorrow

Meet Your Presenter



Dr. Selenid Gonzalez-Frey

PRODiG Fellow

Elementary Education and Literacy
SUNY Buffalo State

Lead author of *Connected Phonation is More Effective than Segmented Phonation for Teaching Beginning Readers to Decode Unfamiliar Words* with Dr. Linnea Ehri



What You Will Learn

- Some difficulties students experience with decoding words
- How connected phonation can help students overcome some of these difficulties
- How connected phonation fits into systematic and explicit programs that teach reading
- The instructional implications of using words made up of continuant consonants to teach decoding before moving into words made up of stop consonants

Decoding is Central to Learning to Read

- **Simple view** of reading: decoding x language comprehension
 - $RC = D \times LC$
- Chall's stage theory: **Stage 1** Decoding
- Ehri's phase theory: decoding moves readers from **partial to full phase**
 - Decoding enables reading **unfamiliar words**
 - Decoding activates mapping, bonds spellings to pronunciations in memory to enable **sight word reading**
- David Share: decoding for **self-teaching** new words

Decoding is Central to Learning to Read

A central aim of reading instruction is to support children in becoming fluent readers with effective comprehension skills.

To reach this goal, beginners need to acquire the ability to decode words.

Chall's (1983) 6 Stages of Reading Abilities

- Stage 0: prereading
- Stage 1: decoding
- Stage 2: fluency
- Stage 3: reading to access new ideas
- Stage 4 & 5: comprehend text with multiple POVs

Ehri's (2005) Phase Theory: 4 Phases of Sight Word Reading Development

- Pre-alphabetic
- Partial alphabetic
- Full alphabetic
- Consolidated alphabetic

Decoding is Central to Learning to Read

A central aim of reading instruction is to support children in becoming fluent readers with effective comprehension skills.

To reach this goal, beginners need to acquire the ability to decode words.

Chall's (1983) 6 Stages of Reading Abilities

- Stage 0: prereading
- **Stage 1: decoding**
- Stage 2: fluency
- Stage 3: reading to access new ideas
- Stage 4 & 5: comprehend text with multiple POVs

Ehri's (2005) Phase Theory: 4 Phases of Sight Word Reading Development

- Pre-alphabetic
- Partial alphabetic
- Full alphabetic
- Consolidated alphabetic

Decoding is Central to Learning to Read

A central aim of reading instruction is to support children in becoming fluent readers with effective comprehension skills.

To reach this goal, beginners need to acquire the ability to decode words.

Chall's (1983) 6 Stages of Reading Abilities

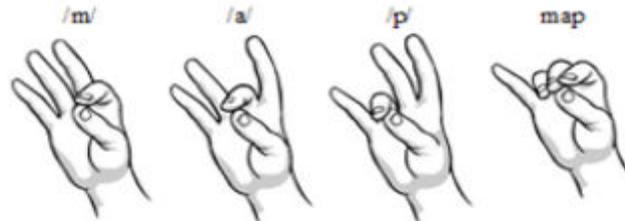
- Stage 0: prereading
- **Stage 1: decoding**
- Stage 2: fluency
- Stage 3: reading to access new ideas
- Stage 4 & 5: comprehend text with multiple POVs

Ehri's (2005) Phase Theory: 4 Phases of Sight Word Reading Development

- Pre-alphabetic
- **Partial alphabetic**
- **Full alphabetic**
- Consolidated alphabetic

Decoding Instruction

- Synthetic Phonic Programs
 - A common approach is to teach students to segment individual phonemes in words by pausing between the phonemes before blending them together
- Ex.: Wilson Foundations Program
 - Uses a tapping method
 - Students use their fingertips to represent each phoneme as they orally segment the phonemes with pauses between phonemes
 - Then must blend the phonemes to form a word
 - Students smoothly run their thumb under each fingertip used to represent the phonemes in the words



Segmented Phonation

Learning Difficulties: Problem Motivating Study

- Practitioners often observe readers struggling to put the letter-sounds back together to determine its pronunciation
- Stop Consonants
 - Problematic when students are tasked with blending stop consonants
 - Requires students to delete the schwa vowels attached to the isolated sounds (e.g., bə – a – tə) in order to blend the sounds to form the words (e.g., bat)
 - In addition, must remember which sounds were spoken when the students puts the isolated sounds together to blend them



Literature Review:

Oral Blending of Phonemes

- Murray, Brabham, Villaume, and Veal (2002) examined 3 ways to orally segment words to evaluate their effects on ease of blending those words correctly:
 - words segmented into onset-rime (e.g., bl-ink)
 - words segmented using body-coda (e.g., bli-nk)
 - words segmented into their individual phonemes

Found that students were rarely successful in blending when words were segmented with pauses introduced after each phoneme

