

SUBTYPES IN CHILDHOOD STUTTERING: CLINICAL APPLICATIONS

Patricia M. Zebrowski, Ph.D.
 Department of Communication Sciences and Disorders
 University of Iowa
 Iowa City, Iowa
 USA

tricia-zebrowski@uiowa.edu
www.uiowa.edu/~comsci/research/stuttering/index.html

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Subtypes in Stuttering

- A special or subordinate type within a larger, more general type (i.e. children with developmental stuttering)
- A subtype maintains the central or core characteristics of the larger group (e.g. SLDs or within-word disfluencies), but presents with its own relatively unique features (e.g. SLDs + phonological delay).

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Subtypes in Stuttering

- Research exploring single variables has revealed subtypes within the population of CWS. These subtype “groups” can be classified a number of ways.
- The task of subtyping is made more complex by the fact that there are subsets within subtypes, each having its own characteristics. Thus there is the potential for boundless subtypes (Yairi, 2007).

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Subtypes in Stuttering

For the purposes of stuttering intervention for children, it seems reasonable for us to focus on the subtypes that will assist us in differential diagnosis and individualized treatment.

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Subtypes in Stuttering

- For example, consider Yairi’s (2007) organization classification scheme:
 - Etiology (single, multiple domains)
 - Type of stuttering behavior (repetitions, prolongations; overt vs. covert; associated social anxiety, etc.)

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Subtypes in Stuttering

- Concomitant disorders (phonology, language, ADD/ADHD (attention deficit disorder))
- Biological characteristics
- Onset and development
- Behavioral characteristics

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What subtype classifications are the most useful for speech-language pathologists?

What subtype classifications are directly addressed by speech-language pathologists?

How Does Identification of Subtypes Help Us To Treat Stuttering.....

- As a disorder of communication
- As a behavior, with observable and unobservable features

Stuttering as a Disorder

What are the conditions under which stuttering emerges in children?

Subtypes in etiology: single, multiple domains

Subtypes in concomitant disorders

Subtypes in biological characteristics

Subtypes in onset and development

Stuttering as a Disorder

Subtypes in etiology: single, multiple domains

• Single – Psycholinguistic deficits implicating different sources of disruption (e.g. phonological encoding versus syntactic processing)

• Multiple – Psychological, Neurological, Environmental; in isolation, or combined.

Multifactorial Theory of Stuttering

Stuttering is a complex disorder, and stuttered speech is a complex behavior. As such, it is not likely to be triggered by one stimulus, but by several.

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These variables can be either external or internal, and are 'packaged' in different ways for different children. They are considered to be 'risk factors'.

(Smith and Kelly, 1997)

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These factors change over time and are present in widely varying degrees in children who stutter. A small change in one of these factors or in the ways in which they interact may lead to large changes in fluency (nonlinearity).

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In essence, there is no core factor(s) necessary for stuttering to emerge or persist in young children

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Rather, stuttering results from the complex interaction of a number of risk factors

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These same risk factors may also be relevant to both recovery from *and* persistence in stuttering for young children who are close to the onset of stuttering (Yairi and Ambrose, 1999; Guitar, 1997; Zebrowski and Conture, 1998).

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Candidate Risk Factors

Speech motor skills
 Temperament
 Family History (Genetics)
 Language Abilities
 Cognitive Abilities

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Candidate Risk Factors (cont'd)

Verbal Environment
 Time Pressure in Everyday Life
 Parental Expectations
 Parent's Reaction and Response to Stuttering

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Stuttering as a Disorder

Subtypes in concomitant disorders

- Phonology
- Language
 - Delayed or Advanced
 - Dissociation – between/within domains

Phonology

- Evidence suggests that children who stutter are *more likely* to exhibit (co-existing) phonological delay or disorder when compared to their nonstuttering peers (Blood, Ridenour, Qualls & Hammer, 2003; Louko, Edwards and Conture, 1990; Paden and Yairi, 1996).

AND...

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Phonology

- Comparisons of children who recovered from, and persisted in, stuttering showed that the persistent group achieved poorer scores across a number of tests of phonological proficiency (Paden and Yairi, 1996)

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Language

- Research findings have been *mixed*. Some studies have shown that deficiencies in language may coexist with stuttering, while others have indicated that children who stutter, *as a group*, present with age-appropriate expressive and receptive language skills (e.g. Anderson & Conture, 2000; Watkins, Yairi & Ambrose, 1999; Yaruss, LaSalle & Conture, 1998)

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Language

- These studies have also revealed a subgroup of young children who stutter who show advanced, or precocious language abilities.
- In particular, there is a subgroup who begin to stutter *prior to age three*, who show a 'mismatch' between phonological and language development (Watkins, Yairi and Ambrose, 1999).

