


COLLEGE OF HEALTH AND PUBLIC AFFAIRS
 Department of Communication Sciences and Disorders



Speech-associated attitude and its broader framework

The legacy of Gene J Brutten

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Two-Factor Theory

Brutten & Shoemaker

From Two Factor Theory to multi-dimensional assessment

The legacy of Gene Brutten

The modification of Stuttering (1967)

Charles Van Riper

“After years of wandering in the jungle of stuttering theory and research it is with great relief and appreciation that one finds a clearing, with cultivated fields, pathways precisely outlined, and boundaries clearly marked. This book is such a clearing. It does not profess to have laid the whole forest bare. Thickets and swamps still remain for other men to master, but in the area of learning theory as it applies to the problem of stuttering the authors have done deeds that leave us all indebted.”

“The model presented here, like all models, will doubtless find revisions in future years. That is what models are for. They help free us from the inertia bred of confusion; they permit us to progress. In the tangle of information that surrounds stuttering they are indispensable if we are to understand the disorder.”

The legacy of Gene Brutten

- Two-Factor theory/Learning-based principles/Response-Contingent stimulation/Punishment (Janssen, Kraaimaat, Bastijns, Stes)
- Anxiety (Kraaimaat, Janssen)
- Eyemarker investigations (Janssen, Bakker, Van der Meulen)
- Behavior Assessment Battery (Bakker, Janssen, Ezrati, Green, Boutsen, De Nil, Jelcic-Jacsik, Gačnik, Novsak, Kawai, Johannisson, Neumann, Agius, Bernardini, Cocco, Medeiros de Britto, Busto Marolt, Van Borsel, Hylebos, Peleman, Węsierska, Vanryckeghem)
- Genetics/Incipient stuttering (Kloth, Kraaimaat, Janssen)
- Reaction time/Duration/Speech rate (Wieneke, Janssen, Boutsen, De Nil)
- Physiological measurement (Bakker)
- Adaptation
- Pragmatics

Two-Factor Theory: Interactionist Model

- Basic to the two-factor position: assumption that *genetic* and *environmental* factors interactively determine the behaviors of PWS
 - “. . . both heredity and environment contribute to the determination of behavior. . .”
 - “. . . most theorists concerned with stuttering have directed their attention to the environmental influences and have failed to consider the organism in which learning takes place . . .” (Brutten & Shoemaker, 1967, p. 49)
- Genetic history accounts for a majority of the risk variance; but neither heredity (organismic factors) nor environment are *singularly* sufficient to account for the presence of stuttering

- Stuttering is **not a unitary behavior**
 - consists of different behaviors
 - at any instance different combination of behaviors may be present
- stuttering should be **defined** and **measured** more precisely
 - concept of '**stuttering moment**' is too gross to be useful
 - investigators should *measure specific behaviors* that are a part of a behavior complex
- "... one of the major contributions of the decade of the seventies was the recognition that it was necessary to specify the exact characteristics of the behaviors generally lumped together under the label of a *moment of stuttering*" (Van Riper, 1982)

Strong Arguments for Precise Definition and Measurement

- Scientific analysis: precise **specification** of topographic features
 - behaviors, feelings, thoughts
- Functional analysis of cause-effect relations is clouded
 - when the topography of a behavior is unclear, the unit is fuzzy
- **Measuring** stuttering at a molecular level
 - What do we measure when we measure stuttering?
 - Heart rate, palmar sweating, muscular tension, breathing pattern etc.. can be observed and reliably measured

Topographic Specification of DV

- "Stuttering moment" is not an operationally useful concept
 - Does not refer to a **quantifiable** event
 - Lack of inter-rater reliability
 - \Rightarrow Specific behaviors need to be **defined** and **measured**

Two distinct processes

- **Stuttering behaviors** belong to one response class
- Two-Factor theory: it is not stuttering that is learned; but **negative emotional reaction** to the act of speaking is learned
- **Classical conditioning** paradigms: negative emotional reactions can be acquired, becomes classically conditioned with concurrent stimuli
- Emotional stress may produce autonomic reactions resulting in **speech breakdown**
- **Stuttering** represents a behavioral failure or **disintegration** created by **negative emotion**

Molecular analysis expanded

- In time, molecular analysis extended, giving additional utility and breadth
 - **neuromotor** processes underlying disfluent and fluent speech production
 - specific actions in the **respiratory**, **laryngeal**, and **articulatory** systems
 - looking molecularly at the **timing** of movements
 - presence or absence of **coordination** within and across speech systems