- Cassady and Smith (2004) also found that body-coda blending was easier than both onset-rime and phoneme blending which did not differ

Literature Review:

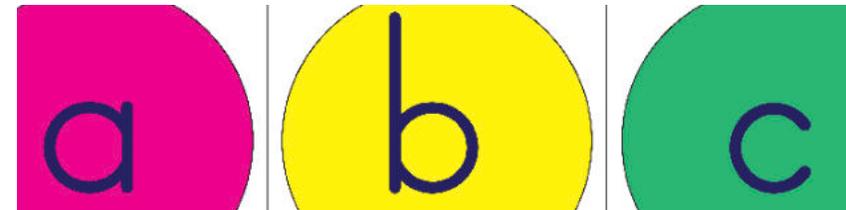
Oral Blending of Phonemes

- Weisberg, Andracchio, and Savard (1989) investigated whether pausing between phonemes of a word compared to not pausing when segmenting would affect oral word blending ability:
 - Examined 3 different pause intervals:
 - No pause (0 second pause)
 - 1 second pause
 - 3 second pause
- Results indicated that students produced more correct real and nonwords after hearing the phonemes streamed (0 second pause) than after hearing the phonemes segmented with breaks (1 second pause and 3 seconds pause)

Literature Review:

Blending of Phonemes When Decoding

- Weisberg and Savard (1993) investigated the effects of (1) pausing & (2) not pausing between phonemes on blending ability
- Results showed that students in the 1 second pause group exhibited more difficulty blending
- In both conditions, students did not have difficulty in correctly identifying the phonemes in the target words when segmenting them
 - However, students in the 1 second pause condition tended to delete sounds from the words when blending
- **Thus, an important finding is that to teach decoding skills, letter sound knowledge is essential but, on its own, is not sufficient**



How Might the Decoding Task Be Made Easier?

- Constable (2010) compared the effectiveness of two approaches to sounding out words when learning to read
- Decoding instruction (learning trial) involved same set of words for both groups
 - Words consisted of continuant phonemes that could be stretched & held without breaking the speech stream
 - Continuous speech production (Connected phonation)
 - Segmented speech production (Segmented phonation)
 - Control condition
- Decoding transfer task with stop consonants
- Findings
 - Students in the segmented speech production group reached criterion sooner during learning trial
 - Students receiving continuous speech production training outperformed students receiving segmented speech production training on the transfer task
 - The continuous group was more successful at transferring their decoding strategy to words with stop consonants

How Might the Decoding Task Be Made Easier?

Connected Phonation Procedure

Teach students to hold and connect adjacent phonemes that are represented by letters rather than break with a pause between phonemes before they are blended

- This is possible with **continuant consonants** (f, l, m, n, s)
 - Sound can be held without altering their form
ffff llll mmmmm nnnnn ssssss
- Children read CVC nonwords with continuant consonants & vowels
- They **stretch & hold sounds of letters with no breaks** (ex., mmmmaaaaaffff)
- Then they blend the sounds to pronounce the word “maf”
- They practiced with corrective feedback until perfect

Research Questions

1. Will beginning readers learn to decode CVC nonwords containing continuant consonants more readily when they are taught with the connected phonation procedure than with the segmented phonation procedure?
2. Will decoding skill transfer more readily to new CVC nonwords containing stop consonants when preceded by connected phonation training than by segmented phonation training?

Research Questions

3. Will the beneficial effects of blending instruction with no pauses persist over time on a delayed posttest assessing CVC nonword reading with stop consonants?
4. Will the beneficial effects transfer to different literacy tasks that were not taught including reading more complex nonwords with consonant clusters (CCVC), reading CVC real words, and spelling CVC nonwords?

Methods

Participants

- Kindergarteners
- Proficient in English, no learning disabilities

Pretests: Administered on Day 1

- Letter name and sounds of 13 target letters
 - Stops: b, d, k, p, t Continuants: f, l, m, n, s
 - Short vowels: a, i, o (short vowel sounds)
- Decode 5 CVC nonwords
- Read 20 pre-primer and 20 primer words
- Phonemic Awareness
- Spelling Nonwords

Eligibility:

- Knew sounds of 13 target letters
- Read no more than 1 CVC nonword

Methods: Pilot Study vs. Dissertation

Our Participants

Pilot Study	Dissertation
Had received Foundations Instruction	No prior explicit decoding instruction
In both: They could sound out letters But could not blend them to decode nonwords	

Methods

Participants

- Kindergarteners
- Proficient in English, no learning disabilities

Pretests: Administered on Day 1

- Letter name and sounds of 13 target letters
 - Stops: b, d, k, p, t Continuants: f, l, m, n, s
Short vowels: a, i, o (short vowel sounds)
- Decode 5 CVC nonwords
- Read 20 pre-primer and 20 primer words
- Phonemic Awareness
- Spelling Nonwords

