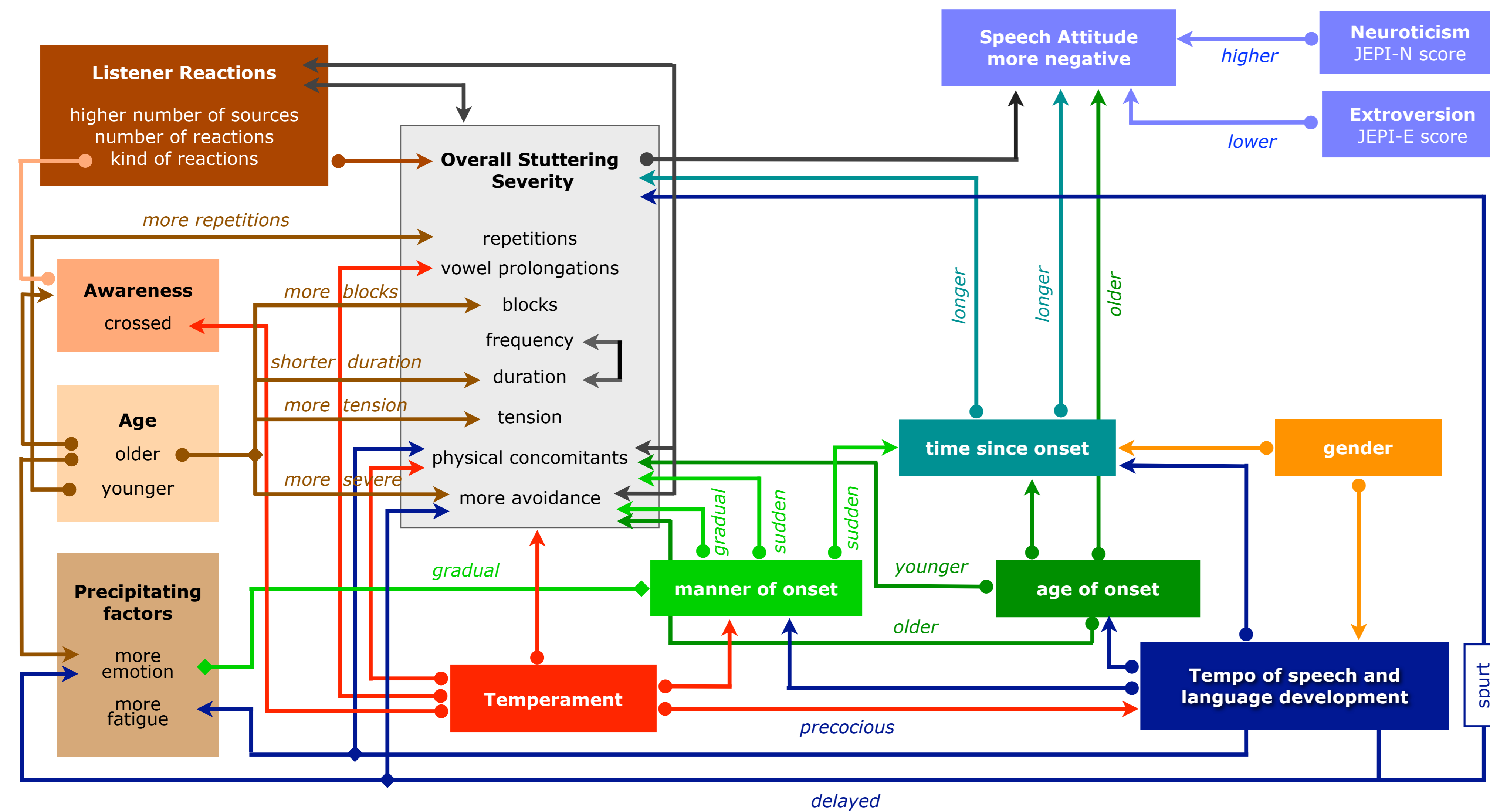


# Epidemiology and Phenomenology of Stuttering: a Model of Development and Consistency of Related Phenomena

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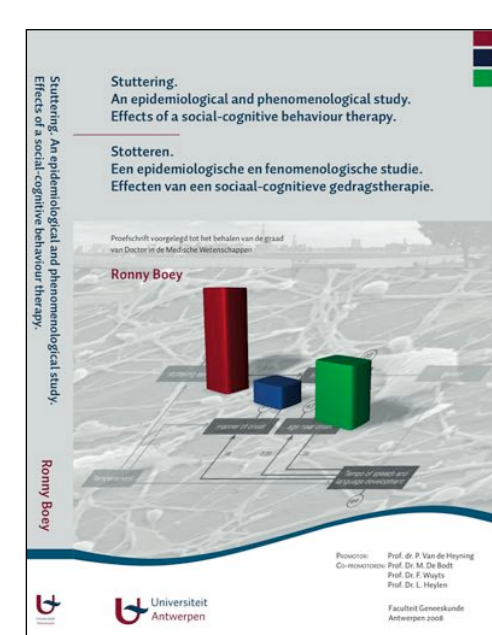
In the Antwerp epidemiological and phenomenological study on stuttering, the onset and development of stuttering have been studied. Descriptive data related to the onset of stuttering have been obtained for a group of 1549 participants. Reported and observed variables have been obtained in order to test several hypotheses concerning the age-related, gender-related and interrelated phenomena. The following aspects of stuttering and related phenomena have been studied: (a) stuttering-like disfluencies (type, frequency, duration, tension), (b) subtypes of stuttering and the role of temperament, (c) the onset of stuttering and related variables, (d) precipitating factors post onset, (e) stuttering associated behaviour (physical concomitants and avoidance), (f) awareness of stuttering, (g) speech attitude, (h) listener reactions. Findings resulted in the construction of a model of development and consistency of stuttering characteristics and related phenomena.



## An integrated model of onset and development of stuttering, stuttering severity and related phenomena

\* The present findings are part of the results of a doctoral research project conducted by the author at the University of Antwerp, Faculty of Medicine.  
Promotor: Paul Van de Heyning. Co-promoters: Marc De Bodt, Floris Wuyts, Louis Heylen.

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The Antwerp Epidemiological and Phenomenological Study has been conducted in the Centre of Stuttering Therapy (Antwerp, Belgium) between January 15, 1991 and April 12, 2006.

### Participants

- Number.** A group of 1549 persons who stutter participated, all native Dutch-speaking individuals living in Flanders, northern part of Belgium.
- Age.** The group consisted of 1048 young children and 501 children and adolescents. The mean age is 76.8 months (i.e., 6;4 years) ( $SD = 41;6$ , range 1;9-17;8 years). The group of males is older ( $M = 91$  months, i.e. 7;7 years,  $SD = 42$ , range 1;9-17;7 years) than the group of females ( $M = 69$  months, i.e. 5;9 years,  $SD = 39$ , range 1;11-16;9 years).