- **Behaviors secondary to stuttering** belong to another response class
- The second half of two-factor theory explains the learning of **acquired adjustive responses** associated with stuttering
- Behaviors secondary to stuttering: **instrumentally learned** because the person's belief that they are instrumental in avoiding, lessening, or escaping a stutter

Factor I – Negative Emotion

- For many PWS **originally neutral stimuli**: sounds (particular articulatory postures or movements), words (name), situations and particular listeners have come, through experience, to evoke **negative emotional response**
- These stimuli consistently create discomfort, fear, anxiety
 - subtle changes in functions of the autonomic nervous system: hearts pound, muscles tense, hands sweat, breathing becomes irregular (PSA)
- The **emotional response** is usually associated with **fluency failure**
 - Negative emotional responding seems to *interfere* with the *accuracy* and *continuity of motor performance*, vital to fluent speech

The totality of Two-Factor

- By **distinguishing** between the two types of responses, the Two-Factor approach provides a more **efficient** strategy for behavior change
- The probability of **successfully modifying** behavior is much less when we treat all responses as if they were learned the same way
- The differentiation between classically and instrumentally conditioned responses does **not** mean that the two types are **unrelated**
 - interact to produce both the emotional and behavioral effects

- Emotional response is generalized through the process of **higher order conditioning** and **stimulus generalization**

- **Higher order conditioning**: stimuli further removed from the originating stimulus are able to elicit the same response (e.g. elevated anxiety in *anticipation* of making introductions)
- **Stimulus generalization**: anxiety radiates to other situations and might create social anxiety (fear for criticism, shame, fear to be identified as a stutterer)
 - fear of saying first name radiates out to most words originating with the same initial sound
 - negative emotional reaction when ordering in MacDonalds generalizes to every snack bar, café, brasserie, restaurant)

Then and Now

- Brutten's insistence that we **measure** specified **behaviors** that constitute stuttering is still valid
 - issues surrounding the definition and reliable measurement of stuttering are still not resolved
- **Neurophysiological** research on sympathetic arousal has revisited the role of **emotion** in stuttering
- The current level of **neurophysiological** knowledge cannot fully explain the etiology of stuttering, neither can **learning theory**
- The dysfluency itself is neurophysiologically determined. How the individual deals with the *expectation* of dysfluency, the *actual* stuttering and the moments *after* the occurrence are learned
- “Accepting the above, the work of Brutten and Shoemaker (1967) and their 'two-factor theory of stuttering' is a “best fit” (Robert Logan, 1999)

Factor II

- **Adjustive responses**: learned from past experiences and consequences
 - learn to discriminate which adjustive responses will avoid negative **consequences** and which will bring about positive consequences
 - learn to make those responses that are **instrumental** in reducing negative stimulation or in increasing positive stimulation
- In the learning of instrumental responses, both classical and instrumental conditioning are involved
- Operants involve goal oriented actions, voluntarily emitted
 - under control of the consequent event, and influenced by reinforcement or punishment
- Punishment studies

From Theory to Practice

- Dr. Helbert Damsté and a Fulbright Hays award to **Utrecht**, brought Two Factor theory out of the **laboratory** into the **clinic** room
- In the **clinic**, behaviors were molecularly separated
 - how Two-Factor Theory affects therapeutic strategies
- Basic **theoretical position**:
 - various *dimensions* of a PWS's speech and speech-associated difficulties need to be *evaluated* so that treatment is client-directed
 - ⇒ development of the **Behavior Assessment Battery**, first multi-dimensional evaluative battery in area of fluency disorders

Behavior Assessment Battery

Brutten & Vanryckeghem

Inside View

Behavior Assessment Battery

- Multi-dimensional, evidence-based approach to diagnostic and therapeutic **decision making**
 - Reduce client heterogeneity: assist in separating PWS from normally fluent speakers, and individuals whose fluency failures are characteristic of disorders other than stuttering
- Helps **decrease diagnostic errors**
 - The absence of behavioral markers that are known to denote stuttering fosters *alpha* and *beta* diagnostic errors and clinical mismanagement

Inside View

- The **uni-dimensional view** that stuttering is a disorder whose assessment and treatment essentially *only* requires attention to the particular forms of *disfluency* that interrupt the forward flow of speech has been *challenged* (Barber Watson, 1995; Conture, 2001; Cooper, 1979, 1984; Guitar, 2006; Manning, 2009; Van Riper, 1982; Williams, 1979; Yaruss & Quesal, 2006)
- To define stuttering *uniquely* in terms of *speech disruptions* is *insufficient* because it does “not allow the differentiation between stuttering and other fluency disorders” (Silverman (2004 p. 11))

