Ask the Expert on Stuttering in Childhood: Behavioral, Psychological and Linguistic Aspects

Prince Salman Center for Disability Research

January 28, 2008

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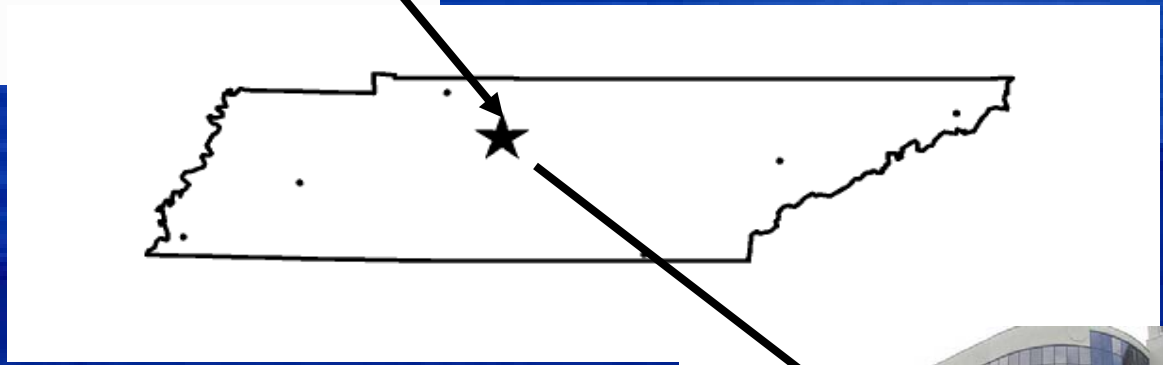
Where in the world is the Vanderbilt Bill Wilkerson Center (VBWC)?

USA



TN

VBWC

Vanderbilt Bill Wilkerson Center, Nashville, TN, USA

“Nothing important gets done alone”

Those that came before us and those that will follow us

Goleman, D., Boyatzis, R., & McKee, A. (2002). *Primal leadership: Realizing the power of emotional intelligence*.

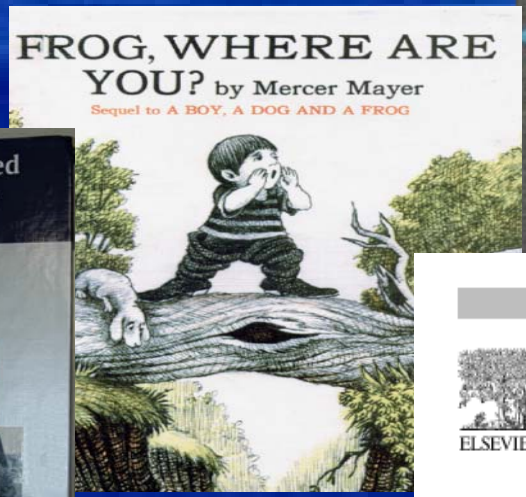
Developmental Stuttering Project (DSP): 1980-2008

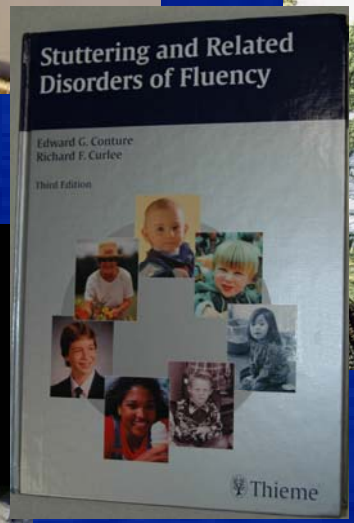
Phonological Priming in Picture Naming of Young Children Who Stutter

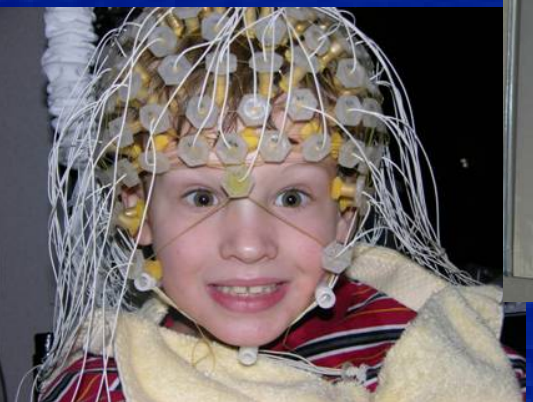
Kenneth S. Melnick
University of North Texas, Denton, TX

Edward G. Conture
Ralph N. Ohde
Vanderbilt University, Nashville, TN

The purpose of this study was to assess the influence of phonological priming on the speech reaction time (SRT) of children who do (CWS) and who do not (CWNS) stutter during a picture-naming task. Participants were eighteen 3–5-year-old CWS (M = 50.67 months, SD = 11.83 months), matched in age and gender with 18 CWNS (M = 49.44 months, SD = 10.22 months). The picture-naming task required each child to name, one at a time, computer-presented, white-on-black line drawings of common, age-appropriate objects "as quickly as you can" during 3 different conditions: (a) no prime, (b) related prime, and (c) unrelated prime, with naming latency (alternatively referred to as SRT; in milliseconds) as the main dependent variable. Results indicated that all children exhibited faster or shorter SRTs during the related condition compared to the no prime condition







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Journal of Communication Disorders xxx (2006) xxx–xxx

Journal of Communication Disorders

Relation of emotional reactivity and regulation to childhood stuttering

Jan Karrass *, Tedra A. Walden, Edward G. Conture, Corrin G. Graham, Hayley S. Arnold, K.N. Hartfield, Krista A. Schwenk

Wendell Johnson: 1906-1965

Dean Williams: 1924-1994

Edward Conture: 1945 -

Patricia Zebrowski: 1955-

Those who came before me – studying and treating stuttering – and some of those who will follow

DHSS Graduate Students Participating on DSP

Hayley Arnold

Geoffrey Coalson

Robin Jones

Christine Coulter

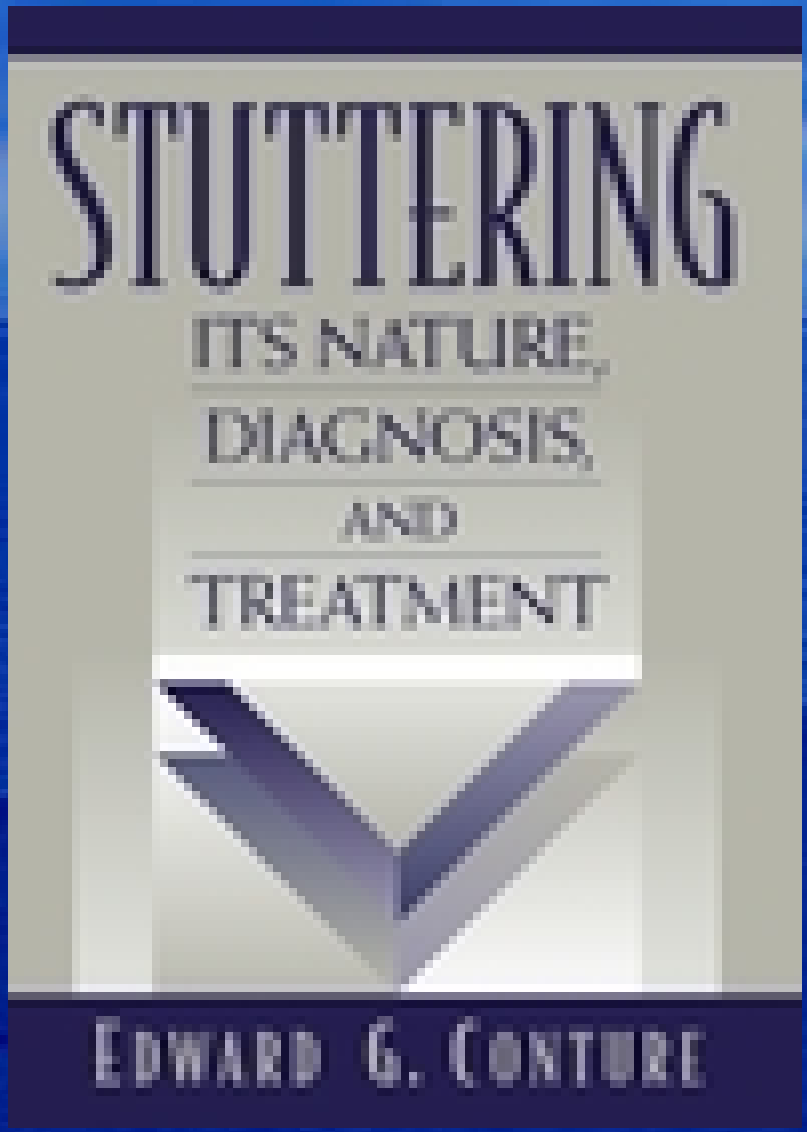
Kia Hartfield

Mark Shohet

Katerina Ntrourou

And, of course, Wheatley…

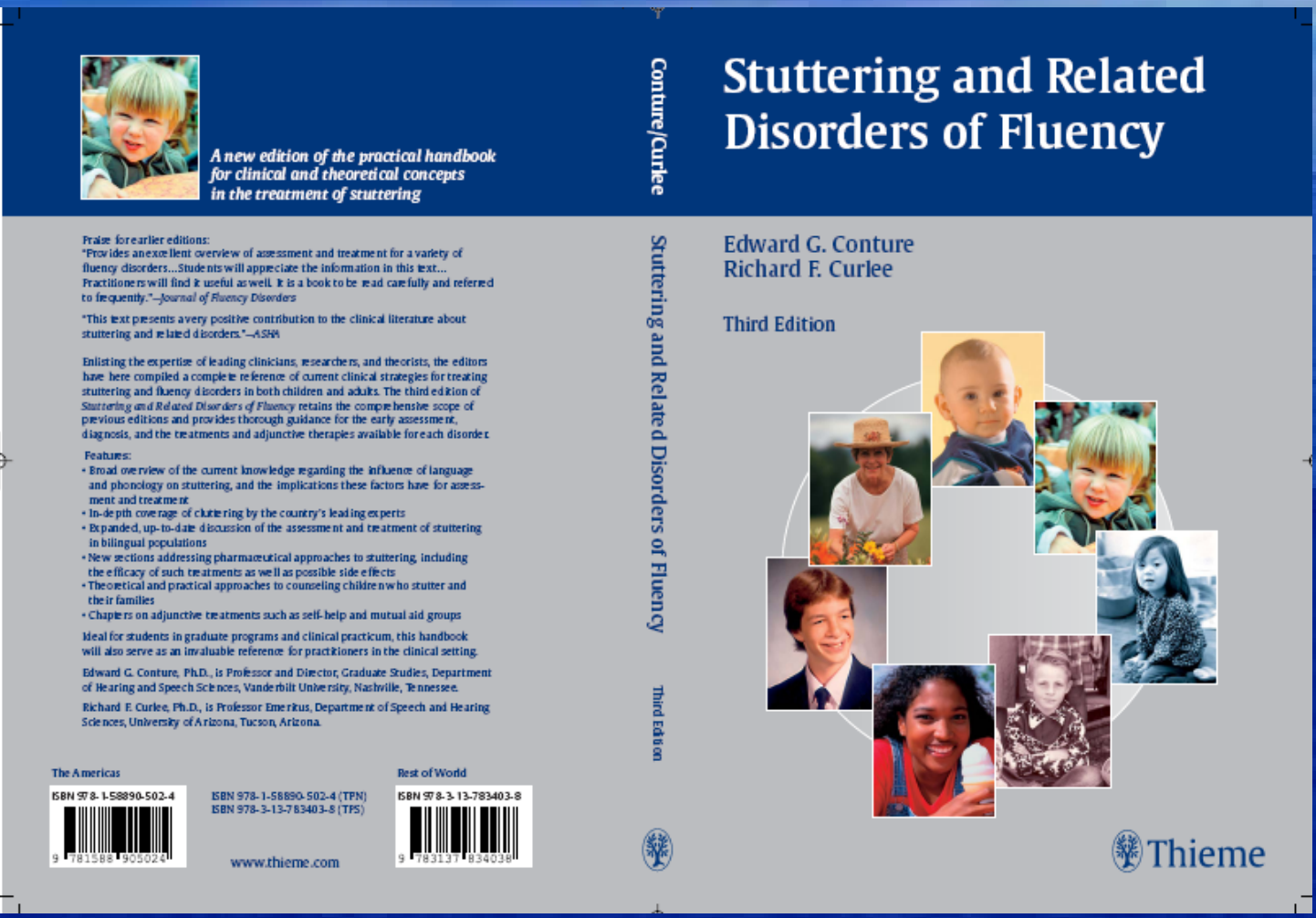
I have to do all the work around here…



Much of this presentation based on:

Conture, E. (2001). Stuttering: Its Nature, Assessment and Treatment. Needham Heights, MA: Allyn & Bacon ISBN #: 0-205-31924-6

And…Conture, E. & Curlee, R. (Eds) (2007). *Stuttering and Related Disorders of Fluency.* NY, NY: Thieme



A new edition of the practical handbook for clinical and theoretical concepts in the treatment of stuttering

Praise for earlier editions:
"Provides an excellent overview of assessment and treatment for a variety of fluency disorders…Students will appreciate the information in this text… Practitioners will find it useful as well. It is a book to be read carefully and referred to frequently."—*Journal of Fluency Disorders*

"This text presents a very positive contribution to the clinical literature about stuttering and related disorders."—*ASHA*

Enlisting the expertise of leading clinicians, researchers, and theorists, the editors have here compiled a complete reference of current clinical strategies for treating stuttering and fluency disorders in both children and adults. The third edition of *Stuttering and Related Disorders of Fluency* retains the comprehensive scope of previous editions and provides thorough guidance for the early assessment, diagnosis, and the treatments and adjunctive therapies available for each disorder.