Eligibility:

- Knew sounds of 13 target letters
- Read no more than 1 CVC nonword

Methods: Treatment Conditions

- Students were matched on word reading scores & members of pairs were randomly assigned to one of the two treatment conditions
- Both conditions used the same 20 CVC nonwords made up of continuants consonants & vowels

Connected Phonation Condition

Taught to pronounce phonemes corresponding to letters with no pauses

- Learned to run finger beneath each letter in the word, without stopping
- For ex.: “san” read as sssaaannn without stopping



Segmented Phonation Condition

Taught to pause between phonemes prior to blending

- Learned to point to each letter in the word, stopping movement at each letter
- For ex.: “san” read as /s/ /a/ /n/ with a pause between phonemes

Methods: Training Task

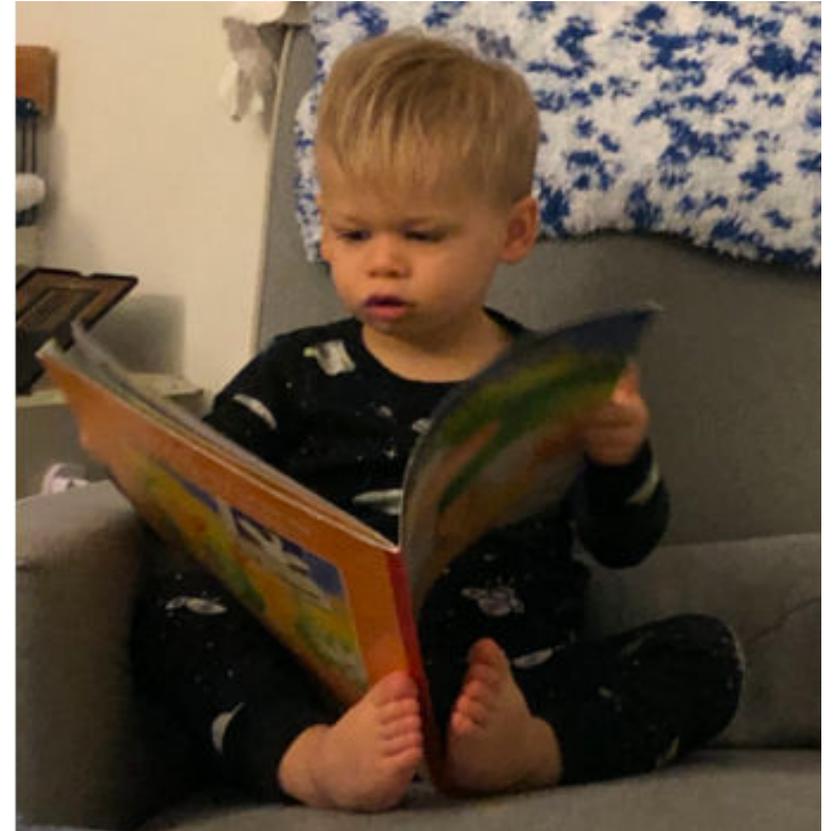
Decoding Training with Continuants

Continuous Phonation Condition & Segmented Phonation Condition

- The first 5 words were used to model
- Words 6 – 20, the students were asked to sound out each word by either stopping or not stopping between sounds before blending the sounds to read the words
- Corrective feedback was provided
- Continued until they could blend 5 words in a row correctly
- Assessed on the # of words practiced before reaching criterion

Immediate Posttests

- Transfer Posttest with Stop Consonants
- CCVC Nonword Reading



Methods: Transfer Posttest

Transfer Posttest with Stop Consonants

- 20 novel nonwords with initial and final stop consonants
- Shown one word at a time
- No corrective feedback provided
- Students scored on ability to accurately read each word as a whole, succinct word

Methods: CCVC Nonword Reading

- 8 CCVC nonwords made up of continuants and stop consonants
- Students were shown one word at a time
- No corrective feedback was provided
- Students were scored on ability to read each word as a whole, succinct word

Nonwords with Continuants	Nonwords with Stops
SLIF FLAM SNOM SMAN	STIP SPAK SKIB KLOD

Delayed Posttests

- Nonword Decoding Task (addressing RQ 3)
 - 20 novel CVC nonwords
 - 1st read the 10 nonwords composed of stop consonants
 - Then, the 10 nonwords composed of continuants
- Phonemic Awareness (addressing RQ 4)
 - Blending Phonemes into Words
 - Segmenting Words into Phonemes
- Real Word Reading (addressing RQ 4)
 - 12 real CVC words
- Spelling Nonwords (addressing RQ 4)
 - Students listened to and asked to spell 10 CVC nonwords