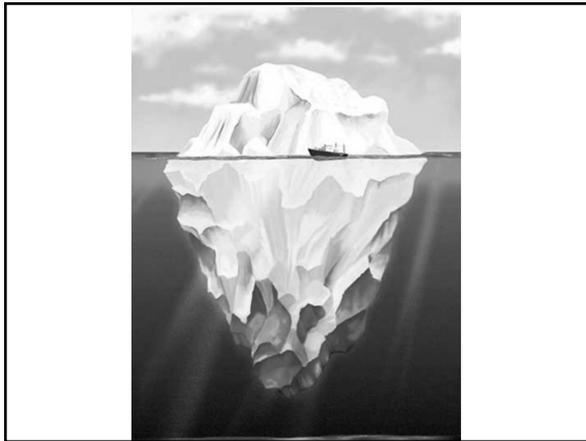
Behavior Assessment Battery (BAB) channels of observation and measurement

- Patient history
- **Self-report: normed assessment tools**
- Observation: operational definition and measurement!
 - Type of behavior
 - stuttering and other disfluencies
 - behaviors secondary to stuttering
 - Extemporaneous speech versus reading
 - Anticipation, consistency, adaptation
- Physiological measurement

- Stuttering is best seen as a **multi-dimensional disorder** in which speech-associated attitudinal and affective reactions, and behaviors of avoidance and escape are vital components
 - (Barber, 1981; Barber Watson, 1988, 1995; Brutten & Shoemaker, 1967; Brutten & Vanryckeghem, 2003a,b, 2007a; Conture, 2001; Cooper, 1979; Guitar, 1976, 2006; Manning, 1999; Riley, 1994; Smith & Kelly, 1997; Yaruss & Quesal, 2006)
- Cooper: “though observable speech dysfluencies ... [are] an essential element in labeling one a stutterer... the label does not apply unless the dysfluencies are accompanied by feelings, attitudes, and other behaviors characteristic of the stuttering syndrome“ (1999, p.10)

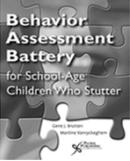
- **Covert** attitudinal, affective and behavioral variables can serve to more fully characterize the *person* who stutters
 - seek ways to **augment the clinical observations** of the frequency and severity of stuttering
- Broaden the meaningfulness of the elements that characterize the PWS to include **personal reactions** that are not directly observable

- Self-report measures of the attitudinal, emotional and/or coping elements of stuttering
 - some test procedures' results are **confounded**: total score and/or sub-scale scores cut across a **molar** mixture of various reactive and behavioral elements
- tests that **separately** explore the affective, coping and attitudinal reactions that are part of the stuttering disorder; and their impact on a PWS



BEHAVIOR ASSESSMENT BATTERY ©

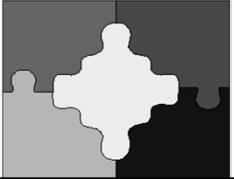
- **Communication Attitude Test (CAT, KiddyCAT, BigCAT)**
- **Behavior Checklist (BCL)**
- **Speech Situation Checklist**
 - ↳ Emotional Reaction (SSC-ER)
 - ↳ Speech Disruption (SSC-SD)

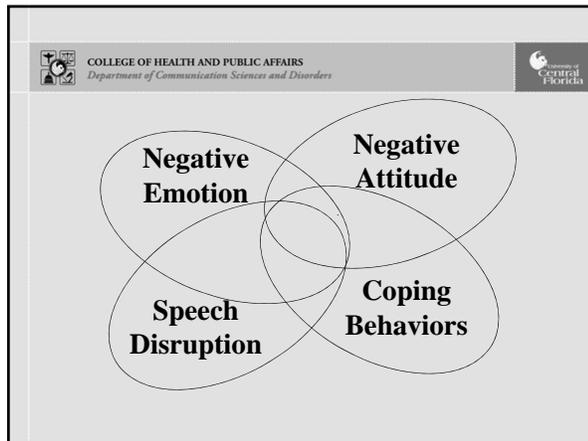


- Explore the **intrinsic features** of stuttering - ones that are *experiential* in nature rather than directly observable
 - clinicians have turned increasingly to the development and use of standardized self-report procedures
 - provide clinicians with a more extensive understanding of the PWS and stuttering, one that includes a “*view from within*”
- **Self-report procedures** brought **data-bound attention** to the reactive aspects of the disorder

