Real-Time Analysis of Speech Fluency

(Yaruss, Journal of Speech-Language Pathology, 1998)

- Diagnostic assessment typically looks at frequency of disfluency, duration, types, and severity of disfluency of disfluency in spontaneous speech. Diagnosis also includes potential interactions between fluency and speech/language development and oral-motor skills. Also the client’s reaction to stuttering and attitudes about speaking.
- The two most fundamental measures include frequency of disfluency and types of disfluency.
- Thorough evaluation is important for planning treatment.

Purpose of Real-Time Analysis

- Provide a measure of the frequency of various types of disfluency occurring in a speech sample.
- Does not require a transcription.
- Quick and easy to perform.
- Provides information important to clinical decision-making.
- Flexible by allowing the clinician to select syllable or word measurement; the behaviors measured (types of disfluency vs. stuttering); and sample size. Other measures such as duration and number of iterations can also be measured.
- Transcribed analysis is time consuming and Real-Time Analysis can be done more frequently, thus is a better tool for session-to-session documentation.

Procedures for Conducting Real-Time Analysis

- Basic procedure involves observing a speech sample and counting fluent and disfluent words (either video tape, audio tape or in person).
- Step 1: Observe the client speaking for a few minutes to become familiar with the general speaking style and pattern of disfluencies in the speech.
- Step 2: Begin coding speech with a dot (.) or a dash (-) for fluent words and an (x) or coding symbol for a disfluent word.

Coding Symbols:  

- R = repetitions  
- rv = revision
- P = prolongations  
- F = filler/starter
- B = blocks  
- p = long pause
• **Representative Sample.** Do not worry about missing words or maintaining pace with the speaker. Focus on obtaining a representative sample.

• **Disfluency Count Sheet:** word count or syllable count—most differentiate between less typical and more typical disfluencies.

  • **Specific Considerations:**

    . multiple iterations of a single disfluency – mark with type of disfluency & number

    . disfluencies involving several words (not always a correlation between number of disfluencies and words)

    . multiple disfluency types on a single word or phrase; options include selecting the most severe type of disfluency, entering a code for each type of disfluency, or develop a code for disfluency combinations.

    . formulaic utterances/lexicalized phrases

    . repetitions that are not disfluencies

    . toy noises

    . unintelligible utterances

    . non-representative samples

    . additional markings: vertical slash for utterance breaks, superscripts for number of iterations, heavy dots for the presence of visible or audible tension.

• **Intrajudge agreement is important.**


FLUENCY FRIDAY PLUS: TYPES OF DISFLUENCIES (Gregory, et. al.)

More Typical Disfluencies (Disfluencies without tension; Counted but separated from disfluencies with tension)

- **Hesitations**: silent pause of 1 second or longer  
  (ie: I... *(pause)*... want the red one)
- **Interjections**: meaningless words irrelevant to the message [um/like/well/uh]  
  (ie: I um want the red one)
- **Revisions**: change in content, grammar, or pronunciation of a message  
  (ie: I want the blue... the red one)
- **Unfinished words**: a word that is abandoned and not completed later in the message  
  (ie: I want the oran.....red one)
- **Phrase repetitions**: repetition of at least 2 complete words of the message  
  (ie: I want... I want the red one)
- **Word repetitions** (up to 2x): repetition of a whole word in a slow casual way  
  (ie: I I want the red one)

Less Typical Disfluencies (Disfluencies with tension; considered as stuttered words)

- **Word repetitions** (3x or more): repetitions of a whole word  
  (ie: I I I want the red one)
- **Interjections**: (used as a starter, or 3x or more, or used rapidly)  
  (ie: Um Um Um I want well well well the red one)
- **Syllable repetitions**: more than a sound repetition and less than a word repetition  
  (ie: wa wa wa want the red one)
- **Sound repetitions**: repetition of a phoneme that does not stand alone as a word  
  (ie: I want the r r r red one)
- **Prolongations**: duration of a phoneme (may include pitch rise and tension)  
  (ie: IIIIII want the red one, or I waaaaaant the red one)
- **Blocks**: inappropriate timing for initiation of a phoneme or release of a stop element  
  (ie: I want..........the red one) [can include fixed articulatory posture and tension]
- **Multi-component**: combination of disfluencies right in a row (less or more typical types)  
  (ie: I I waaaaaant the red one, or I, uh uh, wa wa wa want the red one)