- Gender.** Participants were 1191 males and 358 females (ratio 3.2:1).
- Criteria for participation:** (a) being labelled as stuttering by one or both parents, (b) either directly referred by a physician, speech language pathologist, school guidance team, (c) affirmative description of characteristics of stuttering in the structured interview, (d) a positive detection of stuttering based on one or more of tests for detection of stuttering and stuttering severity.

### Procedure

- Reported and observed data have been registered concerning: (a) stuttering-like disfluencies [SLD] (type, frequency, duration, tension), (b) subtypes of stuttering and the role of temperament, (c) the onset of stuttering and related variables, (d) precipitating factors post onset, (e) stuttering associated behaviour, (f) awareness of stuttering, (g) speech attitude, (h) listener reactions.
- Standardized, reliable and validated procedures, instruments and tests have been used. Parent/clinician rater reliability have been calculated for reported and observed stuttering characteristics.
- Interview.** A semi-structural clinician-parent/patient interview has been completed. Sections: (a) speech difficulty and disfluencies, (b) speech-associated behaviour, (c) precipitating factors, (d) onset of stuttering, (e) speech and language development, (f) reaction of the child/adult towards his/her own speech, (g) and of listeners, (h) pre-birth, birth and health factors, (i) familial occurrence of stuttering, (j) behavioural and personality traits, (k) school and extra-mural activities, (l) demographic data and family characteristics.
- Speech samples** have been taken according to the guidelines of the applied instruments (SPI & SSI, Riley; TVS-NL & TVS-L, Boey).
- Speech attitude.** For children between 7 and 14 years old the Communication Attitude Dutch (CATd) has been used. For older children and adolescents the S-scale of Erickson has been used.
- Personality characteristics.** Personality questionnaires have been used: the Junior Eysenck Personality Inventory (JEPI), the Amsterdamse Biografische Vragenlijst voor Kinderen (ABVvk), the Amsterdamse Biografische Vragenlijst België (ABVB).