Features:
- Broad overview of the current knowledge regarding the influence of language and phonology on stuttering, and the implications these factors have for assessment and treatment
- In-depth coverage of cluttering by the country's leading experts
- Expanded, up-to-date discussion of the assessment and treatment of stuttering in bilingual populations
- New sections addressing pharmaceutical approaches to stuttering, including the efficacy of such treatments as well as possible side effects
- Theoretical and practical approaches to counseling children who stutter and their families
- Chapters on adjunctive treatments such as self-help and mutual aid groups

Ideal for students in graduate programs and clinical practicum, this handbook will also serve as an invaluable reference for practitioners in the clinical setting.

Edward G. Conture, Ph.D., is Professor and Director, Graduate Studies, Department of Hearing and Speech Sciences, Vanderbilt University, Nashville, Tennessee.

Richard F. Curlee, Ph.D., is Professor Emeritus, Department of Speech and Hearing Sciences, University of Arizona, Tucson, Arizona.

The Americas
ISBN 978-1-58890-502-4

ISBN 978-1-58890-502-4 (TPN)
ISBN 978-3-13-783403-8 (TPS)

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ISBN 978-3-13-783403-8

Conture/Curlee

Stuttering and Related Disorders of Fluency

Third Edition

Stuttering and Related Disorders of Fluency

Edward G. Conture
Richard F. Curlee

Third Edition

Thieme

Some journal-level products of DSP (2003-2008)

Phonological Priming in Picture Naming of Young Children Who Stutter

Kenneth S. Molnick
University of North Texas, Denton, TX

Edward G. Conture
Ralph N. Ohde
Vanderbilt University, Nashville, TN

The purpose of this study was to assess the influence of phonological priming on the speech reaction time (SRT) of children who do (CWS) and who do not (CWNS) stutter during a picture-naming task. Participants were eighteen 3–5-year-old CWS [M = 50.67 months, SD = 11.83 months], matched in age and gender with 18 CWNS [M = 49.44 months, SD = 10.22 months]. The picture-naming task required each child to name, one at a time, computer-presented, white-on-black line drawings of common, age-appropriate objects "as quickly as you can" during 3 different conditions: (a) no prime, (b) related prime, and (c) unrelated as SRT: in milliseconds) as

+ Model
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Journal of Fluency Disorders xxx (2006) xxx–xxx
Journal of FLUENCY DISORDERS

Effects of perceptual and conceptual similarity in lexical priming of young children who stutter: Preliminary findings

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Received 10 April 2006; received in revised form 8 August 2006; accepted 16 August 2006

Abstract

The purpose of this study was to investigate the influence of conceptual and perceptual properti words on the speed and accuracy of lexical retrieval of children who do (CWS) and do not stutter (CW during a picture-naming task. Participants consisted of 13.3–5-year-old CWS and the same numb CWNS. All participants had speech, language, and hearing development within normal limits, wit exception of stuttering for CWS. Both talker groups participated in a picture-naming task where they named, one at a time, computer-presented, black-on-white drawings of common age-appropriate objects. These pictures were named during four auditory priming conditions: (a) a *neutral* prime consisting of a tone, (b) a word prime *physically* related to the target word, (c) a word prime *functionally* related to the target word,

Lexical Priming in Picture Naming of Young Children Who Do and Do Not Stutter

Mark W. Pellowski*
Edward G. Conture
Vanderbilt University, Nashville, TN

The purpose of this investigation was to assess the influence of lexical/semantic priming on the speech reaction time of young children who do and do not stutter during a picture-naming task. Participants were 23 children who stutter,

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Journal of Fluency Disorders 30 (2005) 125–148
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Phonological neighborhood density in the picture naming of young children who stutter: Preliminary study

Hayley S. Arnold *, Edward G. Conture, Ralph N. Ohde

Department of Hearing and Speech Sciences, Vanderbilt Bill Wilkerson Center for Otolaryngology and Communication Sciences and Disorders, Vanderbilt University Medical Center, 1114 19th Avenue South, Nashville, TN 37212, USA

Received 10 March 2004; received in revised form 21 September 2004; accepted 10 January 2005

Abstract

The purpose of this study was to assess the effect of phonological neighborhood density on the speech reaction time (SRT) and errors of children who do and do not stutter during a picture-naming task. Participants were nine 3–5-year-old children who stutter (CWS) matched in age and gender to nine children who do not stutter (CWNS). Initial analyses indicated that both CWNS and CWS were significantly faster (i.e., exhibited shorter SRTs) and more accurate on phonologically sparse than phonologically dense words, findings consistent with those found with older children (Newman & Germain, 2002). Further analyses indicated that talker group differences in receptive language scores weakened these findings. These preliminary findings were taken to suggest that phonological neighborhood density appears to influence the picture-naming speed and accuracy of preschool-aged children.

Sentence-Structure Priming in Young Children Who Do and Do Not Stutter

Julie D. Anderson
Edward G. Conture
Vanderbilt University, Nashville, TN

The purpose of this study was to use an age-appropriate version of the sentence-structure priming paradigm (e.g., K. Bock, 1990; K. Bock, H. Loebell, & R. Morey, 1992) to assess experimentally the syntactic processing abilities of children who stutter (CWS) and children who do not stutter (CWNS). Participants were 16 CWS and 16 CWNS between the ages of 3:3 [years: months] and 5:3, matched for gender and age (±4 months). All participants had speech, language, and hearing development within normal limits, with the exception of stuttering for CWS. All children participated in a sentence-structure priming task where they were shown and asked to describe, on a computer screen, black-on-white line drawings of children, adults, and animals performing activities that could be appropriately described using simple active affirmative declarative (SAAD) sentences (e.g., "The man is walking the dog"). Speech reaction time (SRT) was measured from the onset of the picture presentation to the onset of the child's verbal response in the absence and presence of priming sentences, counterbal-

Temperamental Characteristics of Young Children Who Stutter

Julie D. Anderson
Indiana University Bloomington

Mark W. Pellowski
Tow

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Vande

The purpose of this investigation was to assess the temperamental characteristics of children who do (CWS) and do not (CWNS) stutter using a norm-referenced parent-report questionnaire. Participants were 31 CWS and 31 CWNS between

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Journal of Communication Disorders

Reaction to background stimulation of preschool children who do and do not stutter

Krista A. Schwenk *, Edward G. Conture, Tedra A. Walden

Vanderbilt University, United States

Received 13 July 2005; received in revised form 15 May 2006; accepted 6 June 2006

Abstract

This study investigated the maintenance of attention and adaptation to background stimuli of preschool children who do (CWS) and do not stutter (CWNS). Participants were 13 monolingual, Standard American English speaking, 3–5-year-old CWS and 14 CWNS. Results indicated that CWS were significantly more apt than CWNS to attend to or look at changes in background stimuli, although there were no significant differences between groups in duration and latency of these looks. Findings suggest that preschool CWS are more reactive to, distracted by, and slower to adapt and habituate to environmental stimuli than their CWNS counterparts.

Learning outcomes: The reader should be able to: (1) recognize the temperamental differences between CWS and CWNS, (2) define attention reactivity and regulation, (3) explain how attention reactivity and regulation are associated with preschool stuttering, and (4) understand recent empirical evidence relating reactivity and regulation to preschool stuttering.

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Relation of emotional reactivity and regulation to childhood stuttering

Jan Karrass *, Tedra A. Walden, Edward G. Conture, Corrin G. Graham, Hayley S. Arnold, K.N. Hartfield, Krista A. Schwenk

Purpose

- **To describe a program of study, begun 28 years ago, that attempts to better understand the onset, development and maintenance of childhood stuttering through the empirical assessment of emotional and speech-language planning processes of children who do and do not stutter.**

Presentation supported in part by NIH/NIDCD R01DC000523-13, NIH/NIDCD R01 DC00647-01A2 **grants to Vanderbilt University as well as a Vanderbilt University Discovery Grant**

Developmental Stuttering

Stuttering that starts in childhood and develops, changes across the lifespan, particularly from preschool to high school

High School

Preschool

School-age

- TWO-YEARS-OLD

- FOUR- YEARS-OLD

- SOMEWHERE BETWEEN 2 AND 4 Years of Age, STUTTERING BEGINS FOR MOST CHILDREN WHO STUTTER

Some Basic Facts About Stuttering

Prevalence: About 1% of school age population

Sex Ratio: 3 boys for 1 girl on average

Familial Incidence: For 50% or more of people who stutter, some other family members also stutter.

Onset: Mean = 30-36 months; range 2 to 9; 90% have begun by 7 years of age (a disorder of childhood)

Speech at onset: For many, relatively non-tense reps of sounds and syllables; for some, can be relatively tense with sound prolongations &/or blocks

Variation/variability: Stuttering varies across time, situations, listeners, nature of speaking tasks; variation is one of the basic characteristics of stuttering

Spontaneous Recovery: At least 50% exhibit improvement without formal treatment.

Dispositional (trait)/situational (state) aspects of emotions: Gradual adaptation to novelty, differences, change (less than ideal adaptation to change); stay with task despite reasonable requests/demands of others (inability to shift and refocus attention); may be less regular/rhythmic in bodily/daily functions (arrhythmic).

Approximately 80% of preschool children who assent for our study complete our study.

Communicative-Emotional Model of Developmental (Childhood) Stuttering & Related notions

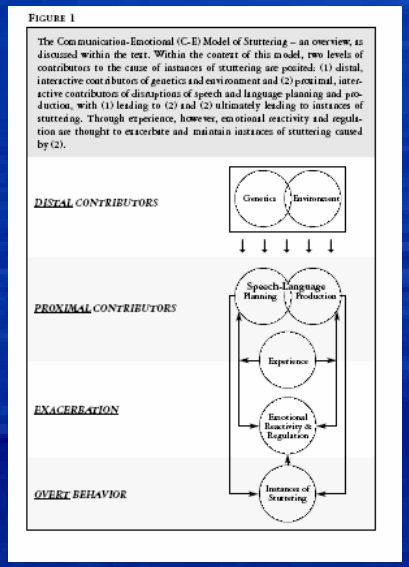
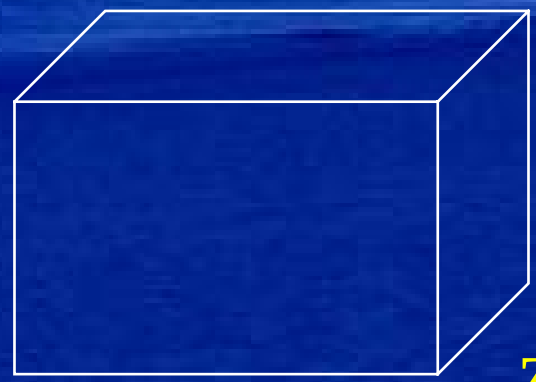


FIGURE 1

The Communication-Emotional (C-E) Model of Stuttering – an overview, as discussed within the text. Within the context of this model, two levels of contributors to the cause of instances of stuttering are posited: (1) distal, interactive contributors of genetics and environment and (2) proximal, interactive contributors of disruptions of speech and language planning and production, with (1) leading to (2) and (2) ultimately leading to instances of stuttering. Through experience, however, emotional reactivity and regulation are thought to exacerbate and maintain instances of stuttering caused by (2).



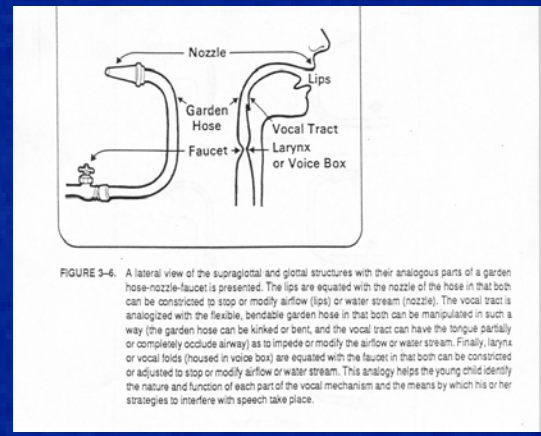


FIGURE 3–6. A lateral view of the supraglottal and glottal structures with their analogous parts of a garden hose-nozzle-faucet is presented. The lips are equated with the nozzle of the hose in that both can be constricted to stop or modify airflow (lips) or water stream (nozzle). The vocal tract is analogized with the flexible, bendable garden hose in that both can be manipulated in such a way (the garden hose can be kinked or bent, and the vocal tract can have the tongue partially or completely occlude airway) as to impede or modify the airflow or water stream. Finally, larynx or vocal folds (housed in voice box) are equated with the faucet in that both can be constricted or adjusted to stop or modify airflow or water stream. This analogy helps the young child identify the nature and function of each part of the vocal mechanism and the means by which his or her strategies to interfere with speech take place.