Behavior Assessment Battery

- **Affective:**
 - Speech Situation Checklist – Emotional Reaction
- **Behavioral:**
 - Speech Situation Checklist-Speech Disruption
 - Behavior Checklist
- **Cognitive:**
 - Communication Attitude Test
 - KiddyCAT
 - BigCAT





Cognition/Attitude

- Automatic thoughts, imaginations, self-verbalizations
- Rational (real) or irrational
 - irrational negative cognitions can be part of the stuttering syndrome
 - can be intra- and interpersonal
- When **cognitions** become irrational
 - have an influence on speech – strengthen stuttering behavior
 - serve a mediating and controlling function
 - prohibit PWS to deal with problems in a constructive manner
- When certain cognitions stabilize to a more **permanent** totality of negative thoughts and anticipations, **negative communication attitude** has been established

Cognition

Speech-Associated Attitude

Cognition as integral component of molecular analysis of the experiences of PWS

- Importance of the relationship between **cognition** and **stuttering** and its role in the onset and development of the disorder has long been recognized (Lincoln, Onslow & Menzies, 1996)
- Speech-associated attitude = fundamental component of the speech disruption, negative emotion, coping behaviors that characterize PWS
 - Barber Watson (1995): inter-relationship between these components, the “**reciprocal nature** of attitudes and behaviors” (p. 144)
 - dealing with “**head**” issues (p. 145) is as important as addressing a PWS’ speech

- Relationship between **stuttering** and speech-associated **attitude**: topic of discussion by theorists, diagnosticians, and clinicians
- Concerned with and differed about “**cause or effect**”
 - disruptive impact that negative attitude may have on fluency
 - possible effect of fluency failure on speech-related attitude
- Both viewpoints suggest a **link** between attitude and stuttering
 - speech-associated mal-attitude and stuttering might have a bidirectional or “**loop**” **relationship** (Liebert & Liebert, 1995)
 - cause and effect can “**mutually influence** each other” and have a “**contributory causal role**” (p. 89)

Adults

- Pretreatment **attitude**: seen as a good **prognostic measure** of the instatement and maintenance of fluency (Guitar, 1976)
- **Long-term maintenance** of fluency that resulted from the operant treatment program used: at least partially dependent on improved attitude toward speech (Andrews & Cutler, 1974)
- **Relapse** was more often associated with negative speech-associated attitude than was a positive belief (Guitar, 1979; Guitar & Bass, 1978)

Children

- Grims (1978)
 - 70 item experimental A-scale: CWS and CWNS in kindergarten through 4th grade
 - scale score of the two groups did not differ
 - the groups did differ significantly on 19 of the questionnaire's items
 - A-19 administered to a different sample of children
 - responses to the items of this scale did not significantly separate CWS from CWNS
- Investigation into speech-associated attitude remained fallow until 1984: CAT

- Clinically-based research which support the contention that attitude toward speech and fluency are related: led various clinicians to incorporate **attitude change** into their **treatment programs**
 - Boberg (1981): belief that improvement might not hold up if a negative attitude toward speech persisted
 - Ryan (1974) and Perkins (1979) contended that a positive attitude toward speech is essential for normal sounding speech to have permanence
 - Cooper (1979, 1999):
 - **negative attitude** toward speech is a **basic element** of the disorder that is stuttering
 - therapy is inadequate if it does not assist the individual in clarifying his feelings and attitude about dysfluency

Communication Attitude Test for School-Age Children (CAT)

Brutten & Vanryckeghem, 2003, 2007

Children

- **Absence of data** that verify the relationship between negative beliefs and dysfluency for children who stutter
- **Indirect studies** of speech-related attitude of young CWS
 - wishes of children who stutter: no suggestion that stuttering youngsters have a particularly negative viewpoint with respect to their speech (Silverman, 1970; Culatta et al., 1985)
- Woods (1974): **directly** asked CWS and their classmates to evaluate their own speech competence and that of their peers
 - CWS viewed themselves, and were seen by their peers, as being poorer speakers
 - CWS gave "stuttering" or "having a speech problem" or "not speaking well" as reasons for their unfavorable self-estimate