Delayed Posttests

- **Nonword Decoding Task** (addressing research question 3)
 - 20 novel CVC nonwords
 - 1st read the 10 nonwords composed of stop consonants
 - Then, the 10 nonwords composed of continuants
- Phonemic Awareness (addressing research question 4)
 - Blending Phonemes into Words
 - Segmenting Words into Phonemes
- Real Word Reading (addressing research question 4)
 - 12 real CVC words
- Spelling Nonwords (addressing research question 4)
 - Students listened to and asked to spell 10 CVC nonwords

Delayed Posttests

- **Nonword Decoding Task** (addressing research question 3)
 - 20 novel CVC nonwords
 - 1st read the 10 nonwords composed of stop consonants
 - Then, the 10 nonwords composed of continuants
- **Phonemic Awareness** (addressing research question 4)
 - Blending Phonemes into Words
 - Segmenting Words into Phonemes
- Real Word Reading (addressing research question 4)
 - 12 real CVC words
- Spelling Nonwords (addressing research question 4)
 - Students listened to and asked to spell 10 CVC nonwords

Delayed Posttests

- **Nonword Decoding Task** (addressing research question 3)
 - 20 novel CVC nonwords
 - 1st read the 10 nonwords composed of stop consonants
 - Then, the 10 nonwords composed of continuants
- **Phonemic Awareness** (addressing research question 4)
 - Blending Phonemes into Words
 - Segmenting Words into Phonemes
- **Real Word Reading** (addressing research question 4)
 - 12 real CVC words
- Spelling Nonwords (addressing research question 4)
 - Students listened to and asked to spell 10 CVC nonwords

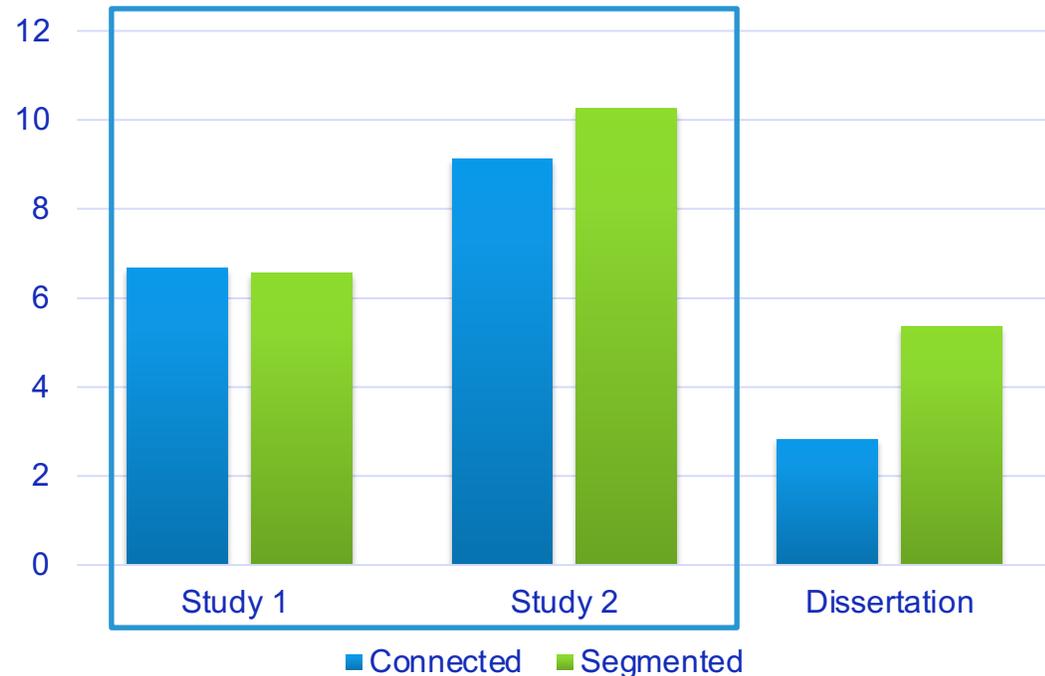
Delayed Posttests

- **Nonword Decoding Task** (addressing research question 3)
 - 20 novel CVC nonwords
 - 1st read the 10 nonwords composed of stop consonants
 - Then, the 10 nonwords composed of continuants
- **Phonemic Awareness** (addressing research question 4)
 - Blending Phonemes into Words
 - Segmenting Words into Phonemes
- **Real Word Reading** (addressing research question 4)
 - 12 real CVC words
- **Spelling Nonwords** (addressing research question 4)
 - Students listened to and asked to spell 10 CVC nonwords

Results: Training Task

Hypothesis 1: During learning trials decoding continuant consonants, the connected phonation group will outperform the segmented phonation group