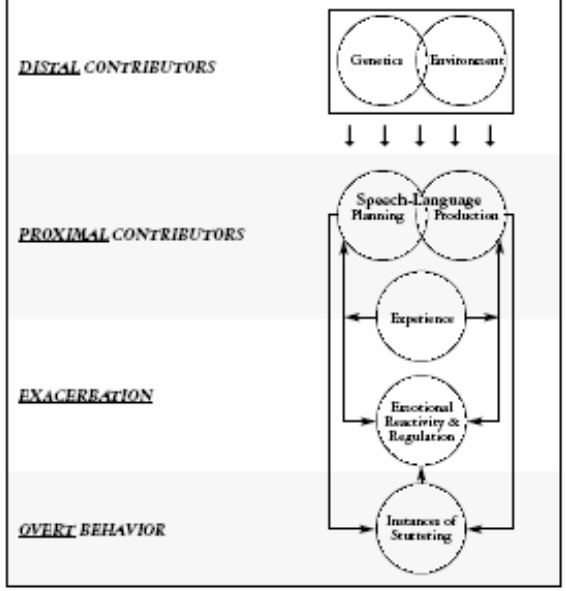
Theory

Assessment

Treatment

FIGURE 1

The Communication-Emotional (C-E) Model of Stuttering – an overview, as discussed within the text. Within the context of this model, two levels of contributors to the cause of instances of stuttering are posited: (1) distal, interactive contributors of genetics and environment and (2) proximal, interactive contributors of disruptions of speech and language planning and production, with (1) leading to (2) and (2) ultimately leading to instances of stuttering. Through experience, however, emotional reactivity and regulation are thought to exacerbate and maintain instances of stuttering caused by (2).



Some models help organize our thoughts, some help organize our research and some do both..

Conceptual Model

Conture, E., Walden, T., Graham, C., Arnold, H., Hartfield, K., and Karrass, J. (2006). Communication-emotional model of stuttering. In N. Bernstein Ratner and J. Tetnowski (Eds.) (pp. 17-46), *Stuttering Research and Practice Volume 2: Contemporary Issues and Approaches.* Mahwah, NJ: Lawrence Erlbaum Associates.

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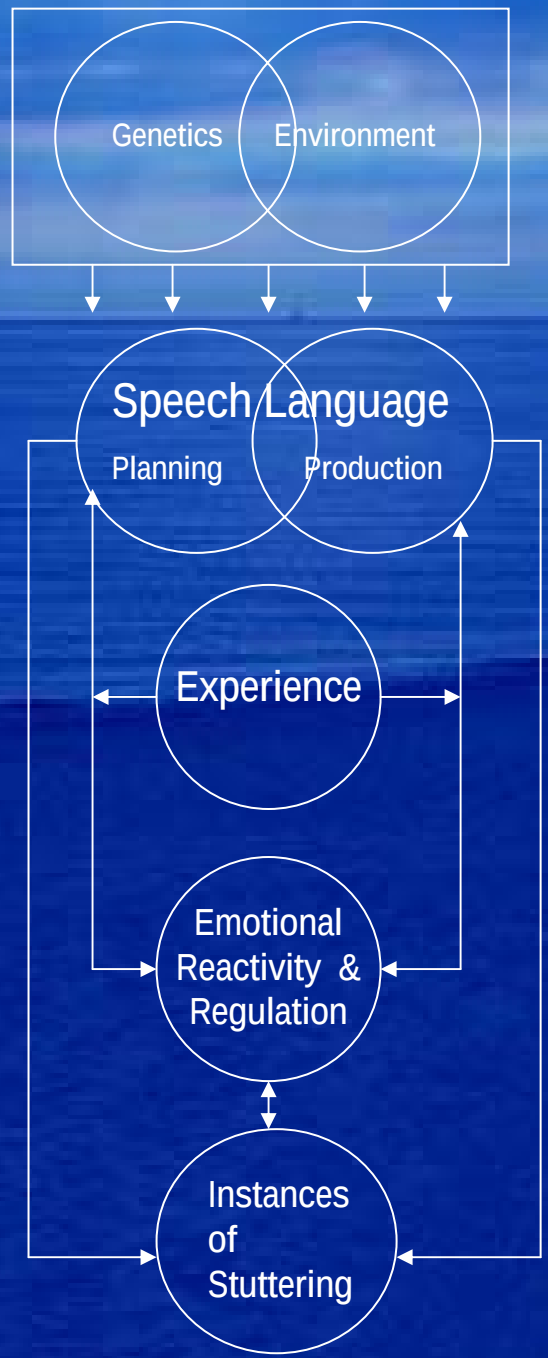
PROXIMAL CONTRIBUTORS

EXACERBATION

OVERT BEHAVIOR

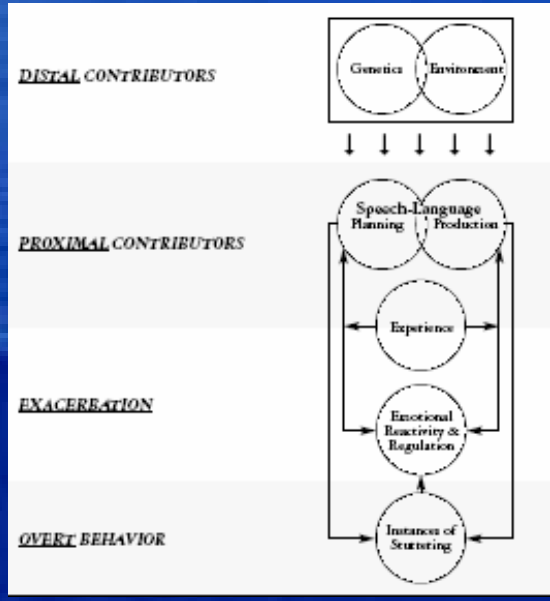


Today's talk will focus on three salient aspects of the model:

(1) *Instances of stuttering:* **Stuttering increases on long, complex utterances, function words and (depending on the measure) is relatively variable**

(2) *Speech-language planning*: Children who stutter exhibit subtle, ineffiencies in planning for speech-language production and,

(3) *Emotional reactivity and regulation*: Children who stutter exhibit differences in some dispositional and situational aspects of emotions



NOTE: Unless otherwise stated, ALL research, diagnostic and treatment data obtained from children 3 years 0 months (36 months) to 5 years 11 months (71 months)…

Attentional-Emotional-Communicative Model

Lowered threshold for limbic-hypothalamic reactivity to various environmental events, especially differences or unexpected, novel changes in environment.

Subtle to non-subtle vulnerabilities in speech-language planning and production

Simple speech-language tasks in either a relatively natural or experimental setting, e.g., J-j-j-jeep (data collection “vehicle”)

Pre-school (young) Child in J-j-j-jeep

Instances of stuttering:

More often on:

(1) Longer, more complex sentences;

(2) More on function than content words; and

(3) Highly variable

Stuttering increases on

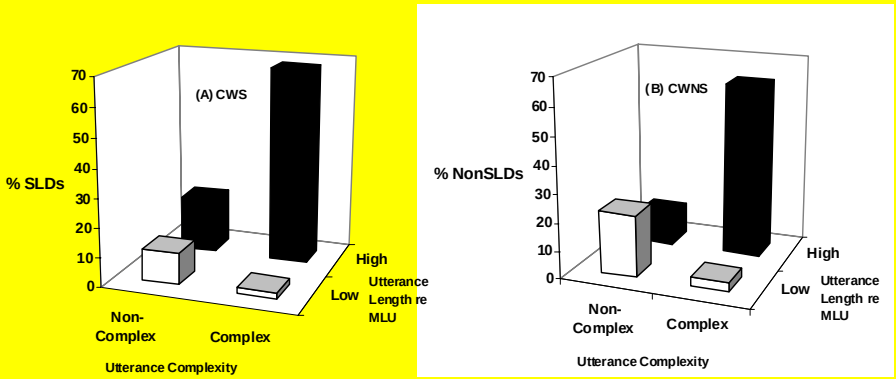


Figure 6. Mean frequency of (**A**) stuttered-like disfluencies (SLDs) for children who stutter (CWS; N = 6) and (**B**) non-stuttered like disfluencies (non-SLDs) for children who do not stutter (CWNS; N = 6) per utterances that are non-complex vs. complex and/or above vs. below their mean length of utterance (MLU).

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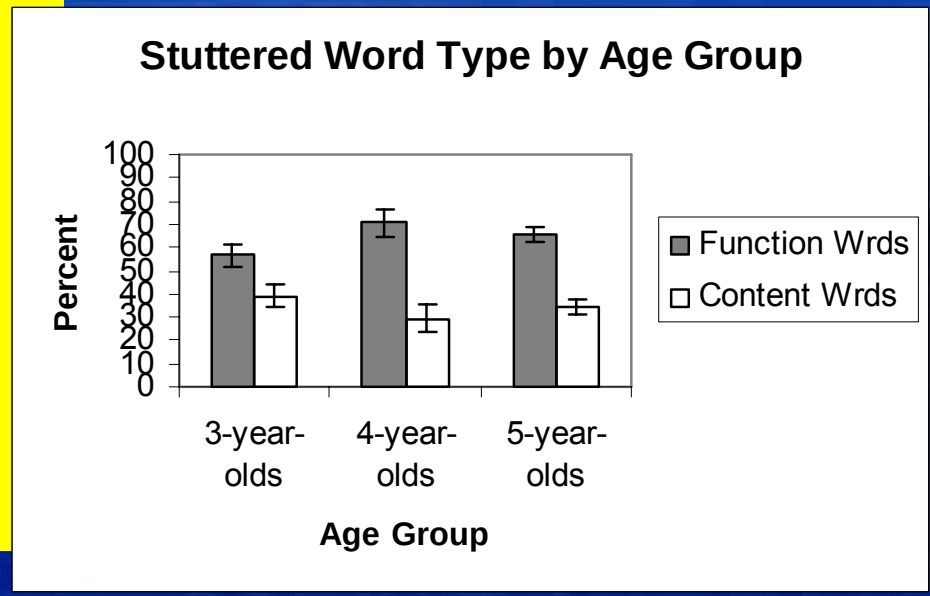
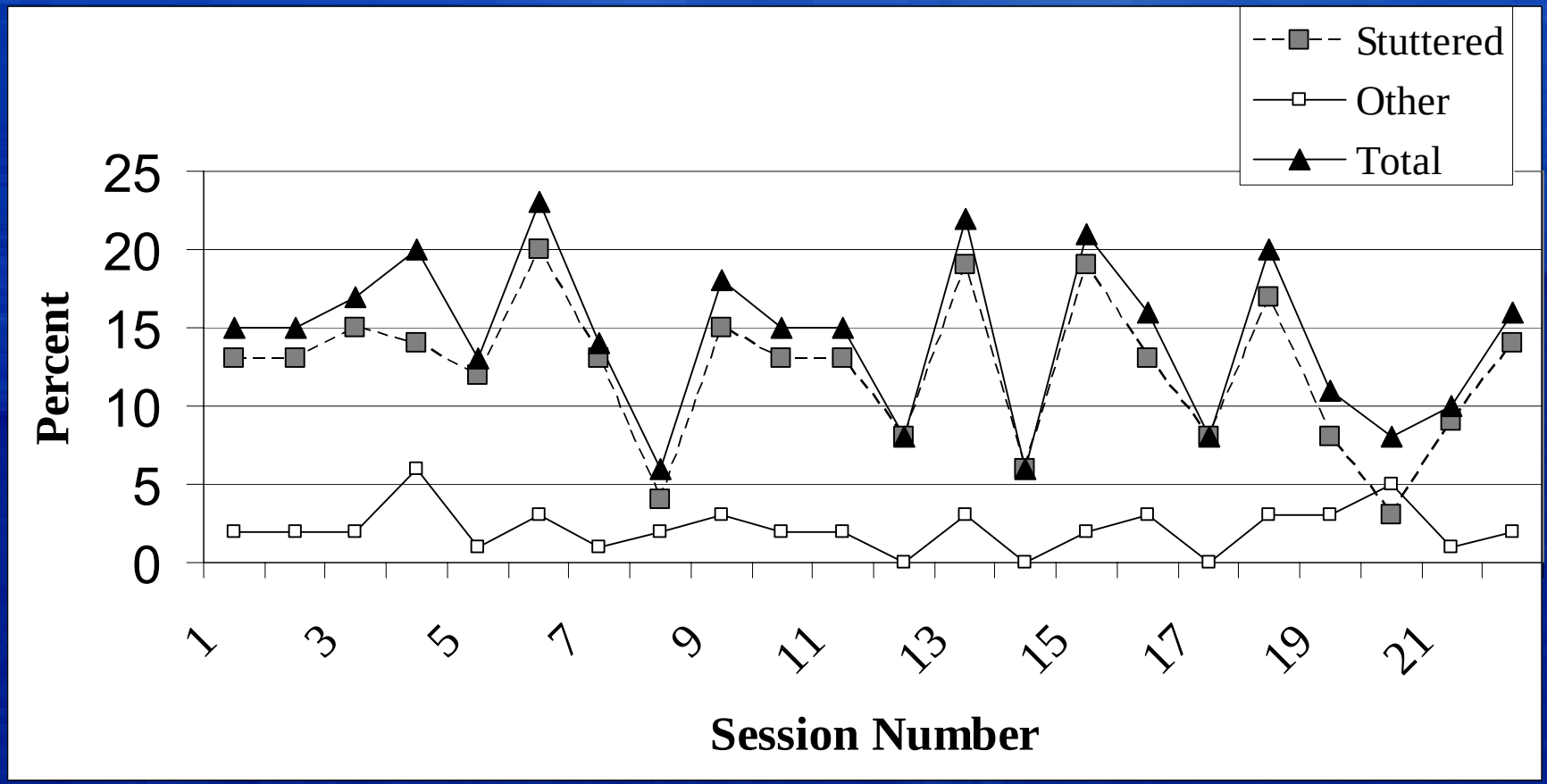


