COARTICULATION THERAPY

The Siegelman Method

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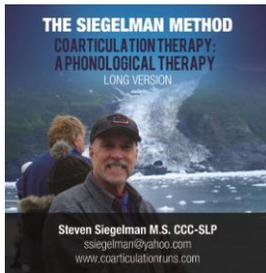_____

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What I Sell

THE SIEGELMAN METHOD
COARTICULATION THERAPY:
A PHONOLOGICAL THERAPY
LONG VERSION

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Important Questions

Single words vs. strings of syllables
Features vs. Articulatory Gestures
Minimal pairs vs. Coarticulation Run
Generative Phonology vs. Articulatory
Phonology vs. Optimality Phonology
Is this technique efficient?
Is it faster than others?

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Three Articles in Advance

Coarticulation Therapy: A New Paradigm, posted on June 23, 2008, 18, 25, 9

Coarticulation Therapy: Tips, Runs, and Opinions, posted on April 20, 2009, 19, 15, 5

Target Selection vs. Mode of Therapy, posted on July 6, 2011, 21, 11, 9

LETTER

Hey Steven,

My name is D. and I am a first-year speech therapist working in an elementary school. The disorders of my 70-child caseload are approximately 80% articulation. As an immediate college graduate, I am using the traditional articulation method (what I was taught at the university) to correct the incorrect productions.

Letter-2

- After working with this therapy technique for 6 months, its ineffectiveness is very apparent. After much research, I have come to the conclusion that co-articulation therapy is effective, not only because it has been proven to be effective, but because it passes the common sense test. How can you expect a child to move from isolation to the conversational level

Letter-3

- when working with the individual phoneme, rather than the phoneme's linguistic environments? I don't understand why co-articulation therapy was not addressed in my academic career.

Second Letter

Mr. Siegelman-

I just wanted to send you a short note to THANK YOU for your recent work publicizing coarticulation therapy. This has been a breath of fresh air in my articulation therapy—I seem to be having good results and it really makes more sense than traditional therapy.

2nd Letter continued

I hope you don't mind a quick question. I noticed in your ADVANCE article that you only mentioned three processes: /r/, /s/, and /k/. I have just started to implement coarticulation therapy, but it would seem to me that this approach could be used for almost any phoneme (e.g., th, sh, ch, l). Would you agree?

THANKS AGAIN!

K. B.

Lincoln, NE

In The Beginning

Arbitrary phonetic representation developed not out of words but from complete, semantically holistic utterances. Words then came from phonetic breakpoints in the syllabic string of a holistic utterance. (Studdert-Kennedy, 2003)

Phonological structures are best described with gestural structures then with traditional feature based representations.

Children learn to speak to articulate meanings, not sounds. (Panagos, 1972)

Gestures and Syllables in Early Speech

Infants extract gestural information from speech events before they can appreciate the linguistic significance of the gesture. (Goldstein and Fowler, 2003)

Canonical babbling is defined as rhythmic alternations between consonant and vowel. These rhythmic alternations are maintained in adults and form the basis for complexity in languages. (Kern and Davis)

COARTICULATION

Movements for each phoneme are overlapping

Examples of coarticulation:

1. in the
2. /ki, ka, ku/
3. sun stroke

Coarticulation in recent speech production models by Kent and Minifie

One can not impose segment boundaries on either the articulatory or acoustic levels due to the overlapping of articulatory movements.

"definable segments of sound do not correspond to segments at the phoneme level".

Manipulation of Syllables

No coda – "Dad Dog" becomes "Da Do" then place a pause between "D-O" and it becomes "Dad O". Velleman goes from CvCv to CvC. (Phonotactic Therapy, Velleman, 2002)

"Joseph" has two syllables. The first syllable is taught as "dj-ou" and the second as "s-ə-f". (Core Vocabulary, Crosbie et al, 2005)

Coarticulation Runs - Strings of Syllables built up into functional phrases - vCvCvCvCv, I make a cookie (Siegelman, 2008,2009

TARGETS FOR THERAPY

Elicit the sound

Syllable as the unit to begin with

Children recognize the syllable easier than they do the individual phoneme

Children under 5 years of age resist segmenting words into units smaller then the syllables (Barnes, 2007)

SIEGELMAN'S METHOD

The syllable is the unit of production.

The phrase is the unit of communication.

The phrase is built up a syllable at a time to a length of 5 syllables.

The phrase contains "I" plus the first Cv syllable of an action word.