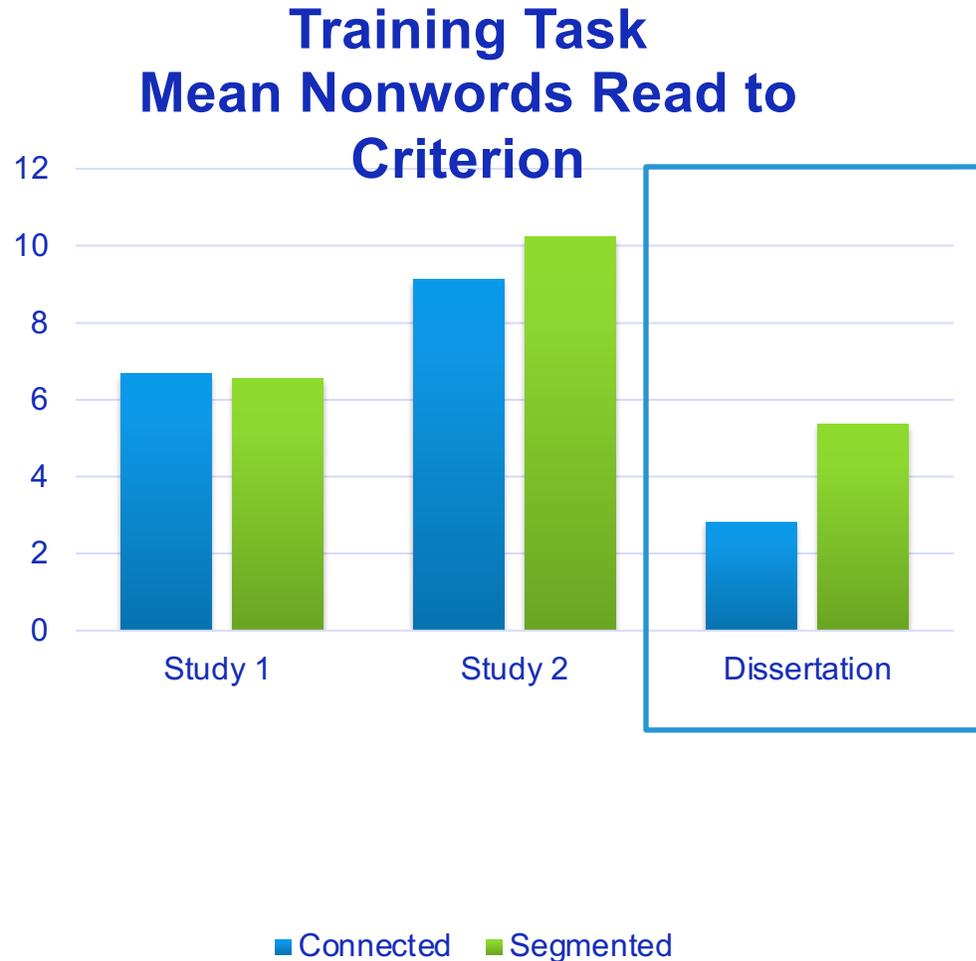
Training Task Mean Nonwords Read to Criterion



Why didn't connected training speed up learning in the pilot study?

- Children in connected condition had to overcome habit of pausing between sounds due to classroom Foundations program
- Correction of these errors delayed their learning

Results: Training Task

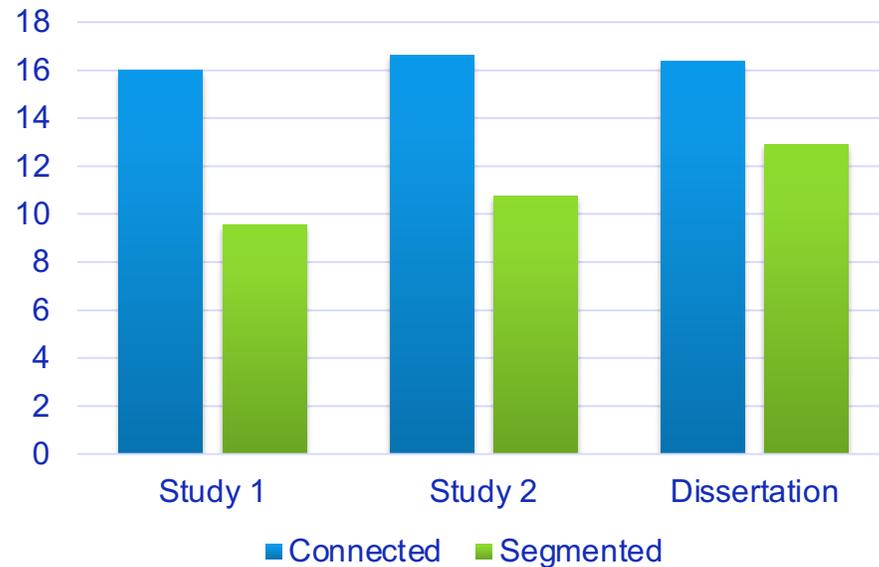


- In contrast, students in the dissertation study had not been exposed to decoding instruction
- Those in the connected condition were not hindered in learning to stretch and connect phonemes
- They required fewer trials to learn to decode

