Reliability of Measurement of Trained Speech Patterns in Stuttering

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Introduction
• The majority of behavioral treatments for stuttering adults teach novel speech patterns that aim to enhance speech fluency.
• In Stuttering Modification approaches *local* techniques are trained to prevent or modify individual stuttering events (i.e. pull-out), whereas Fluency Shaping therapies teach a *global* speech pattern in order to avoid the occurrence of any stuttering moments.
• Thus, novel speech patterns are an important means to achieve controlled fluency.
• However, in outcome studies controlled and spontaneous fluency are not discriminated, which makes outcomes of different approaches hardly comparable.
• A modified version of **time-interval analysis** (Cordes, Ingham, Frank & Ingham, 1992) was regarded as a useful instrument to measure the amount of stuttered speech, spontaneous fluency and controlled fluency.

Aim
Determination of inter-judge and intra-judge agreement of modified time-interval analysis among German experts in stuttering.

Method
• Seventeen German experts in the field of stuttering judged an audio file on two occasions within two months.
• This audio file contained 4-seconds speech segments of 9 stuttering adults collected during telephone interviews.
• 3 speakers of the audio sample had followed a Stuttering Modification therapy, 3 had accomplished a Fluency Shaping therapy, 3 adults did not attend any treatment.
• For each speaker 12 intervals from the interview before and after treatment, resp. for the last group from two different assessments, were chosen at random, totaling in 216 intervals.
• Judges were asked to judge each interval in the following pause, deciding whether
  - speech was spontaneously fluent
  - one/more novel speech pattern(s) used
  - or whether stuttering occurred.

Results
Interval-by-interval inter-judge agreement
• Mean inter-judge agreement amounts to 88.2% on the first occasion.
• On the second occasion, inter-judge agreement decreases slightly to 87.3%.
• Median kappa-values confirm substantial inter-judge agreement on the first ($\kappa = 0.74$) and second ($\kappa = 0.70$) occasion.

Interval-by-interval intra-judge agreement
• Mean intra-judge agreement reached 80%.

Agreed intervals
• 135 of all 216 intervals (62.5%) were judged the same by 80% of the judges on both occasions.
• 51 of all 216 intervals (23.2%) were judged the same by *all* judges on both occasions.

Agreement per category
• Agreement was comparable for stuttered intervals, spontaneous fluent intervals and those containing trained speech pattern(s).
• Agreement for speech patterns trained in the Fluency Shaping therapy was slightly higher than for those of the Stuttering Modification therapy.

Conclusion
• Inter- and intra-judge agreement appear satisfactory and reach the standard criterion of 80%.
• The additional evaluation of novel speech patterns does not seem to attenuate reliability.
• In general, discrimination between spontaneous and controlled fluency allows comparisons of different treatment approaches and could help to investigate the link between relapse and (dis)use of acquired speech patterns.