CAT

- Cognitive component of the Behavior Assessment Battery
- Designed to *specifically* investigate the speech-associated *belief* system of grade-school children
 - speech-associated attitude as a purely *cognitive* measure
 - certain tests cut across a mixture of **unweighted** affective, behavioral, and attitudinal items
- Youngsters (age 6 – 16) who stutter and those who do not are asked to reflect *directly* on their attitude toward speech

CAT

11. I talk well most of the time..... True...False
 12. It is hard for me to talk to people... True...False
 13. I don't talk like other children..... True...False
 16. My words come out easily..... True...False
 25. I would rather talk than write..... True...False

CAT and Reliability

- Repeated internal reliable investigations (Boutsen & Bruten, 1990; Bruten & Dunham, 1989; De Nil & Bruten, 1990; Vanryckeghem & Bruten, 2003)
 - Removal of two items from the original CAT: currently 33 items

CAT

- Bruten & Dunham: 1984
- De Nil & Bruten: 1990, 1991
- Bruten & Vanryckeghem; Vanryckeghem; Vanryckeghem & Bruten: 1992, 1995, 1997, 2003, 2005
- Collaborations with colleagues around the world:
 - Bernardini, Cocco & Zmarich, Medeiros de Britto Pereira; Busto-Marolt; Cocco & Zmarich; Gacnik; Green; Jaksic-Jelicic; Johannisson & Wennerfeldt; Kumai; Mukati

Test-retest reliability

- **Positional stability** of the respondents' scores: initial test, one week later, 12 week hiatus
- The obtained correlations on test-retest scores
 - + .83, + .81 and +.76, respectively (p=.0001)
- t values between all test administrations were non-significant
- **Absolute closeness of the CAT scores:**
 - Absolute amount of speech-associated attitude did not change over a one week period (F=.02, p=.90)
 - It did over a period of 11 and 12 weeks (F=17.97, p=.0001 and F=18.88, p=.0001)

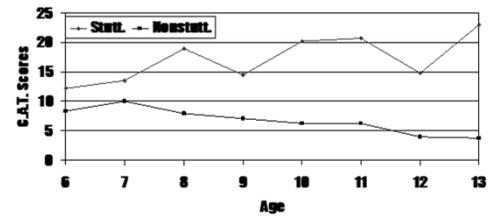
- First reported **normative investigation** of the CAT involved 518 nonstuttering children at age levels 6 through 15.
 - evidenced relatively little in the way of negative attitude
- Dutch CAT: extensive **comparative** research in Flanders, Belgium (De Nil, Bruten, and Claeys, 1985; De Nil & Bruten, 1986, 1990, 1991; Vanryckeghem & Bruten, 1992, 1996, 1997; Vanryckeghem, 1994, 1995; Bruten & Vanryckeghem, 2003, 2007).
 - Group comparisons revealed repeated *between-group differences* that were *statistically significant*.
 - Repeated confirmation that CWS generally view their speech in significantly more negative terms than CWNS

- Speech-associated attitude of the 7 to 13 year old stuttering children sampled were **positionally stable**
 - the CAT scores' rank order was statistically consistent over a period up to three months
- CAT's **sensitivity:**
 - absolute difference among the test means over a 3 month period
 ⇨ capable of reflecting attitudinal change
- CAT scores tend to be stable over time and have both good inter-item reliability and item-to-total score concordancy

CAT and Negative Emotion

- Relationship CAT scores and negative emotion (Vanryckeghem, Hylebos, Brutton & Peleman, 2001)
 - statistically significant .89 correlation coefficient
 - presence of a strong relationship between mal-attitude and negative emotion among CWS
 - supportive of the view that attitude and negative emotion tend to influence each other and are a part of the stuttering syndrome

Line graph of the mean CAT scores of 55 children who stutter and 55 children who do not stutter at eight different age levels (Vanryckeghem & Brutton, 1997)



CAT and Stuttering severity

- Relationship: **CAT** and **Stuttering Severity** measured during reading and extemporaneous speech
- **Correlation: fluency failure** and CAT score is limited
 - Statistically significant ($p < .05$) low correlations were obtained for the CWS (.33 - .39, reading, conversation)
 - Correlations approximated the +.42 results obtained by Guitar (1976) with adults who stutter (S-24 and %SS)
- **Limited shared variance:** measured variables reflect somewhat different aspects of the stuttering syndrome

- Cross-sectional data: attitude of grade-school CWS and CWNS is partly related to their age
 - in divergent ways, the youngsters were differentially affected by their cumulative experience history
- From **age 6** mal-attitude is significantly more likely to be present among CWS than it is among CWNS + the significant increase in disparity between two groups