Results: Transfer Task

Hypothesis 2: During transfer task decoding stop consonants, the connected phonation group will outperform the segmented phonation group

**Transfer Task
Mean Nonwords Correct
(20 max)**



- Children receiving the connected training decoded many more stop consonant nonwords accurately than children receiving segmented training
- The connected phonation training was more effective
- Cohen's $d = 2.60$ for study 1 and 2
- Cohen's $d = 1.32$ for dissertation study

Results: Transfer Task - Error Analysis

- Students in the segmented phonation group
 - mispronounced significantly more nonwords containing stop consonants
 - almost all of the mispronunciations consisted of substituting one incorrect phoneme
- Students in the segmented phonation group mis-recalled many more **initial stop consonants** when blending the sounds to say the nonword than connected students

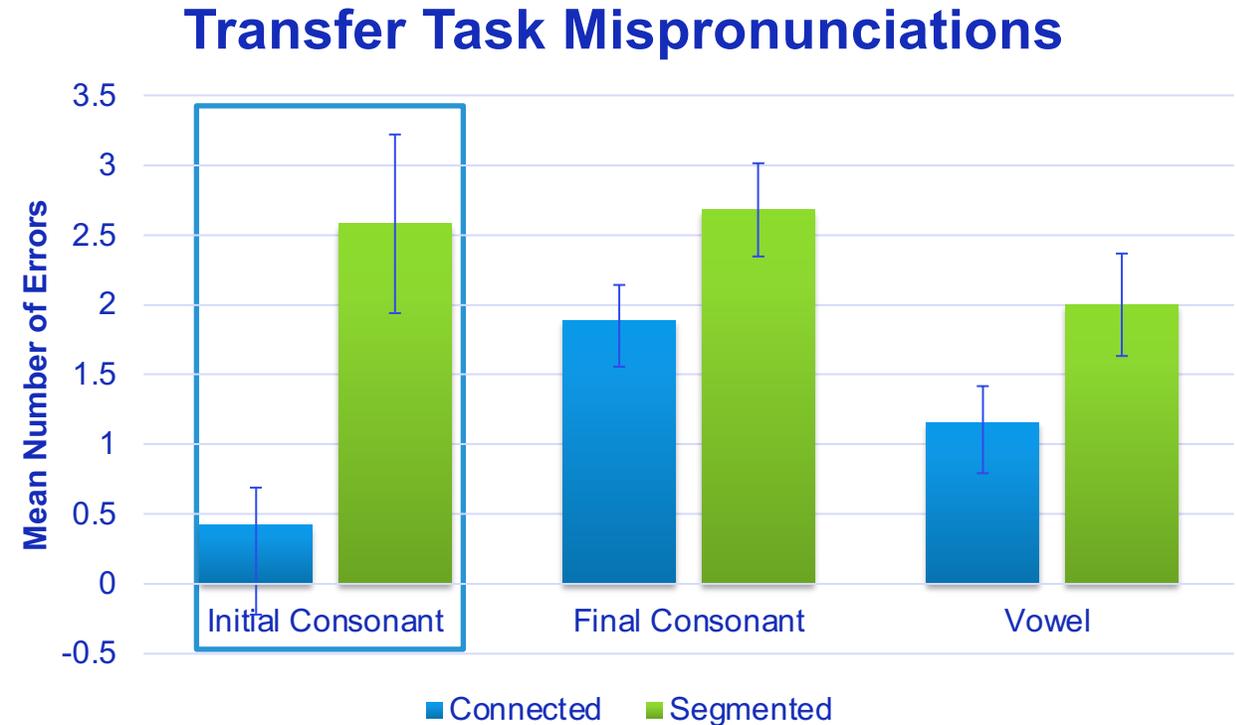


Figure 3. Mean number of errors in the initial consonant, final consonant, and medial vowel position by students in the connected and segmented phonation group.

Results: Delayed Nonword Decoding

Research Question 3: Would the connected phonation training persist over time on a delayed posttest assessing nonword reading with stop consonants?

- An ANOVA was conducted on nonwords correct with treatment and consonant type as the independent variables
 - There were no significant main effects of treatment or consonant type but
 - A significant interaction between the two variables
- **The connected group decoded substantially more stop consonant nonwords than the segmented group,**
 - $d = 0.62$.
- However, there was no difference between the groups in their decoding of continuant nonwords.

Delayed CVC Nonword Reading: What does this tell us?