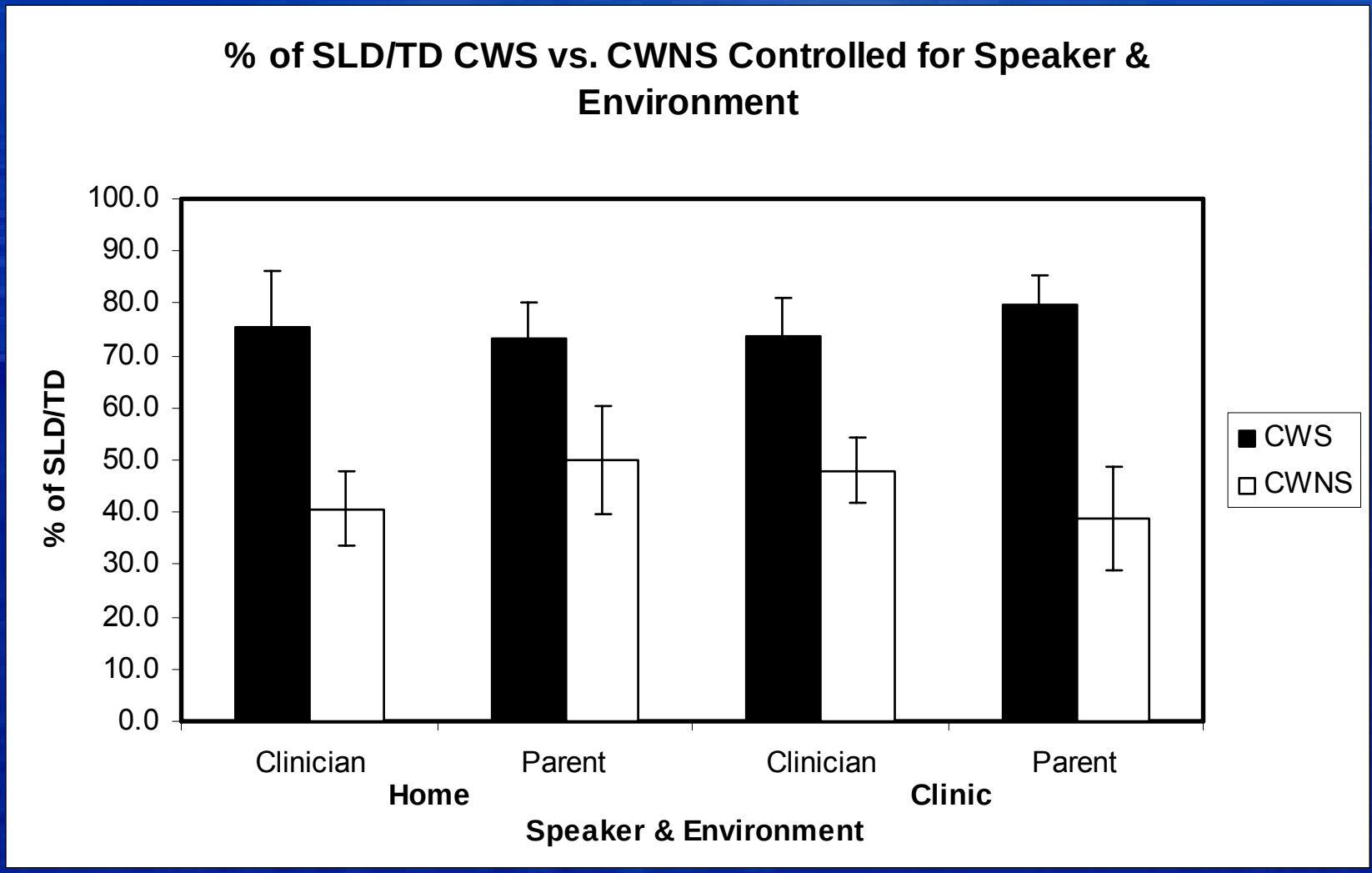
(a) Longer, more complex sentences (Zackheim & Conture, 2003)

b) Function (e.g., prepositions) than content (e.g., nouns) words (Graham, 2003)

Stuttering is Variable



However, ratio of %SLD to Total Disfluencies is relatively stable across *settings* (*Home* vs. *Clinic*) *and listeners* (*Parent* vs. *Clinician*) (after Hartfield et al., in preparation)



Speech-language planning:

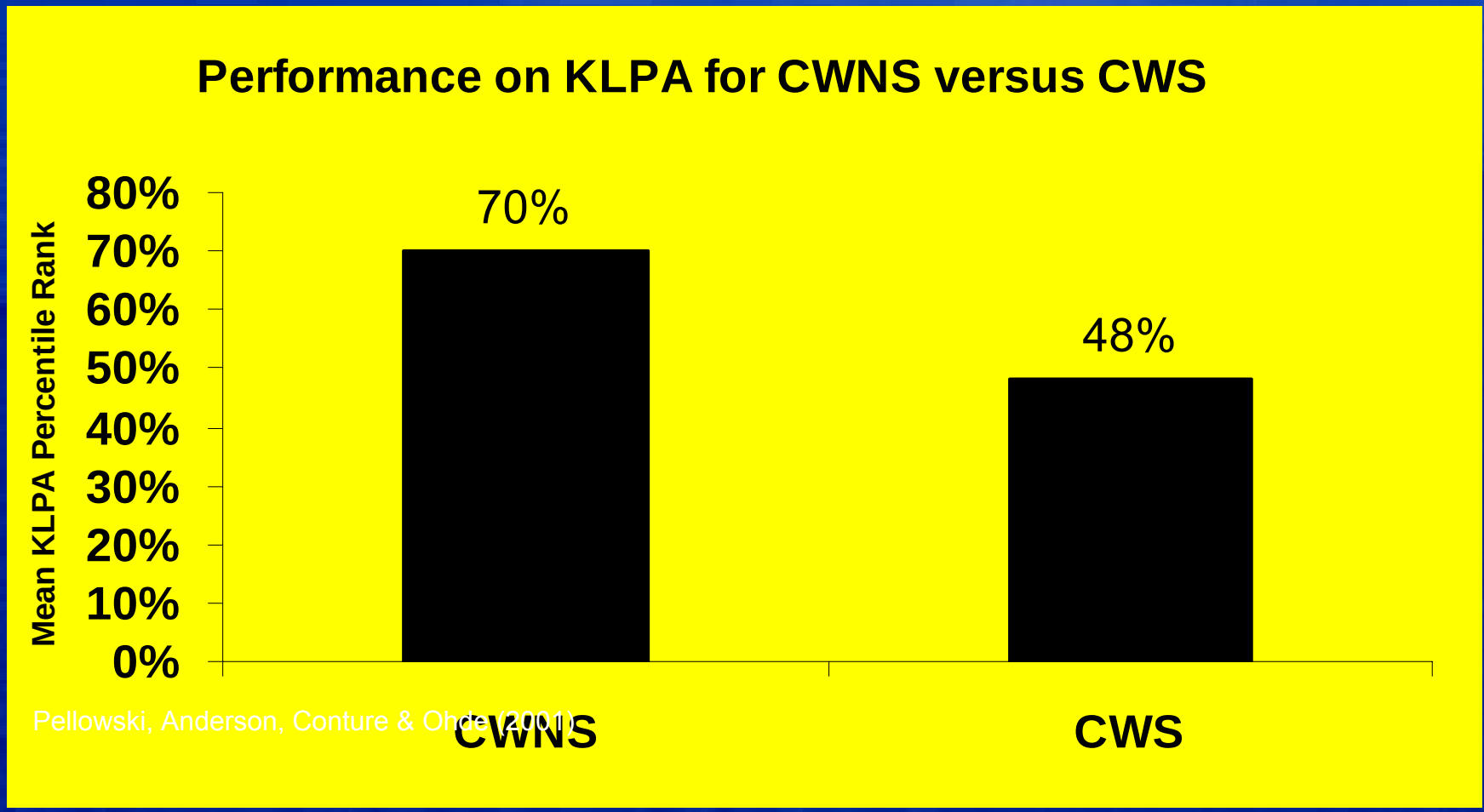
Children who stutter exhibit subtle, inefficiencies in planning for speech-language production

Background: *Descriptive* Data

- Blood et al (2003) completed a nationwide survey sample of 1184 SLPs regarding documented CWS currently in their schools.

- Of the 2628 children who stuttered, **articulation** (33.5%) and **phonology disorders** (12.7%) were the most frequently reported co-occurring speech disorders.

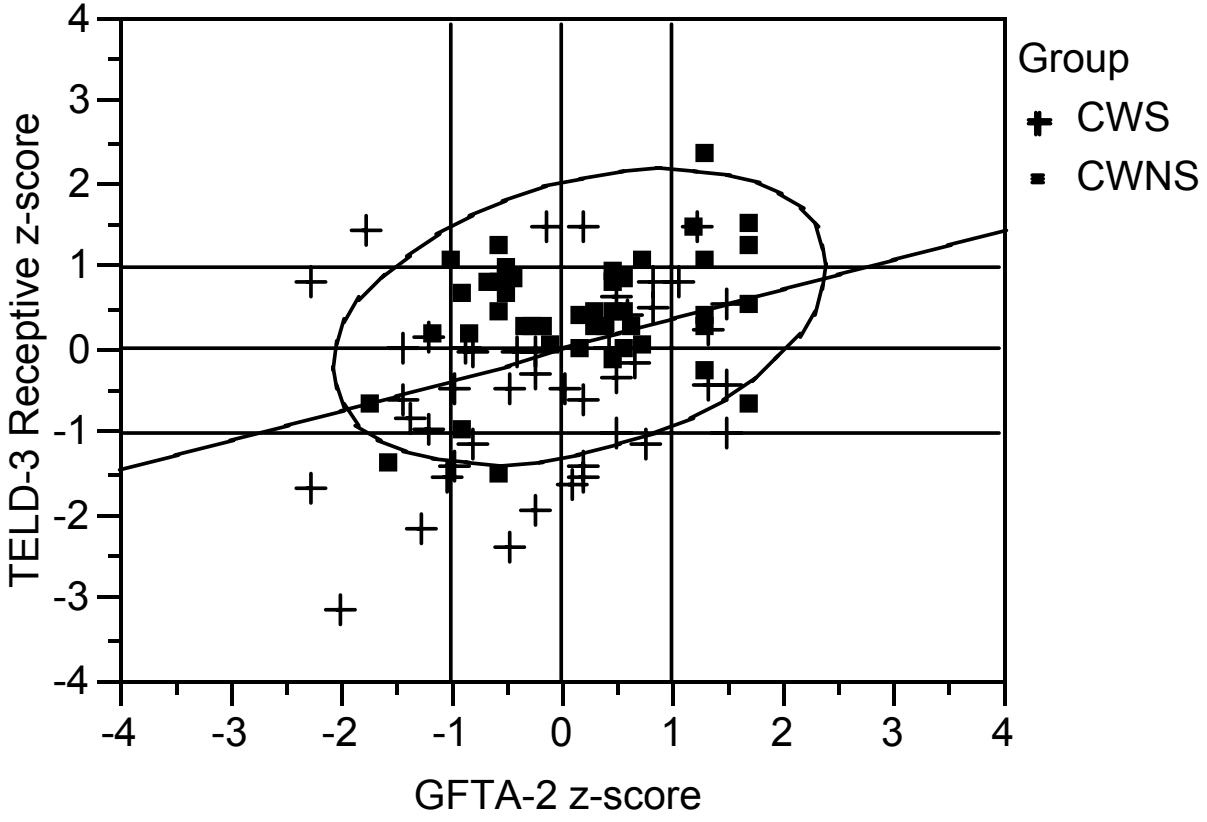
Even removing participants with clinically significantly articulation/phonology problems, CWS score lower than CWNS on *(KLPA = standardized test of phonology; research sample, n = 25; Pellowski, Anderson, Conture & Ohde, 2001).*