- between-group difference in mal-attitude toward speech is present at an earlier age than previously thought AND
- calls for research in youngsters between ages of 2 and 6, the age at which stuttering typically has its onset

CAT and Age

- Mal-attitude of CWS tends to increase with age
- Opposite trend among CWNS: CAT scores decline with age
- Between-group disparity increases with age
 - incremental and decremental trends in attitude are significantly related to age of the children in the two subject groups:
 - CAT score and age: +.39 for CWS and -.42 for CWNS ($p < .05$)
- Significant and divergent trends:
 - CWS: experience history affected the extent to which they viewed speech in a negative light
 - CWNS increased their speech-related confidence

CAT and Parental Report: Concordancy investigation

- Standard practice of clinicians to question the parents of very young children being assessed (development, symptomatology, emotional reactions, attitudes...)
- Clinicians have been wary about the **validity of parental reports**
 - often *limited agreement* between parental statements and either child performance or offspring's reports – questionable usefulness
 - low-to-moderate degree of concordancy between parental report and the performance of a child as measured by means of developmental scales and inventories (Goldstein, 1985; Byrne, Backman, and Smith, 1986; Miller, Manhal, and Mee, 1991)

- Parent-child consistency relative to **attitudes and beliefs**
 - Ability of parents to gauge the attitudes of young adult children (family, drugs, work ethic) (Thompson, Acock & Clark, 1985)
 - Parent-child concordance was low and nonsignificant
- Concordance between children and parents' report becomes greater as children become **older** (Alessandri & Wozniak, 1989)
- Research suggests that the correlation between the reports of parents and that of their child, are less than reassuring
 - Hodges et al. (1990): "parent report was *originally* seen as a *potential gold standard* against which to validate children's reports. However, poor concordance has been found between interview administration to the child and those administered to the parent about the child" (p. 427)

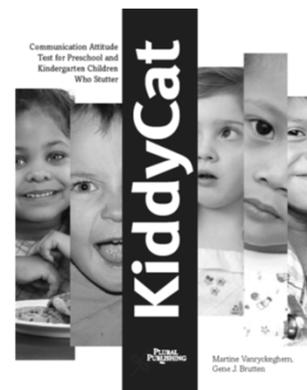
- Relative lack of parent-child agreement is consistent with the findings of **similar** studies in the field of **psychiatry**
 - CAT: one cannot depend with any certainty that the report of a parent shares a common reality with that of their child
 - Parents do not seem suitable surrogate informants
 - Clinicians should be aware of the seemingly limited usefulness of parental comments about their child's speech-associated attitude
 - Does not mean that the parents' views are not important as it relates to the CWS and his/her problem
- ↓
- Worthwhile to **design a test procedure** that can be used to measure speech-associated attitude of children who do not yet read
 - enable the clinician to better assess young children's communication attitude and the attention that it may require

- The belief system of grade-school children about their speech can generally be assessed by means of the CAT
 - test procedure cannot be used with preschoolers
- Traditionally: turn to the children's parents
- CAT: determine if parents' view of their offspring's attitude toward speech is consistent with that of their child

Communication Attitude Test for Preschool and Kindergarten Children who Stutter (KiddyCAT)

Vanryckeghem & Brutten, 2007

- **Positional relationship** between parents' CAT scores and children
 - concordance between the children's CAT scores and those of their mother or father was statistically significant but low
 - correlations ranged from .29 to .34
 - **Parents** of CWS viewed their child's attitude toward speech as being **more negative** than their offspring reported
- ↓
- Parents' CAT report about their child's attitude would not serve as an adequate predictor. Neither parent is likely to be a useful source of information about their child's reported speech-associated attitude
 - for CWS: r^2 mother-child: 12%; father-child: 8%



KiddyCAT

- Vanryckeghem & Bruten: 2007
- Vanryckeghem, Bruten & Hernandez, 2005
- Collaborations with colleagues around the world:
 - Bernardini, Cocco & Zmarich; Bharmal; Clark et al.; De Niels; Franken & Koedoot; Gustavsson & Karlorp; Guttormsen; Medeiros de Britto Perera; Shafir; Vanrobaeys; Wesierska et al.