Levels of The Siegelman Method

1. vCv level –The Core Syllable . You want movement into and out of the consonant. Facilitative contexts are not important. The skill level.
2. vCvCv – The Extended Core Syllable . The level where language is introduced. The use of contrasting gestures (/t/ vs. /s/, /t/ vs. /k/, or /ch/ vs. /sh/). Parts of three words in an utterance. Clusters are introduced next as vCCv after vCvCv is achieved.

METHOD CONTINUED

Strings of vCv syllables contain parts of several words.

Coarticulatory effects are felt across word boundaries.

Your teaching "The flow of movement in the context of language".

Kent and Minifie continued

Models of speech production that are feature based are considered incomplete because features are abstract and do not have connections in a direct manner to motor behaviors in speech.

The authors support a Hierarchical model of speech production whereby the top level is a rhythmic grouping of syllables organized into a suprasegmental pattern.

METHOD CONTINUED

Each new length of syllables is repeated 1-4 times. 100% accuracy is needed to add a new syllable. Error segments are pulled out and practiced before being reinserted into the string.

PROCESSES THAT HURT INTELLIGIBILITY

Deletion of unstressed syllables

Gliding of medial syllables

Stopping of fricatives

Velar fronting

Deletion of final consonants

Phonological processes happen in the string of syllables that is running speech. Phonological processes happen when the movement becomes too complex.

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PHONOLOGICAL PROCESSES

A descriptive method to explain how a child organizes his sound system

Errors are viewed in terms of what gesture needs attention vs. what abstract feature is absent

Processes happen in the string of syllables that is running speech

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Why The Use of an Incorrect Gesture

Compensation for coarticulation occurs when listeners make use of motor competence in the perceiving of speech. (Fowler, (2006)

Listeners as a source of sound change. Listeners may fail to perceptually compensate for coarticulation and come to use different articulatory targets in their own speech by misapprehending speech produced by others. (Hume et al)

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A list of words from Bowen. C. (1998)

/k/ vs. /t/
key tea, corn torn, cop top, cub tub, cork talk, kick tick,

/k/ vs. /t/
bike bite, beak beet, pick pit, peck pet, State stake, fork fort,

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MAKING A RUN

[ek]
[ekə]
[ekəkə]
[mekəkə]
[aimekəkə]
[aimekək^p]
[aimekəkuki]

Carly's first slide

• Two minutes 26 seconds

12/17/08 No Velars

Carly's Second

One minute 46 seconds

1/20/09 First Tongue Depressor

3/2/2014

Carly's Third

47 seconds

1/20/09 Story

Carly's Fourth

- Three minutes 47 seconds

1/21/09 2nd Tongue Depressor

Carly's Fifth

Two minutes 0 seconds

🔊

Self-Correction

"In general, many children with speech sound disorders are not very good at self-correcting. They seem to find it difficult to listen to themselves critically in order to monitor their speech and make any necessary revisions and repairs". Bowen. C. (1998), Phonology and articulatory resources for speech language pathologists

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1/27/09 /k/ Strings into a Run

Paradigm Shift

- Single Word Therapies vs. Therapies conducted via strings of syllables

What is Minimal Pair Therapy

- Minimal pairs represents minimal contrasts that are neutralized in the child's speech. It sets up a communication problem that the child resolves by active exploration of her or his vocal tract to find an acceptable alternative to the old way of producing the word. (Fey, 1992)

A Concern Expressed

- Hodson expressed concerns that some children seem unable to locate a closer approximation to the target using this procedure and become unduly frustrated. (Fey, 1992)

Plethora of Therapies

Baker, (2006) Lists 21 therapy techniques, (none of which are Coarticulation Therapy based on Articulatory Phonology and evidenced by syllabic strings built up into a functional phrase).

In the 1980s, SLPs chose between traditional therapy, minimal pairs, and cycles. Since the 1990s this has expanded to at least 22 different approaches, most have a linguistic approach.

MULTIPLE EXEMPLER TRAINING
by Bowen, C. 1999

1. Minimal pairs
2. Auditory Bombardment – focused auditory input

    a. Word lists with the same phoneme in the initial or final position.

    b. Word lists using minimal meaningful contrasts.
3. To date there is no research to support the use of amplified auditory bombardment.