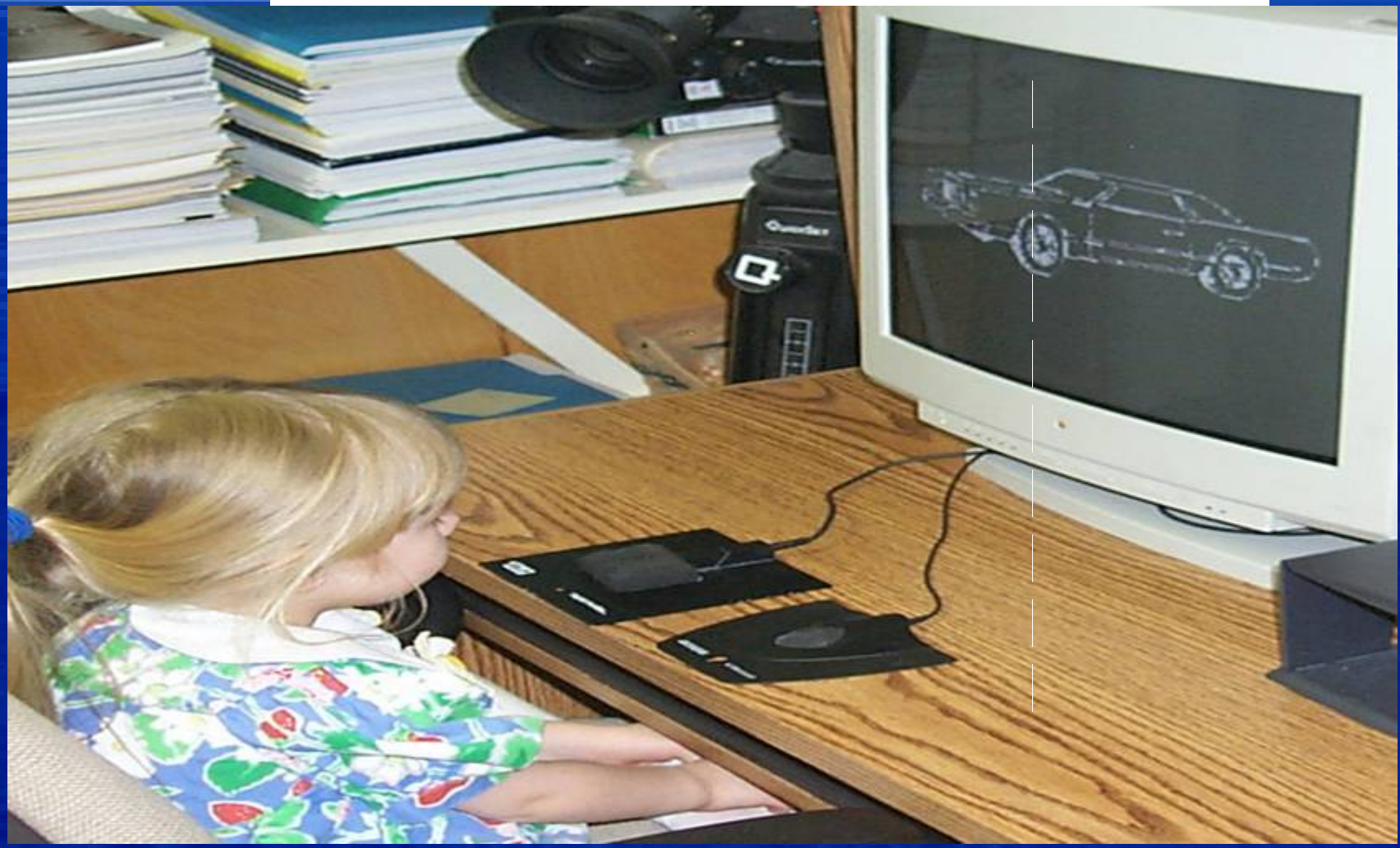
Not just differences in one component of speech-language but differences between two or more components of speech-language (dissociations)

Child (y;m)	Stutt per100 Words	EVT	PPVT	GFTA	CELF	Group
3;4	2.6	103	103	110	104	CWNS
5;3	6.3	101	***111***	***84***	112	CWS

One example of a *dissociation* between *speech sound articulation* and *receptive language; CWS = 45,CWNS = 45* (after Anderson, Pellowski & Conture, 2005)



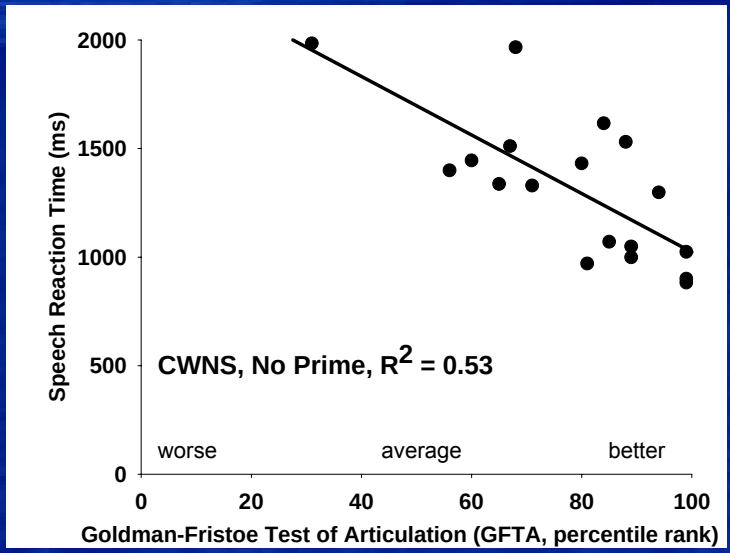
A Series of Picture-Naming Priming Experiments (Phonological, Semantic & Syntactic): in 3 to 5 year-old CWS & CWNS



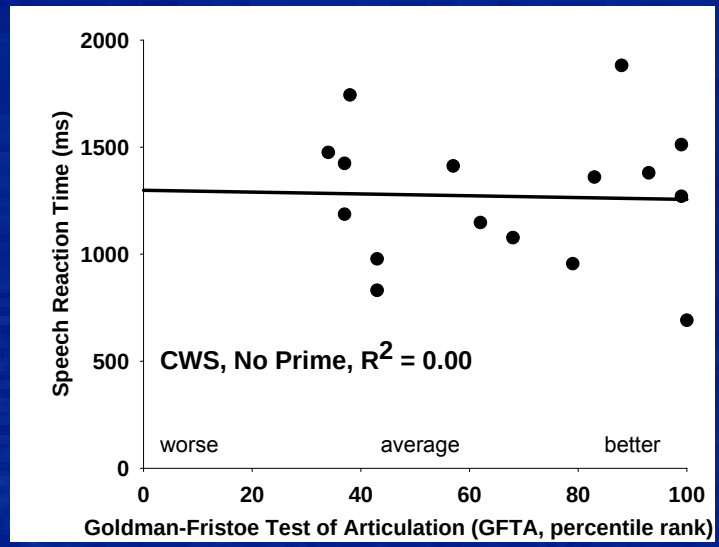
Study 1 (Finding 1): Minimal relation between articulatory mastery and speech reaction time in children who stutter (After Melnick, Conture & Ohde, 2003)