KiddyCAT

- Is talking hard for you? Yes No
- Do your words come out easily? Yes No

KiddyCAT

- The statistical magnitude of the attitudinal difference between CWS and CWNS at **age six** \implies between-group attitudinal difference may well be present among still **younger children**
 - Research evidenced that children as young as three show an **awareness** of disfluency (Ambrose & Yairi, 1994; Ezrati, Platzky, & Yairi, 2001)
- ↓
- “the traditional view of awareness as an *advanced reactive symptom* thus cannot be upheld” (Ambrose & Yairi, 1994, p242)

- **Between-group difference:** CWS score statistically significantly higher than CWNS (Bernardini et al.; Clark et al.; Vanryckeghem & Bruten, 2007; Vanryckeghem et al., 2014; Wesierska et al., 2014)
- Large effect size: 1.44 (Vanryckeghem & Bruten, 2007)
- CWNS
 - 30% reported a complete absence of mal-attitude
 - 50% had a score at or below 1
 - 73% had a score of 2 or lower
 - Only one of the 63 CWNS had a score above 5
- CWS
 - Negative attitude toward speech was absent in only 13%
 - 70% of the CWS had a score above the mean of the CWNS

• KiddyCAT items

- derived from the speech-associated beliefs recorded over many years in files of preschool and kindergarten CWS
- Clark et al.: factor analysis: single factor - “speech difficulty”- underlying the KiddyCAT
- The children are asked to respond by means of ‘yes’ or ‘no’ to simple, verbally presented questions
 - play-type activity: put one of 12 marbles into an egg box type after answering a question

KiddyCAT and age

- younger group (age 3 and 4): significant mean KiddyCAT score difference between CWS and CWNS ($F=15.814, p=.000$)
- older participants (age 5 and 6): mean KiddyCAT score differed significantly between the groups ($F=18.014, p=.000$)

KiddyCAT and Gender

- KiddyCAT score of the male and female CWS did not differ significantly ($F=.201, p=.656$)
- Mean test score of the male CWNS did not differ significantly from that of the female CWNS ($F=.866, p=.356$)
- Within-gender analysis: male CWS reported significantly more in the way of negative attitude than the male CWNS ($F=30.634, p=.000$)
- Mean KiddyCAT score for the female CWS was significantly higher than that of the female CWNS ($F= 6.663, p=.014$)

Communication Attitude Test for Adults who Stutter (BigCAT)

Brutten & Vanryckeghem, 2011

- The **awareness** of dysfluency that CWS have been shown to display is fundamentally related to their speech-associated **attitude**
- Finding of a negative speech-associated attitude among CWS far earlier than previously thought \implies considerable **theoretical relevance** with respect to the onset and development of stuttering
 - presence of speech-associated **mal-attitude** at a time of stuttering **onset** points to the possibility of a causal or a contributory causal factor

- **Communication Inventory (S-39)**, Erickson, 1969) capable of differentiating PWS from PWNS to a statistically significant extent
 - considerable overlap of the S-39 scores of PWS and PWNS
- Removal of non-discriminating items \implies **Erickson S-24**
 - better in differentiating attitude of PWS and PWNS
- Recent research: **item-to-total score consistency** of the S-24 is **questionable** (Brutten & Vanryckeghem, 2003)
 - four items failed to correlate significantly with total score of PWS
- This observation + the S-24 was **normed several decades ago**, is linguistically somewhat out of date \implies **standardizing** the **BigCAT** and the establishment of norms for PWS and PWNS

Clinical implications

- **Awareness** of a difference between dysfluency and fluency by children as young as three (Ambrose & Yairi, 1994)
- **Attitude** toward speech of CWS and CWNS differs significantly by the age of three or four
- Attitude of CWS **becomes increasingly negative with age** (Vanryckeghem & Brutten, 1997)
- \implies highlights the import of attitude in **clinical practice**
 - **need to assess** speech-associated attitude of preschool and kindergarten children whose fluency is problematic
 - when appropriate include attitude change as an aspect of **therapy** (Conture, 2001; Zebrowski & Kelly, 2002)

BigCAT

- BigCAT is a **singularly cognitive** measure of communication attitude
 - items specifically explore speech-associated belief
 - are not directed at affect, speech disruption or coping behaviors
- **Un-confounded** cognition-based measure of speech-associated attitude
- Respondents reflect on 35 statements and indicate whether or not the items represent what they presently *think* about their speech

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BigCAT

1. There is something wrong with the way I speak.....TRUE.....FALSE

13. I have confidence in my speech ability..... TRUE.....FALSE

18. I speak well.....TRUE.....FALSE

BigCAT and Gender

- The mean BigCAT score of males and females in the sample of PWS did not prove to be statistically significant ($t=.722$, $p=.472$)
- Mean BigCAT score difference of male and female PWNS was not statistically significant ($t=.006$, $p=.996$).
- Gender did not have a significant influence on speech-associated attitude as measured by the BigCAT