Carly's Sixth-Last Day

Twenty Nine seconds

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Last Day of Therapy-1

Carly's Seventh-Last Day

Thirty Five seconds

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Last Day of Therapy-2

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Carly's Eigth-Last Day

One minute 17 seconds

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Last Day of Therapy-3

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What Are You Listening To

1. Infants parse a continuous speech stream on the basis of syllable size units (Gierut, 1999)
2. Objects of speech perception are actual vocal tract movements, or gestures, and not abstract phonemes. (Wikipedia)
3. Perceptual dependence on coarticulatory information can be understood due to hearing the complete rather than partial movement toward the phonetic target. (Xu et al, 2006)

Perception

- Speech perception involves access to the speech motor system which is a core claim of the motor theory of speech perception. (Galantucci et al, 2006)
- Since the information for phonetic segments overlap, than information for each segment can span a longer interval of time, and the ear can resolve the segments temporally. (Galantucci, B. 2006)

It's All About Production

- Treatment of sound production facilitated change in both sound production and perception. Treatment of sound perception only enhanced perception not production (Gierut, 1998)

Segmental description ignores temporal detail that is important for speech production and perception, and offers no tools for description of rhythmically produced speech. (Pons, 2007)

Production rather than Perception

1. There is demonstrated activation of speech related muscles during the perception of speech. (Galantucci, B., Fowler, C.A., and Turvey, M.T., 2006)
2. Claims about a child's phonological knowledge are based on speech production rather than on speech perception. (Gierut et al, 1987)

Case Closed

- Ordered letter like symbols cannot provide rich enough specification of linguistic time patterns to successfully account for speech perception. (Pont, 2007)

Techniques in Cycles

Teaches word initial /r/ before er, ir, or medial /r/. (Hodson, 2006)

Click the tongue tip against the alveolar ridge for one hour each day for a week before targeting /l/.

Teaches /s/ clusters before singleton /s/.

Erroneous Hypotheses

- Gierut et al, (2001) said that teaching adjunct /s/ clusters predisposes a child to form erroneous hypotheses about syllable structure.
- You are providing the child with input that does not conform to the universal structure of syllables. (Gierut et al, 2001).

ARTICULATORY PHONOLOGY by Browman and Goldstein

Unifies phonetics and phonology into a single system

BASIC UNIT OF PHONOLOGICAL CONTRAST IS THE ARTICULATORY GESTURE

Utterances are modeled as organized patterns of gestures

COARTICULATION is explained by overlapping gestures.

A.P. continued

The authors, Browman, C.P. and Goldstein, L., state that the fundamental units of phonology ARE NOT ABSTRACT UNITS OF SOUND, represented by mental symbols, BUT RATHER BASIC COORDINATED GESTURES OF SPEECH

A.P. continued

In the past, it was assumed the basic unit of phonology was static and arranged in non-overlapping segments

This view is rejected by Articulatory Phonology

The basic phonological unit is the articulatory gesture

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Additional Support for The Articulatory Gesture

Jannuzi et al, posit that the basic, sublexical, phonological unit of both speech production and processing is the articulatory gesture along with facial salience.

Supported by evidence from Electromyographic Analysis

Example: the contrast of "mop vs. mob"

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Minimal Pairs

/w/ vs. /r/
wok rock, weed read, white right, wake rake, weight rate

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COARTICULATION RUNS FOR /r/

a	ə
ar	ər
ar ju	ərɪz
ju ar	ərɪn
arɪ	hɪərɪn
arɪn	hɪərɪn
ju arɪ	whɪərɪz

Michael's first

Two minutes 49 seconds

1/27/09 /r/ tx.

Michael's second slide

One minute 27 seconds

Minimal Pairs

/s/ vs. /t/
sew toe, said Ted, suit toot, sigh tie, sip tip
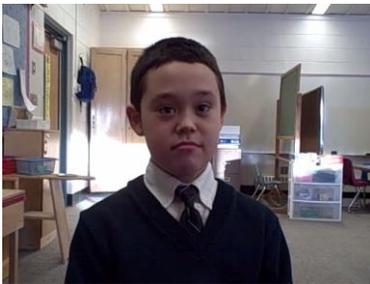
MAKING A RUN

/ais/
/aisisʌmaisɛz/
/aisi/
/aisisʌ/---If the child produces a /ts/ or a /st/ you need to correct this immediately before you continue. This is his stop/fricative substitution. One way is to have the child produce /ais hi/ and then to reduce the silent interval.
/aisisʌmais/
/aisɛz/
/maisɛz/

Sariah's First

One Minute Forty Five seconds

Sariah's First

Sariah's Second

One Minute Three seconds

Sariah's Second

Sariah's Third

One Minute Thirty Eight seconds

Sariah's Third

Additional Words

Final Consonant Deletion
bee beet, bee beach, pie pipe, Sue suit, "C" seat, row road

Weak Syllable Deletion
polysyllables
crocodile, daffodil, Dalmatian, elephant, electrician, photograph