NO PRIME: For example, silence before child sees picture of "dog" to name

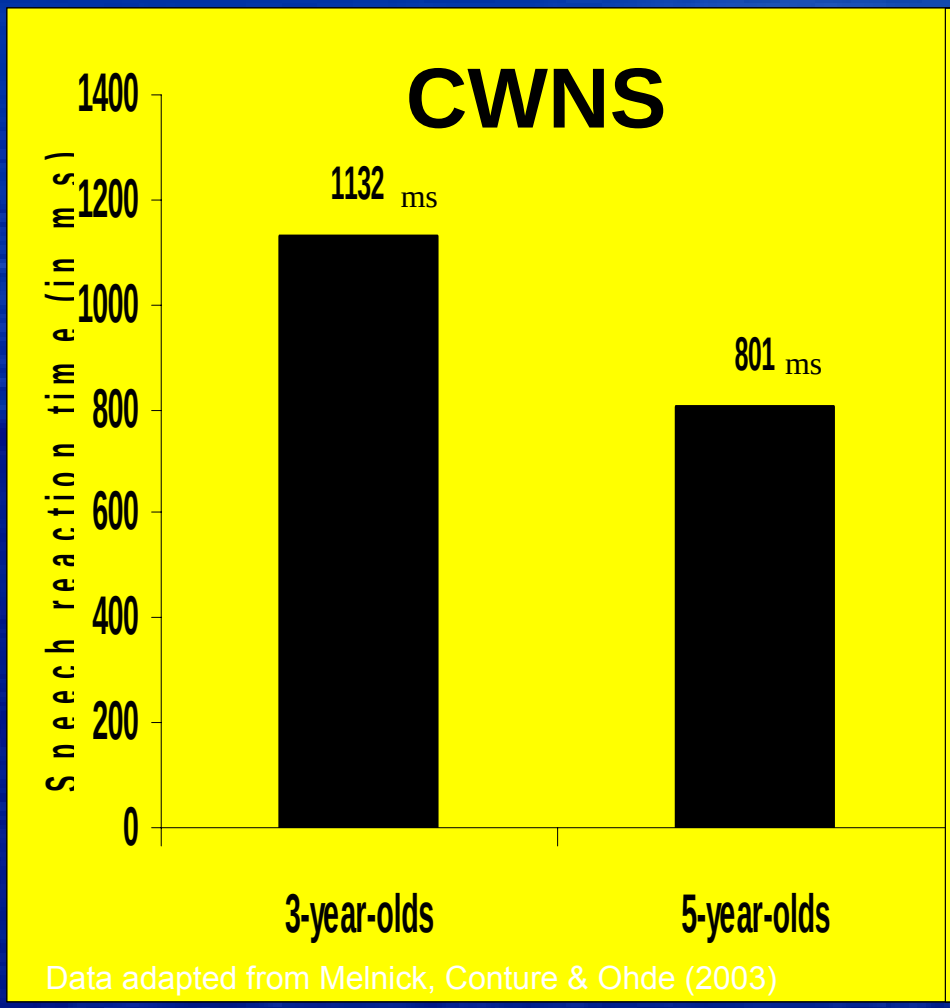
CWNS

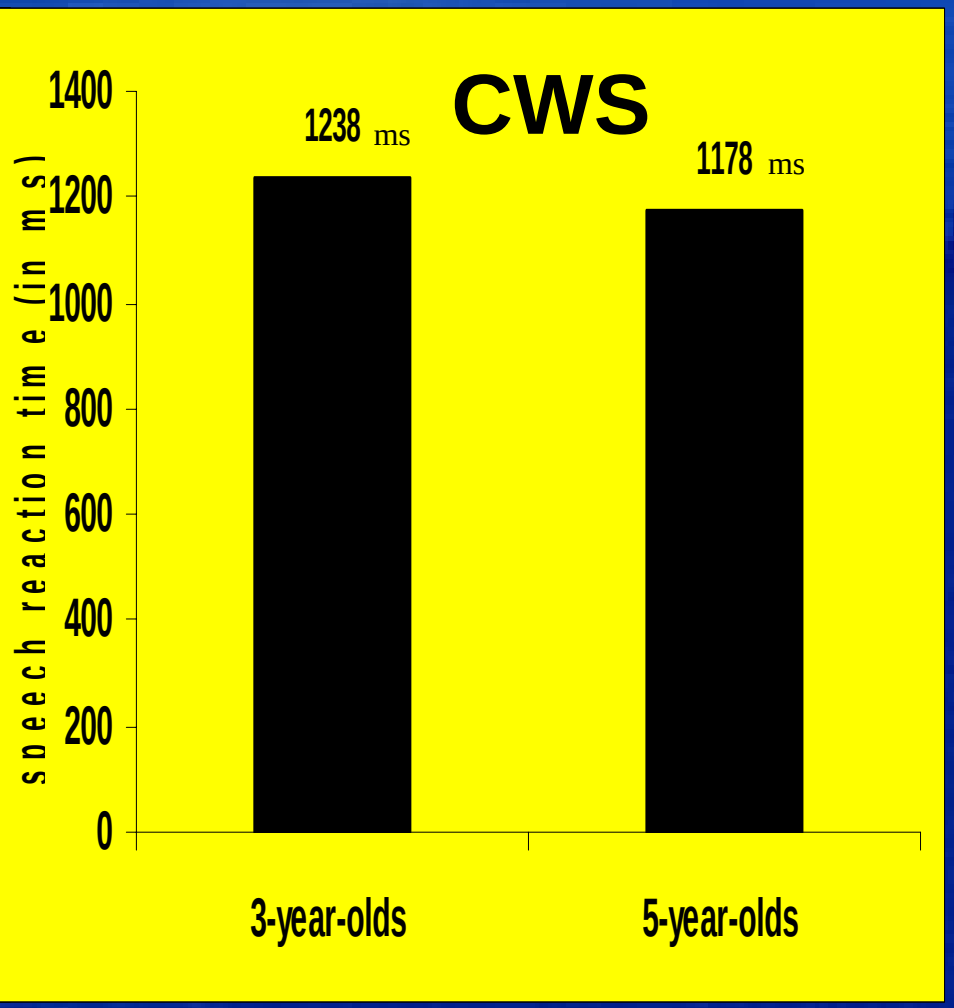


CWS



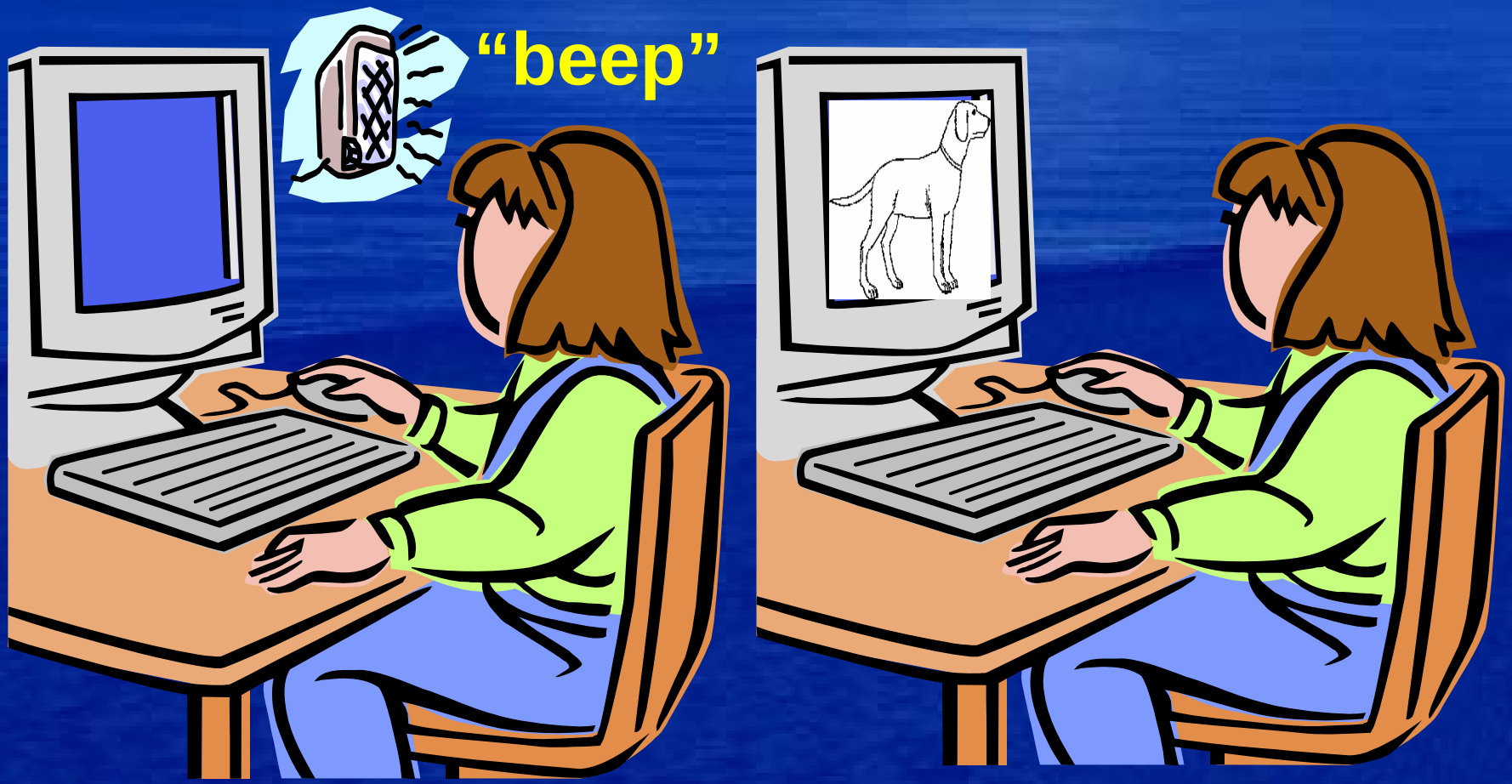
Study 1 (Finding 2): Onset-related *Phonological Priming (after Melnick et al. 2003): Developmental differences between CWNS & CWS*





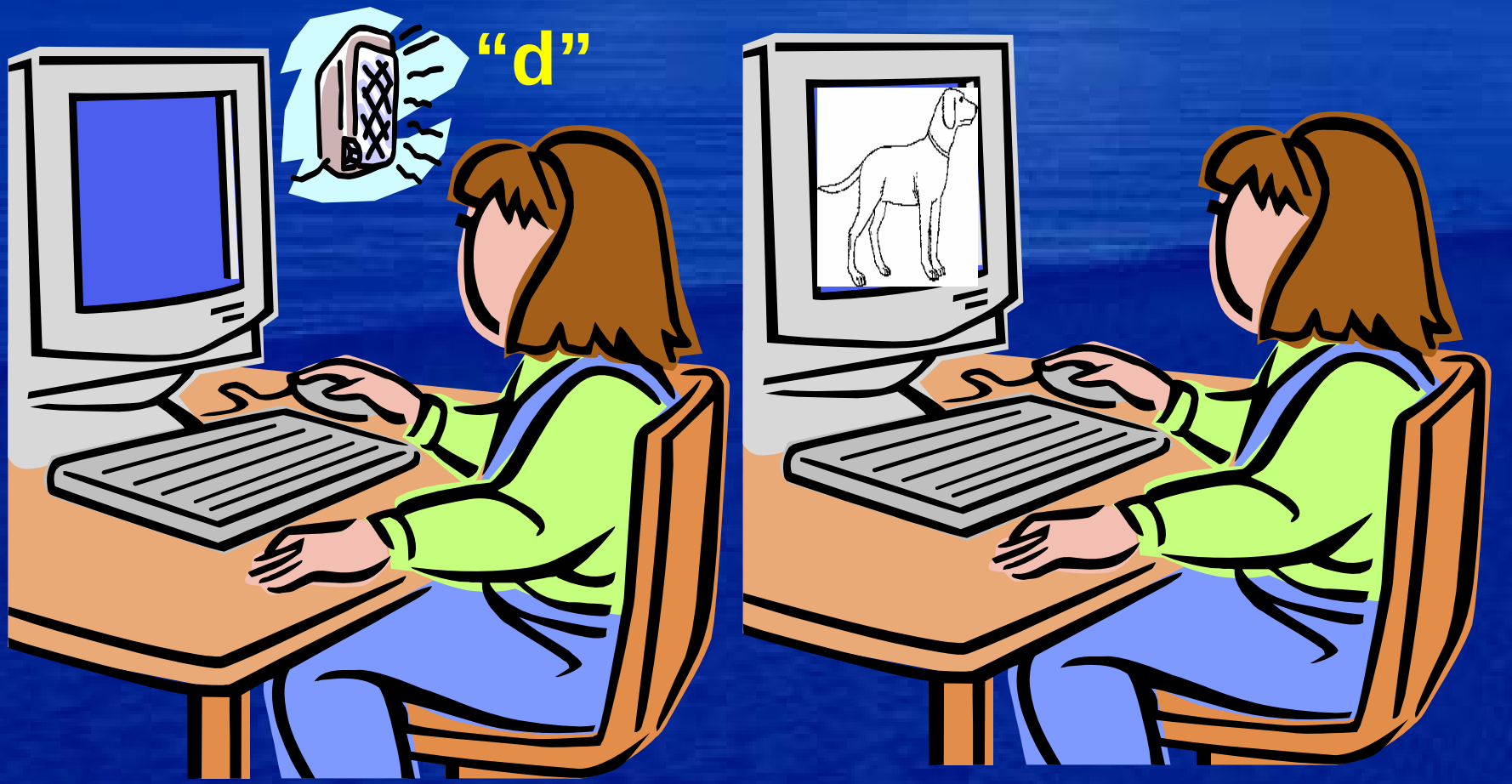
Data adapted from Melnick, Conture & Ohde (2003)

Neutral Prime (after Byrd, Conture & Ohde, in press)



Holistic Prime

Incremental Prime



Holistic (offset-related) versus Incremental (onset-related) Processing After Byrd, Conture & Ohde (In Press, AJSLP).

PARADIGM:

Picture to name,e.g., "dog"

Neutral: Tone 400 ms prior to picture

Onset-related: "d"

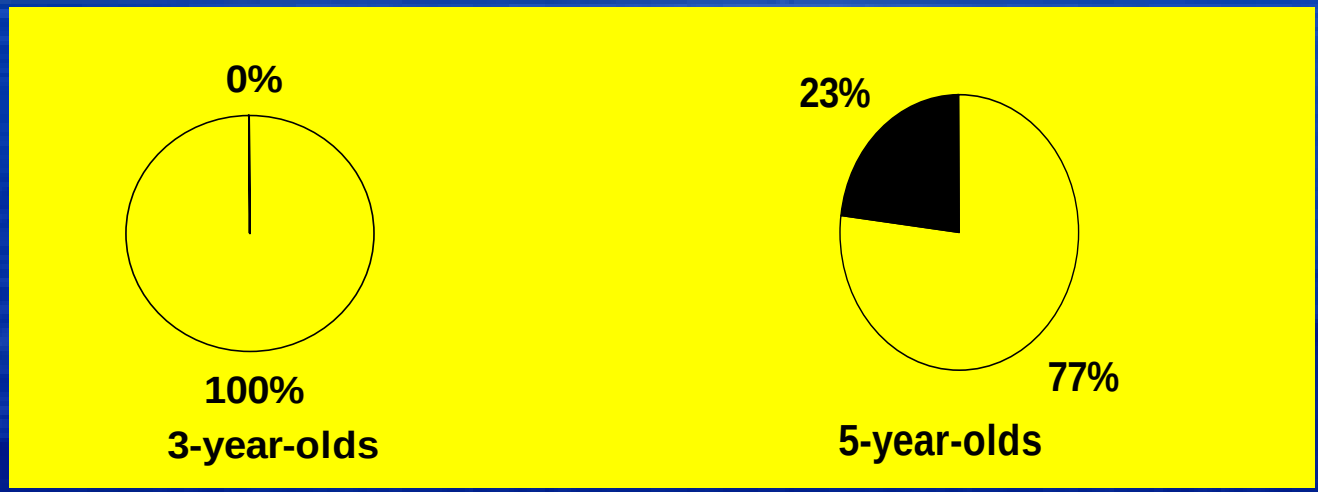
Offset-related: "og"

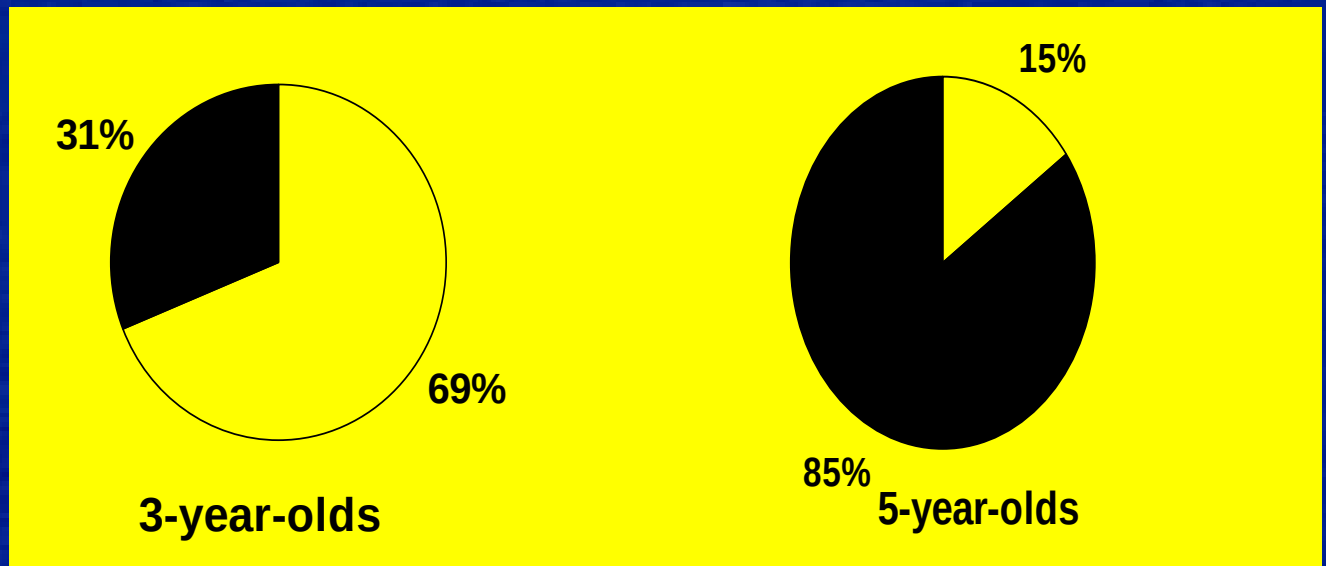
CWS →

CWNS →

Holistic (offset-related) faster

Incremental (onset-related) faster



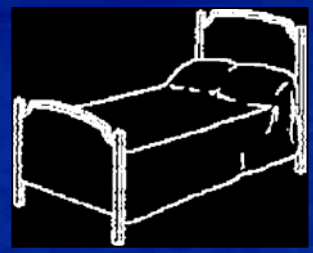


Conditions: Neutral, Holistic, & Incremental

Prime onset → ***Picture onset*** → ***Naming onset***

Neutral
(tone)