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Language

- This latter observation has led researchers to look within and between language domains for evidence of 'dissociation' or 'developmental asynchrony.'
- Results have shown that there is a subgroup of children who stutter who possess age-appropriate language skills with uneven profiles either between domains (i.e. expressive versus receptive) or within domains (e.g. receptive vocabulary and grammatical comprehension) (Anderson, Pellowski & Conture, 2005; Coulter, Anderson & Conture, 2009; Zebrowski, Brown & Tumanova, in preparation).

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Language

Future research should examine the dissociation phenomenon in motor-language performance, both between domains (e.g. expressive language complexity and articulation rate) or within the motor domain (e.g. articulation rate and diadochokinetic speech rate; Yaruss, Logan & Conture, 1994).

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Stuttering as a Disorder

Subtypes in biological characteristics

- **Temperament**

Temperament

- A largely inherited, multi-faceted construct that characterizes a child's general disposition and range of moods (Goldsmith, 1987)
- Reactivity – excitability of the nervous system to behavioral responses or external stimuli

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- Self-regulation – the processes that inhibit or facilitate reactivity (for example, attention, approach-avoidance strategies, etc.)
- Emotionality – emotional response to new or novel stimuli

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- Activity – lethargic to hyperactive
- Sociability – being alone as opposed to being with others

Temperament mediates the influence of the environment on the child.

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- The overall underlying structure of temperament has been shown to be similar for children who do and do not stutter (e.g. Eggers, De Nil & Van den Bergh, 2009)

Temperament mediates the influence of the environment on the child.

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Summary of Research Findings

- Oyler (1996) observed that children who stutter were more “vulnerable” than children who don’t stutter, in that they tended to be “behaviorally inhibited” (BI)
- Behavioral Inhibition was described by Kagan (1984; 1994) as one type of *normal* temperamental profile
- Relatively timid, sensitive to environment and own behaviors, higher levels of *reactivity* and lower thresholds of *excitability* than other children

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Summary of Research Findings

- As a *group*, children who stutter are more reactive, and less able to regulate emotion and attention when compared to their normally fluent peers (Anderson, Pellowski, Conture & Kelly, 2003; Karrass, Walden, Conture, Graham, Arnold & Hartfield, 2006).
- As a *group*, children who stutter are less distractible than their normally fluent peers (attention “surplus”?) and may experience more difficulty adapting to new environments or stimuli (Schwenk, Conture & Walden, 2007)

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Finally....

- BI children may exhibit higher levels of physical tension, especially in the laryngeal muscles, when they experience relatively high degrees of emotional reactivity (Kagan, Reznick and Snidman, 1987)

AND...

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- Inhibitory responses to strong reactivity take three forms: freezing, fleeing, or avoidance. (Gray, 1987).
- Therefore, Guitar (1998) suggested that stuttering children who present with a BI profile may be at increased risk for persistent stuttering.

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Further.....

- It has been suggested that children who stutter and who possess a behaviorally inhibited temperament profile may be:
 - more inclined to be hypervigilant in both covert and overt monitoring of their speech and language
 - more inclined to be behaviorally and emotionally reactive to their speech in general, and their instances of stuttering in particular
 - more sensitive to environmental reactions to their behavior

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Implications?

Stuttering as a Disorder

Subtypes in onset and development

- Onset

Van Riper's "Tracks"

Yairi and colleagues longitudinal studies

Stuttering as a Disorder

Subtypes in onset and development

- Development

Bloodstein's Phases

Yairi and colleagues persistence and recovery

Stuttering as a Disorder: Onset

Van Riper's "Tracks" (1971)

- Analysis of 44 case files of children who stutter
- Observed 4 distinct profiles of stuttering onset
- Yairi & Ambrose (2005) concluded that each track described onset of stuttering in terms of in terms of

Age on onset
Sudden/gradual beginning
Disfluency characteristics
Concomitant problems

Stuttering as a Disorder: Onset

Yairi and colleagues (as reported in Yairi and Ambrose, 2005)

- Majority of children who stutter fit the profile that Van Riper described as "Track I"
- However, there is a subgroup of children presenting with "severe" stuttering at onset, with frequency of behaviors peaking at 2-3 months post onset and full recovery seen by 6-12 months

Stuttering as a Disorder: Development

Bloodstein's "Phases" (1960)

- Four developmental paths
- Cross-sectional; based on case histories of 418 children who stutter from 2 – 16 years of age

- Phase I – episodic, mostly sound/syllable repetitions, little to no awareness/concern
- Phase II – essentially chronic, stuttering exacerbated by arousal, child very aware
- Phase III – chronic yet situation-specific, word substitution and avoidance
- Phase IV - Vivid, fearful anticipation of stuttering;

Stuttering as a Disorder: Development

Yairi and Ambrose, 2005

Relatively brief beginning and ascending phase, and a relatively long declining phase