- The connected phonation group decoded more stop consonants nonwords
- No comparable difference between the two groups in their decoding of continuant nonwords
 - May be because students in both groups received training and corrective feedback in reading nonword with continuant phonemes
- Big takeaway - Beneficial effects of connected phonation training on reading nonwords with stop consonants were still evident one day later

Results

Research Question 4: Would the effects of training transfer to different literacy skills not taught during training

CCVC Nonword Reading

- No significant difference between the connected phonation group & the segmented phonation group ($t(36) = 1.93, p = 0.06$)
 - Students in both training condition read on average approximately the same number of words correct
 - Succeeded in reading on average 73% of the nonwords correctly
 - Suggests that both forms of decoding training transferred and enabled students to read more complex nonwords

Delayed Real Word Reading

- No significant difference between the two groups $t(36) = .434, p = 0.67$
 - Students were successful in reading 82% of the real words on average

Delayed Nonword Spelling

- No significant difference between the two groups $t(36) = -0.58, p = 0.57$

Results: Phonemic Awareness

Research Question 4: Would the effects of training transfer to different literacy skills not taught during training

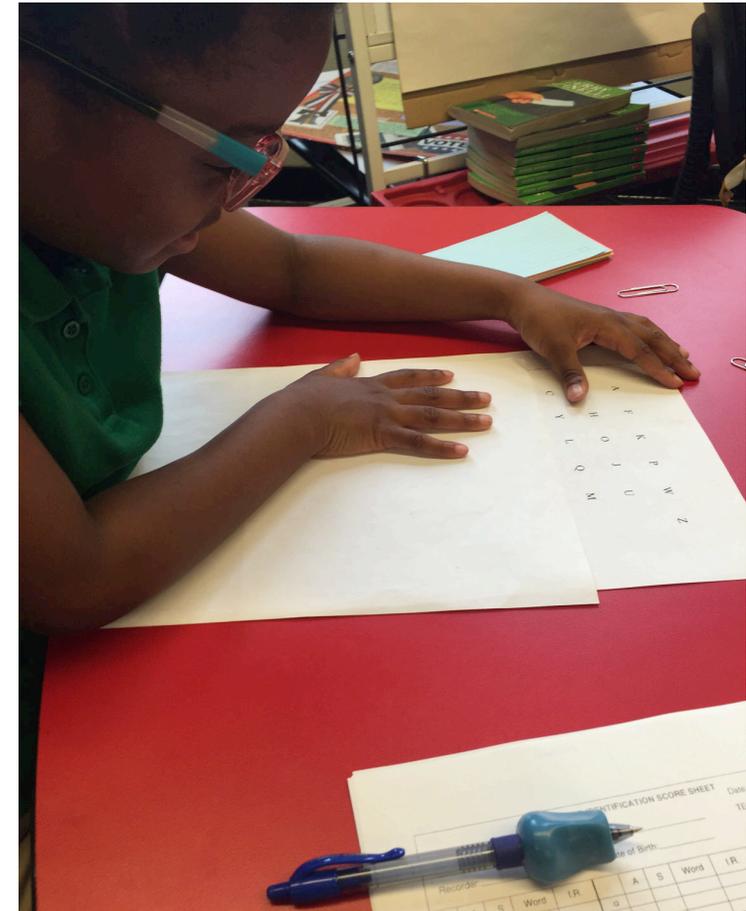
- An ANOVA was conducted on scores, with treatment condition and test time (pretest and posttest) as independent variables.
 - The main effect of treatment was not significant
 - The main effect of test time was significant
 - The interaction was not significant
- Students' phonemic awareness ability (oral segmenting and blending ability) in both training groups significantly improved from pretest to posttest
 - The results suggest that decoding instruction may have helped

Putting It All Together: Training Task

- Students in the connected phonation group reached criterion sooner than students in the segmented phonation group
 - This was different than the pilot study findings
- Unlike the pilot study, students in the dissertation study had not been exposed to segmented phonation or decoding instruction
- Those in the connected condition were not hindered in learning to stretch and connect phonemes
- Students taught connected phonation reached criterion sooner
 - Supporting our expectation that the connected phonation procedure would make it easier to learn to decode words
 - Those in the connected condition were not hindered in learning to stretch and connect phonemes

Putting It All Together: Transfer Task

- The skills acquired from the connected phonation blending method transferred more readily to new CVC nonwords with stop consonants than the skills acquired from the method of stopping the stream of sounds
- Replicates the pilot study findings and Constable's (2002) study
- Shows that the most effective procedure for teaching children to decode is to have them apply streaming with continuant consonants to blend phonemes prior to blending stop consonants