### Data Analysis

- Formulating hypotheses.** Null hypotheses and alternative hypotheses have been formulated, inspired by the extended review of literature and by clinical experience.
- Descriptive statistics.** Descriptive statistics have been calculated for nominal and categorical variables and for continuous variables. All distributions of data have been checked for type of distribution, conditions of homo- or heteroscedasticity, (multi-)collinearity etc.
- Analysis of association and variance.**
  - Chi-square tests have been used to study differences related to nominal or categorical data. Given the large numbers of samples, special care is taken to interpret statistical significance resulting out of Chi-square tests.
  - Bi-variate logistic analysis, sometimes ANOVA, and polynomial logistic regression analysis, have been conducted in order to test hypothesised relationships between binary variables and a number of explanatory variables.



- Structural equation modelling has been used to model multiple analysis and path analysis. Details will be given when a model for the onset of stuttering and speech attitude will be discussed.
- Rater agreement.** For intra and inter-judge agreement Kappa ( $\kappa$ ) and the Positive Agreement Index (PA) has been calculated.

### Results represented in the model of development and consistency

#### Related to overall stuttering severity

- Onset of stuttering.** The overall stuttering severity and variability of severity is significantly influenced by onset-related characteristics.
- Age at onset.** More avoidance behaviour is registered for stuttering children with a later age of onset. More physical concomitants are registered for stuttering children with an earlier age of onset.
- Manner of onset.** A sudden manner of onset is more often associated with more severe physical concomitants. A gradual manner of onset is more often associated with more avoidance behaviour.
- Time since onset.** Children with a longer time since onset, have been observed with an overall higher stuttering severity score, suggesting a developmental effect.
- Tempo of speech/language development.** Children with a precocious speech/language development showed significantly more severe physical concomitants. More often emotion is reported as a precipitating factor. Children with a delayed speech/language development showed significantly more avoidance behaviour. In addition, children with a delayed speech/language development and a reported language development spurt obtained a significantly higher stuttering severity. Furthermore, the tempo of speech/language development is significantly associated with age and manner of onset, gender and temperament.
- Temperament.** High temperamental children obtained a higher overall stuttering severity. More specifically, more frequent vowel prolongations and more intense physical concomitants have been observed.
- Speech attitude.** A more negative speech attitude is associated with a higher overall stuttering severity score. However, the major part of the variability of the speech attitude score, has been explained by personality characteristics (neurotic and extraversion scores).
- Listener reactions.** A higher number of different listeners reacting towards stuttering, and a higher number of reactions have been associated with a higher overall stuttering severity. Specific reactions (e.g., instructions such as to breathe well, to think about, to sing it etc.) have been associated with a higher over stuttering severity, and more in detail with more intense physical concomitants and avoidance behaviour.

#### Related to age

- Stuttering characteristics.** Older children showed more blocks, a shorter duration and more tensioned of SLD and more severe avoidance behaviour. Younger children obtained more repetitions as type of SLD. Children with a longer time since onset obtained a higher overall stuttering severity.
- Awareness.** Awareness of speech difficulty gradually increases with age and is enhanced by specific instructions of listeners as a reaction towards the disfluent speech.
- Speech attitude.** The speech attitude became more negative with a longer time since onset and is associated with an increased stuttering severity.
- Precipitating factors.** For older children (> 7 years old) more often emotion has been reported as a precipitating factor.