Holistic
[ɛd]

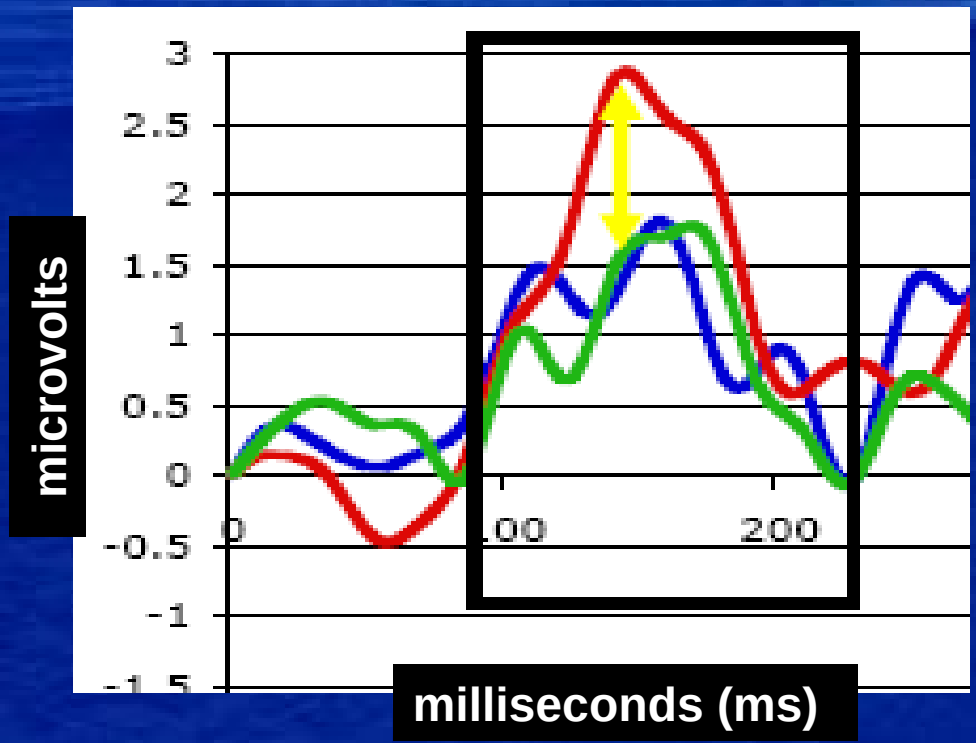


Incremental
[b]

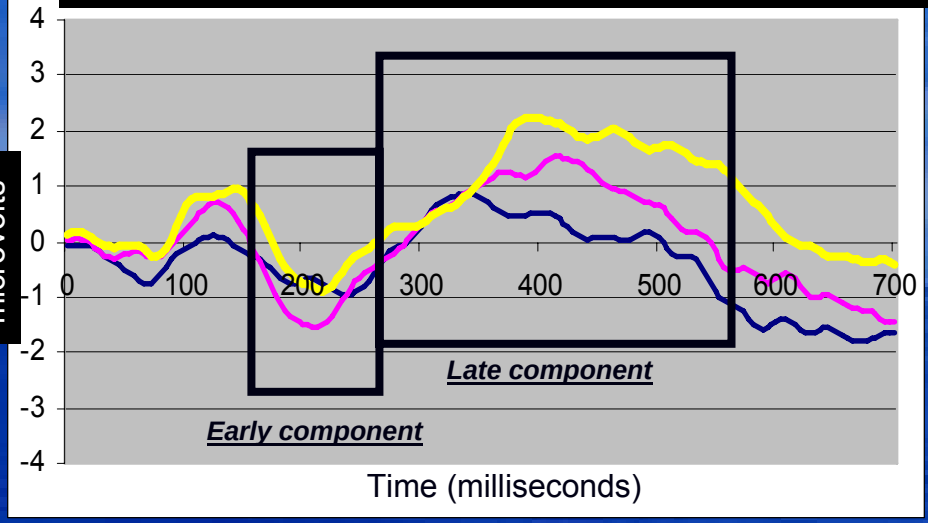
ERP epoch → **700 ms**

Psychophysiology/ERP Measures

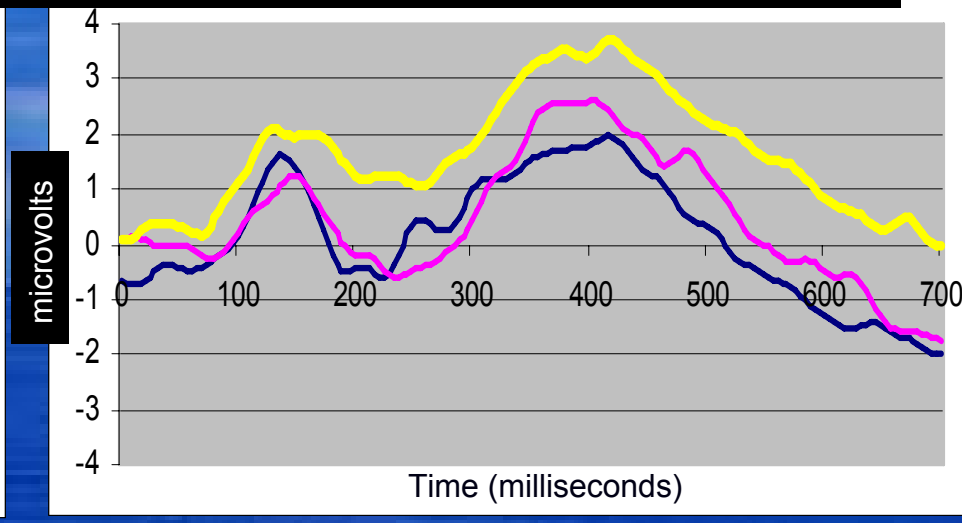
- Basic measure for this preliminary study: Increases/decreases in ERP ***amplitude,*** *with Increased ERP amplitudes indicative of increased cognitive-linguistic resources suggesting less well developed, less efficient cortical processing.*



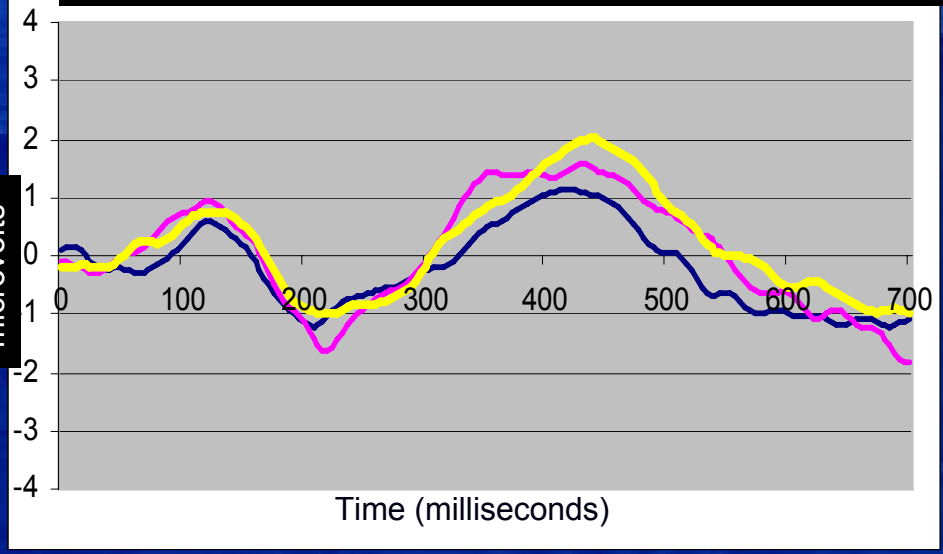
Younger Preschool *CWNS* (N = 3)



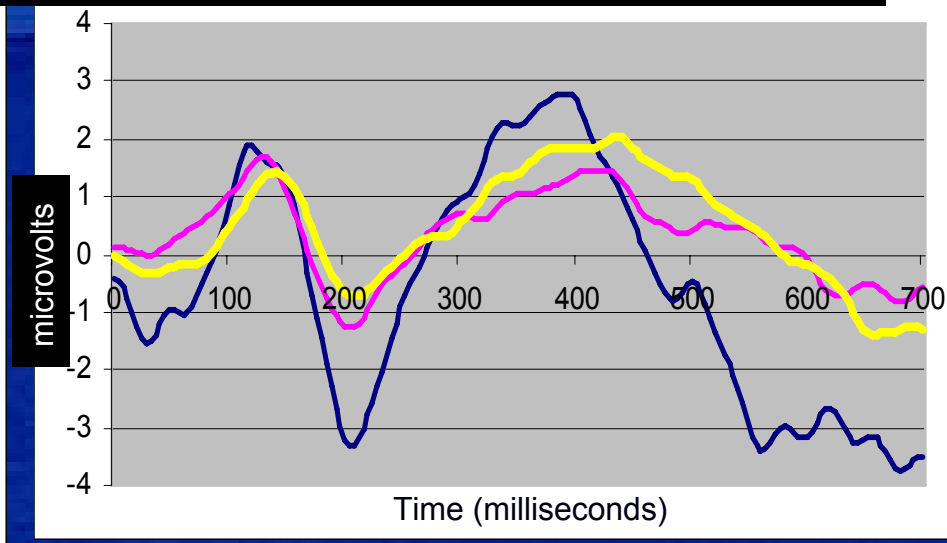
Younger Preschool *CWS* (N = 5)



Older Preschool *CWNS* (N = 3)



Older Preschool *CWS* (N = 5)



Neutral Incremental Holistic

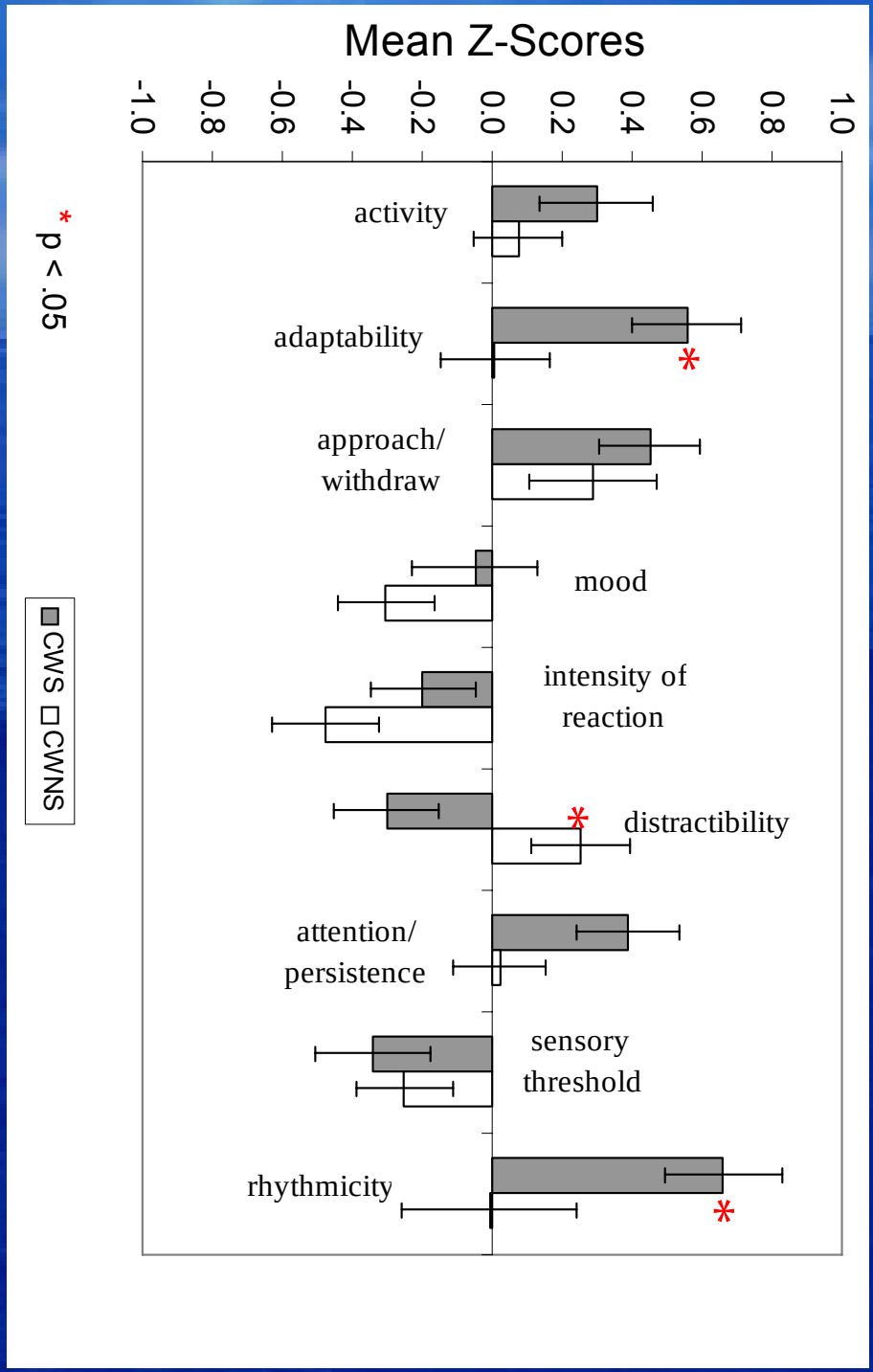
Emotional reactivity and regulation:

Children who stutter exhibit differences in some dispositional and situational aspects of emotions

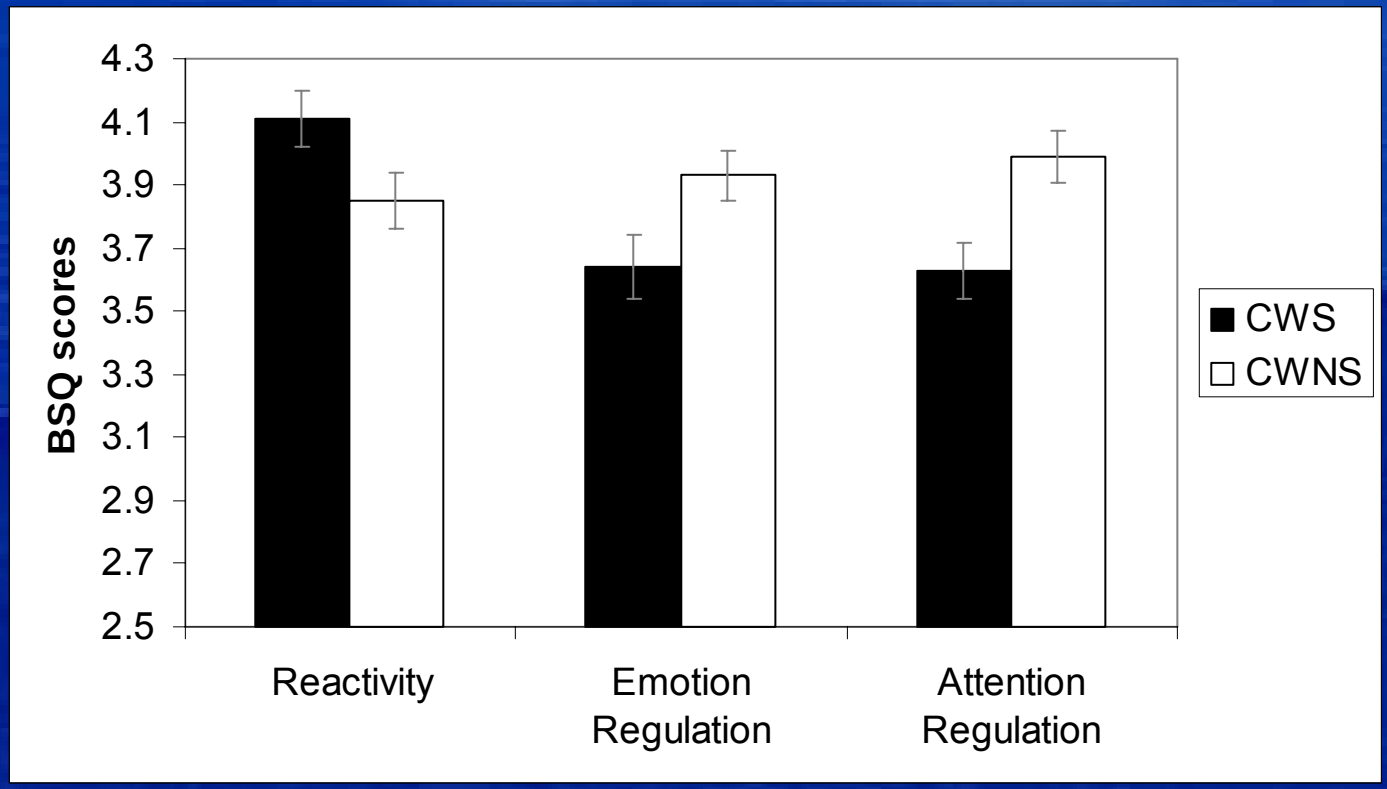
Emotional reactivity and regulation: **Children who stutter exhibit differences in some dispositional and situational aspects of emotions**

"Emotion is a process, a constant, vigilant process…which periodically reaches a level of detection for the person (i.e., a feeling) or an observer" (Cole, Martin & Dennis, 2003, p. 319).

Temperamental characteristics of 3- to 5-year-old CWS (n = 31) and age-, gender- and racially-matched CWNS (n = 31); no significant difference in SES between CWS& CWNS (after Anderson, Pellowski, Conture & Kelly, 2003, *JSLHR*)



CWS (n = 67) have higher reactivity and lower emotion and attention regulation than CWNS (n = 56; Karrass et al. submitted): *BSQ data*



- *(BSQ:* McDevitt, S & Carey, W. (1978). The measurement of temperament in 3-7 year old children. *Journal of Child Psychology, Psychiatry and Allied Disorders*, 19, 245-253; Psych. Corp., 19500 Bulverde Rd, San Antonio, TX 78259 or 1-800-872-1726)

What Have We Learned?

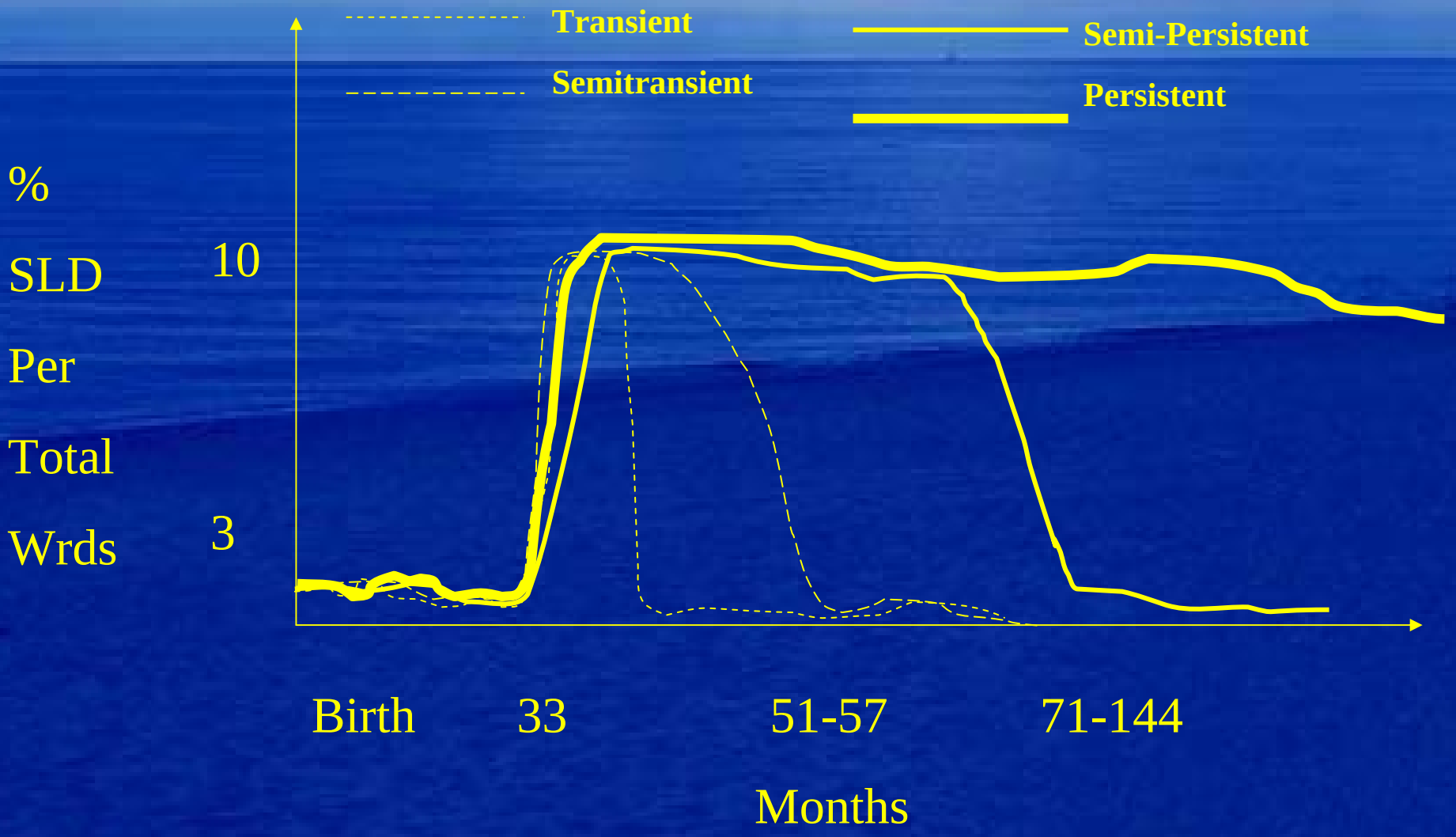
- ***Contributions of speech-language planning:***
- **CWS syntactic, semantic and phonological processes less effient/slower/perhaps less well organized for at least some CWNS**
- **CWS exhibit more "unevenness" in the development of language, vocabulary and articulatory skillsl than CWNS**
- ***Contributions of emotional processes:***
- **CWS less distractible, less adaptable to novelty and less rhythmic than CWNS**
- **CWS more emotionally reactive, less emotionally and attentionally regulated**
- ***Emotions interacting with speech-language planning and production:***
- **CWS more apt to stutter during/after positive than negative arousal**

In essence, certain aspects of CWS speech planning and production systems may be less than well developed, probably more vulnerable to interference, particularly emotional/cognitive interference that is less than well regulated

What does all this mean?

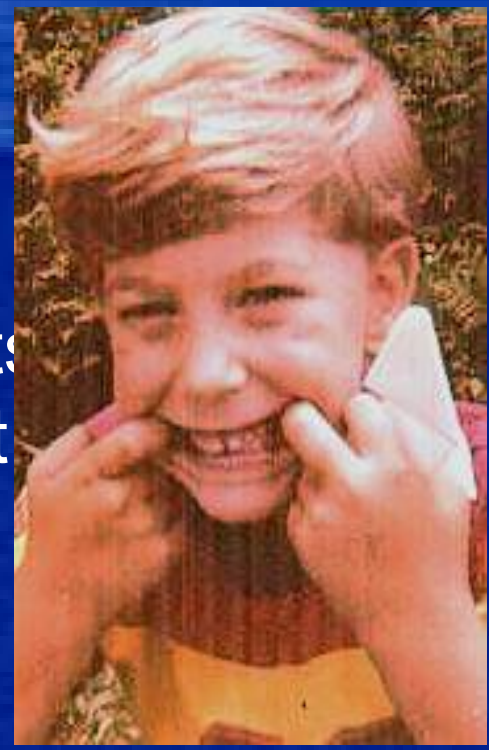
- *Diathesis(tendency, proclivity, or weakness)-Stressor Model (D-SM)*
- *Diathesis:* At least some CWS are less well developed/somewhat delayed in the quick, efficient processing of speech-language
- *Stressor* (for some): High emotional reactivity that is minimally regulated, demanding attentional resources
- *Concurrent processing load* - processing speech-language simultaneously with emotional information/state - subtly to not so subtly derails ongoing speech language processing (similar to use of cell phone while driving disrupts driving)

Four possible trajectories of developmental stuttering:



Trajectories, transitions, & turning points (Caspi, 1998)

- Trajectory: pathway across life span, e.g., social history.
- Transition: specific life event, e.g., marriage.
- Turning points: when trajectory meets transition, could be gradual to abrupt "redirection," of one's life.



Trajectories, transitions, and childhood stuttering

- For example, *trajectory* of continued slow linguistic development intersects with *transition* associated with temperamental (strong and relatively prolonged) reaction to moving to a new town leading to a *turnaround* in speech (dis)fluency of varying lengths/ duration.

- Thus, it may not be the mere presence of a transition but its intersection with a trajectory that impacts, “turnarounds,” in a previously fluent speech-language system

Attentional-Emotional-Communicative Model

Lowered threshold for limbic-hypothalamic reactivity to various environmental events, especially differences or unexpected, novel changes in environment.

Subtle to non-subtle vulnerabilities in speech-language planning and production

Great presentation …I haven't sleep that well in weeks!

The End

The End

The End

The End

The End

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references: Experimental studies

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