Putting It All Together: What the Error Analysis Shows Us

Students in the **Segmented Phonation** group

- Spoke the sound of each letter separately before blending the nonword
- Caused them to add schwa vowels that had to be deleted
- Made it harder to *remember* the sounds they had just spoken when attempting to blend them
- When memory slipped, they would substitute another phoneme
- Memory for the initial consonant suffered the most
 - likely because it occurred earliest and was eroded by subsequent phonemes

Putting It All Together: What the Error Analysis Shows Us

Students in the **Connected Phonation** group

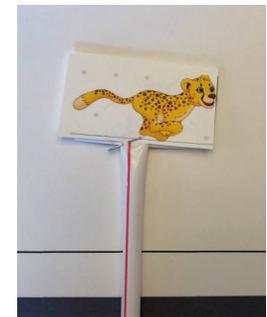
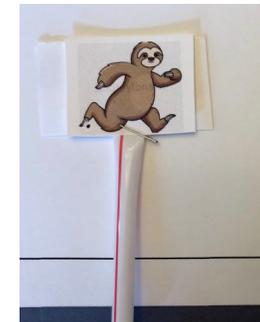
- Did not apply stretching procedure because stops cannot be stretch
- They produced a whole, succinct word without stretching or breaking between phoneme
- This avoided adding schwa vowels and resulted in a blended nonword
- Made it easier to remember phonemes, especially memory for initial consonants

Implications for Instruction

- Findings suggests that decoding programs could be made more effective by implementing the connected phonation procedure
 - This would involve teaching students first to decode CVC words with continuant consonants until they master the procedure, and
 - Then progressing to the decoding of words with stop consonants
- Based on these findings:
 - Students in the connected phonation condition seem to have a better concept of how to bring separate phonemes in a word together when blending to read a whole word
 - The act of not pausing when identifying the sounds may have been connected, in their minds, to the task of blending when reading the nonwords

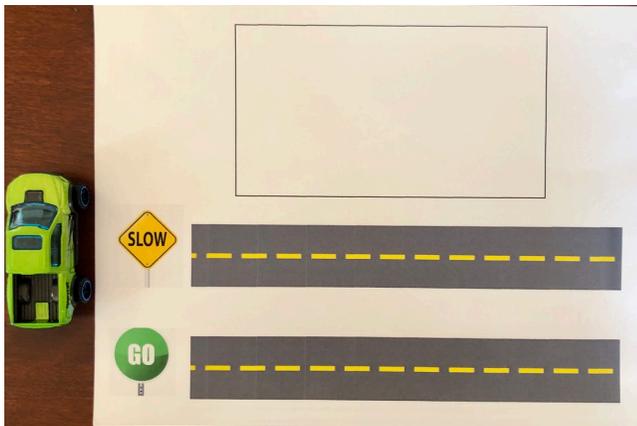
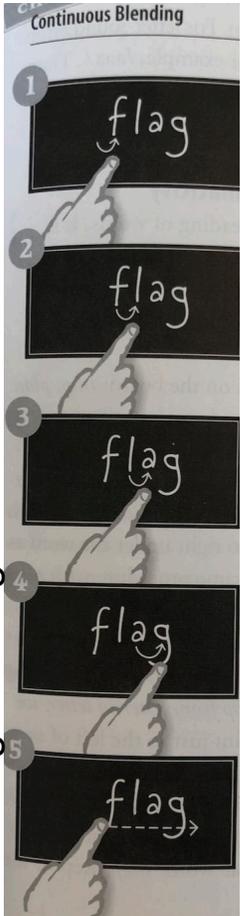
Implications for Instructions

- Students in the segmented phonation group may have approached the task of segmenting the phonemes in words with pauses as an initial but different task to bring these sounds together
 - Appeared to be exerting more effort in attempting to bring the segmented sounds together
- The learning trial took approx. 20 minutes & students only met for a single session to learn how to use connected phonation procedures
- The visuals included flashcards with words printed, which are easy to make
- Used a tactile method to reinforce identifying phonemes



In Practice

- We suggest that the connected phonation method holds much promise for teaching students to decode in the classroom
- Clarifies why the segmented procedure may cause difficulty when blending
- Start decoding instruction by teaching children to stretch and connect continuant consonants without breaking the speech stream
 - Once they learn this, then transition to stop consonants



Thank you!



Contact:

Selenid Gonzalez-Frey

freysm@buffalostate.edu

Learn the Science of Reading

- 7-10-week online course that teaches foundational skills and instructional practices based on the science of reading
- Learn to understand and recognize dyslexia and its warning signs
- Learn the structure of the English and Spanish language system
- Includes the *Teaching Reading Sourcebook* and *Assessing Reading: Multiple Measures* textbooks
- Next sessions begin June 3 & Sept. 16
- Available for graduate credit

www.corelearn.com/online-elementary-reading-academy

Questions?



Get in Touch with CORE!

info@corelearn.com
888.249.6155



Consortium on Reaching Excellence in Education



@COREInc