BigCAT

- Brutten & Vanryckeghem: 2011
- Collaborations with colleagues:
 - Medeiros de Britto Perera; Yadegari

BigCAT and S-24

- For both S-24 and BigCAT: considerable difference in the speech-associated attitude reported by PWS and PWNS
- However, **between-group difference** was descriptively far greater for the BigCAT than it was for the S-24
 - average BigCAT score of PWS was 5 ½ SD above mean of PWNS
 - mean S-24 score of PWS was 3 SD above that of PWNS
- Quantitative difference between these two tests in terms of their **discriminative power** between the response of the PWNS and PWS
 - BigCAT effect size: 4.98 ($p=.000$; $CI=4.3225/5.6463$)
 - S-24 effect size = 2.73 ($p=.000$; $CI=2.2785/3.1869$)

BigCAT

- **Highly significant** between-group difference ($t=37.702$, $p=.000$) in the mean scores
 - average score of PWS is 5 ½ SD above mean score of the PWNS
- **Cronbach Alpha:** .84 for PWS and .85 for the PWNS
 - strong relationship between the response of the participants in each group to the items that make up this test procedure

- BigCAT: **powerful** and **internally consistent** measure of speech-associated attitude
- Considerable between-group difference in attitude of PWS and PWNS + **minimal overlap** between the groups
 - ⇒ BigCAT a useful addition to clinical decision making

Implications for Treatment

Cognition

- **Behavior** change brought about by treatment is not likely to last in the absence of **cognitive** change (Andrews & Craig, 1988; Neilson, 1999)
- Cognitive behavior therapists (e.g. Bandura): **behavior** change patterns become more stable if there is **cognitive support**
- Meichenbaum & Cameron: importance of a *positive attitude* in both *attaining* and *maintaining* behavior change
- If the client's **attitude** toward communication does not **normalize**, the outcome of treatment is likely to be poor (Guitar & Bass, 1978; Menzies, O'Brian, Onslow, Packman, St Clare & Block, 2008)

- **Two-Factor model** helps the clinician pinpoint the **targets of therapy** and guides the observation of behavior change
 - pre-, peri- and post-treatment assessment
- **Congruence** between the patient's individual **needs** and the therapeutic **tactics** employed
- Stuttering is a **multidimensional** problem that involves a mosaic of emotional and adjustive responses that need to be dealt with

Two-Factor Theory – Multi-dimensional evidence-based *assessment and treatment*

- **Multi-dimensional assessment**
 - Affective
 - Behavioral
 - Cognitive
- **Multi-modal treatment:**
 - Stuttering behaviors (stuttering modification and fluency shaping)
 - Negative emotion, anxiety reduction, desensitization
 - Behaviors secondary to stuttering: operant conditioning approaches
 - cognitive treatment (attitude)

Cognition

- Multi-dimensional framework
 - improved fluency depends, in part, on the need to **replace** the disruptive effect of a **negative speech-related attitude** with a belief system that is **positive** and supportive of fluency
- For PWS, to bridge the gap between sounding normal and feeling normal, their speech-associated **attitudes** need to be "**identified, reinforced or modified**" (Perkins, 1979, p.383)
- Andrews & Cutler: Inter-relationship between behavior change and attitude: "**successful treatment** requires not only that stutterers speak normally but also that they *believe* themselves to be as effective as normal speakers in their interaction with others" (1974, p. 317)

The legacy of Gene Brutton

The road ahead

New Directions

- The pendulum of scientific popularity swings back and forth
- Viewpoints reflect the ebb and flow of data
- Assessment and Treatment outcome studies move us away from dependence on authorities, single case findings, and commercial publicity, to data-bound findings on an international scale

Tribute to Gene J Brutton

- Yearly visits to **Europe** since **1971** stimulated and shaped research for close to 50 years
- Kraaimaat: “For many of us he opened a window to the USA by facilitating contacts with other leading colleagues, motivating us to present at ASHA conferences and to publish in international journals which was not common in those days”
- Janssen: “He was the most European-minded American I ever met”
- Ezrati: “We can see his (Gene) generosity through his willingness to share and present. He encouraged knowledge enrichment and research”
- De Nil: “With the death of Dr. Gene Brutton, many of us not only have lost a dear friend and colleague but our field also has lost one of its giants”