- Subgroup of children presenting with “severe” stuttering at onset, with frequency of behaviors peaking at 2-3 months post onset and full recovery seen by 6-12 months

Patterns of Unassisted Recovery

- Probability of recovery highest from 6-36 months post onset
- Majority of children recover within 12-24 months post onset
- Period of recovery marked by steady decrease in sound/syllable and word repetitions and prolonged sounds over time, beginning shortly after onset

- Relatively brief beginning and ascending phase, and a relatively long declining phase
- Subgroup of children presenting with “severe” stuttering at onset, with frequency of behaviors peaking at 2-3 months post onset and full recovery seen by 6-12 months

Recovery Predictors

- Described by Yairi and associates (1992,1996)
- Onset before age 3
- Female
- Measurable decrease in sound/syllable and word repetitions, and sound prolongations, overtime, observed relatively soon post-onset

- No family history of stuttering or a family history of recovery
- No coexisting phonological problems (and possibly language and cognitive problems?)

****ALL ARE PROBABILITY INDICATORS****

Stuttering as a Behavior

What speech and related behaviors distinguish stuttering from nonstuttering children and differentiate subtypes of children who stutter?

CHARACTERIZING DISFLUENT BEHAVIOR

BETWEEN-WORD (aka “Other” Disfluencies; Yairi et al., 1999)

- Interjections
- Revisions
- Phrase repetitions

CHARACTERIZING DISFLUENT BEHAVIOR, (cont.)

WITHIN-WORD (aka “Stuttering-Like” Disfluencies; Yairi et al., 1999).

- Sound/syllable repetitions
- Sound prolongations (audible and inaudible)
- Monosyllabic whole-word repetitions

STUTTERING IS A FORM OF SPEECH DISFLUENCY CHARACTERIZED BY A RELATIVELY HIGH PROPORTION OF WITHIN-WORD SPEECH DISFLUENCIES AND ASSOCIATED BEHAVIORS

...AND

LISTENERS MORE FREQUENTLY JUDGE **WITHIN-WORD** DISFLUENCIES TO BE ‘STUTTERING’ OR ‘ATYPICAL’ AS COMPARED TO **BETWEEN-WORD** DISFLUENCIES.

We begin to suspect that a child is either stuttering or at risk for developing a stuttering problem if (s)he meets **BOTH** of the following criteria:

- Produces **THREE (3)** or more **WITHIN-WORD (SLDs)** speech disfluencies per 100 words of conversational speech (i.e., sound/syllable repetitions and/or sound prolongations)
- Parents and/or other people in the child’s environment express concern that the child either stutters or is a stutterer.

Stuttering as a Behavior

What speech and related behaviors distinguish stuttering from nonstuttering children, and differentiate subtypes of children who stutter?

Subtypes as determined by...

Frequency of speech disfluency? Probably not.

Relative proportion of disfluency types (within and between) Probably so.

- stuttering versus normal disfluency (Yairi & Ambrose, 1999)
- Gregory (1973) "more" or "less" typical (i.e. sound prolongations versus repetitions)
- Schwartz & Conture (1988) Sound Prolongation Index (SPI)

Subtypes as determined by...

- "clonic" versus "tonic" ? (i.e. Froeschels, 1934)
- clustered disfluencies and their significance (e.g. LaSalle & Conture, 1995)?
- "motor" versus "linguistic"
- change over time predicts persistence and recovery
- additional questions....type and treatment responsiveness?

Subtypes as determined by...

Duration of disfluencies? Probably so.

- number and 'tempo' of repeated unit as indication of persistence versus recovery (Throneberg & Yairi, 2001; Zebrowski, 1991,1994)
- Duration of prolongations correlated with articulation rate in preschool and school-aged children who stutter (Zebrowski, 1994; Tumanova, Zebrowski & Throneberg (in press).
- Longer duration, slower articulatory rate; may be related to increased reactivity and subsequent attempts to compensate.

Subtypes as determined by...

Associated behaviors/physical concomitants? Probably so.

- Are observed close to the onset (Schwartz, Zebrowski & Conture, 1990)
- Number and variety, along with SPI have been shown to distinguish five distinct group of children who stutter (Schwartz & Conture, (1988).
- When considered along with temperament may distinguish children with potential for reactive compensation
- May related to developmental course (i.e. persistence versus recovery).

Subtypes in Stuttering:Some Conclusions....

- High within-group variability and individual differences in or along any domain does not suggest that subgroups exist. Perhaps this is all we are really looking at.
- Presently, our clinical work is guided by the observation of individual differences as opposed to 'subgroups'.
- Using the notion of "risk factors" and their presence/absence and relative weights within an interaction framework may yield robust evidence of subgroups.

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