Utterances vs. Multisyllabic Words

Focal point of disordered prosody is within the utterance and not within multisyllabic single words (Shriberg et al, 2001)

Therapy techniques to improve disordered prosody in autistic children should be temporally and spatially sensitive (Diehl and Paul, 2009)

Bradley's First

Three Minutes Two seconds

2/11/09 Progress in Therapy

Kevin's First

One Minute Seventeen seconds

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Kevin's First

Kevin's Second

• Thirty Three seconds

🔊

Kevin's Second

Kevin's Third

Forty Four seconds

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Kevin's Third

Kevin's Fourth

One Minute Eighteen seconds

Kevin's Fourth

Beginnings of Method vs. Target

Gierut (2005) compared conventional minimal pairs to modified cycles and whole language and no method stood out as the more effective.

Gierut then said that the method is secondary to promoting change and that the input to treatment is most important.

What is treated may be more important than how it is taught.

Real O.T. Therapy Techniques

Once O.T. chooses a target (input) then what is important is how are those targets are put into actual therapy.

Isolated sound production is not used nor is treatment in connected speech. (Gierut, 2005)

Conventional methods are employed clinically to stabilize a child's responses. (Gierut, 2005)

Successive approximations are accepted. (One of many therapies that does this).

Perceptual and or metalinguistic treatment is not employed.

Barlow, J.A. (2001)

Targeting least known-most difficult sounds results in substantial change.

Therapy on obligatory error patterns, those sounds with 0% accuracy will result in system wide improvement.

P. 253, treat /f/, /r/, and /l/ in the final position.

The author chose to use the following target words: knife, cough, car, bear, ball, and hill.

Coariculation Tx. Within Optimality Phonology

Target Phrases:

– 1. "I roll a ball off a car"

– 2. "I roll a car off a hill"

– 3. "I fell off a ladder"

  vCvCvCvCvCv

In the Context of Therapy

[juwarɪnəskul] you are in a school

glide vowel liquid vowel nasal vowel fricative
 obstruent vowel liquid

This string of syllables built up into a phrase follows the sonority sequencing principle.

Contrasting Gestures within Coarticulation Therapy

Target Phrases:
 – "I go to my school"
 – "I got a get a cookie"
 – "I eat a cake"
 – "I got a good acorn"
 – "I sit on a seat"
 – "I catch a shoe"
 – "I tape a boat"

Moving Away From G.P. to O.P.

• Relationships between error patterns are not apparent under rule or process based approaches. (Barlow, 2001)

Dinnsen, D.A., O'Connor, K.M.

Optimality theory has led to implicational relationships among specific error patterns.

The occurrence of a stopping error pattern implies the co-occurrence of a gliding error pattern.

By eliminating the gliding error pattern the stopping error pattern is eliminated without direct therapy.

Coarticulation Therapy for Implicationally Related Error Patterns

Target Phrase:

1. "I like a lot of soap"

    v liq. v stop v liq. v stop v fric. v stop

    vlvkvlvtvsvp---- L's at the beginning
followed by a stop-fricative syllable sequence.

The elimination of gliding leads to the elimination of stopping. (Dinnsen and O'Connor, 2001, p.268)

Experiment with low %s of Accuracy

In an experiment by Gierut et al, (2001) an average of 5 untreated sounds were added to the child's repetoire.

Average performance being 30% with /s/ and /l/ under 30% in single words.

Not able to say what singletons will come in. Some get /s/ and others do not. (Then how could one say that fixing gliding makes stopping go away without direct therapy).

Morrisett, M.L., et al.

Complex input leads to widespread generalization learning throughout the child's phonological system.

Clusters imply affricates, affricates imply fricatives, and fricatives imply stops.

The target selection for Jarrod was the cluster /spr/.

Learnability Theory within Coarticulation Therapy

Target Phrases:

1. "I spread a print around"

vsprv   vprv   vrv

vCCCv   vCCv   vCv

2. "I splash a plant a lot"

vsplv   vplv   vlv

vCCCv   vCCv   vCv

Complex to Simple within the Phrase

Hi - just came upon your article and although I was taught many years ago about the importance of coarticulation - I found your approach to organizing your therapy very helpful. I am just beginning to see an 8-year-old with apraxia - quite unintelligible.
I definitely need to address this through coarticulation and movement patterns. Any suggestions you could offer for how to structure the sessions hierarchically would be greatly appreciated.
Thanks so much.
J. S.

The End

Thank you for listening

Steven Siegelman M.S. CCC-SLP

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