**Tips for Counting Stutters**

- A **Repetition** of a sound, syllable, or word is **one disfluency** regardless of the number of iterations.  
  (i.e.: Um um um um I wa wa wa want the red uh one = 2 stutters and 5 syllables)
- A **Prolongation** of a sound is **one disfluency**.
- A **Block** on a word is **one disfluency** regardless of the duration.
- An unnaturally **long pause** is **one disfluency** if the pause is longer than comfortable for the listener.
- A revision is **one disfluency**.
- In reading, the omission, modification, or addition of a word or words is **one disfluency**.
- Fillers and starters are counted as disfluencies; several fillers words used to initiate a word are counted as one disfluency.
COUNTING DISFLUENCIES

1. Repetitions of sounds, syllables, or words are counted as one disfluent word regardless of the number of iterations.
2. Prolongations of sounds are counted as one disfluent word.
3. Blocks on a word are counted as one disfluent word regardless of the durations of the block.
4. Unnaturally long pauses are counted as one disfluent word. This is a judgment/the pause should call attention to itself.
5. Revisions are counted as one disfluent word.
6. In reading; the omission, modification, or addition of a word or words is counted as one disfluent word.
7. Fillers and starters are counted as disfluent words. If the client uses several fillers (um, uh, etc.) prior to saying the next word, these are all counted as one disfluent word.

The method of counting stuttered words/minute is recommended as this allows the clinician to obtain samples at various points in the treatment session by taking 1 or 2-minute samples. Counting the number of total words in a sample divided by the number of disfluent words is also acceptable protocol.

CODE:  
R = Repetition
P = prolongation
B = block
(-) = long pause
(x) = revision
F = filler/starter

Name:__________________________
Examiner:______________________
Age:________Date:_____________
FLUENCY FRIDAY PLUS: 300 Syllable Speaking Analysis Form

Student: ____________________________________________

Age: _______________________________________________

Date of Sample: _____________________________________

Speaking Condition: play_______ monologue_________ conversation_________

Communication Partner: clinician_________ parents_______ peers________

Was the student asked to use a fluency strategy prior to the sample?  Yes or No

Instructions:

- Use calculator to count 300 syllables (1+1 =, then press = after that for each syllable)
- Do not count stutters as part of your syllables
- Use clicker/mark on paper to count stutters
- Divide # of stutters by 300 syllables (ie: 16 stutters/300 syllables = .053333)
- Multiply answer x 100 (ie: .053333 x 100 = 5.333%)
- Obtain percentage of stuttered syllables (ie: 5.3%)

Sample 1: _____________%

Sample 2: _____________%

Sample 3: _____________%

Types of stutters used: (mark with X)

- Word repetitions 3x or more and rapid
- Interjections used as starters
- Syllable repetitions
- Sound repetitions
- Prolongations
- Blocks
- Multi-components of these

Further description of stuttering: (visible tension, pitch rise, secondary behaviors)
FLUENCY FRIDAY PLUS: Timed Sample Word Count

Student: ___________________________________________

Age: _____________________________________________

Date of Sample: ___________________________________

Speaking Condition: play______ monologue_______ conversation_________

Communication Partner: clinician_________ parents________ peers________

Was the student asked to use a fluency strategy prior to the sample? Yes or No

Instructions:

• Use stopwatch to time the speaking sample (1 or 2 minutes): only time when student is speaking, turn stopwatch off when student stops talking or when you talk.
• Use clicker or mark with pen # of stutters during timed period
• Divide # of stutters by # of minutes to get stuttered words per minute (swpm)
  (ie: 9 stutters in 2 minutes = 4.5 swpm, or 10 stutters in 1 minute = 10 swpm)

Sample 1: _____________ swpm
Sample 2: _____________ swpm
Sample 3: _____________ swpm

Types of stutters used: (mark with X)

_______ Word repetitions 3x or more and rapid
_______ Interjections used as starters
_______ Syllable repetitions
_______ Sound repetitions
_______ Prolongations
_______ Blocks
_______ Multi-components of these

Further description of stuttering: (visible tension, pitch rise, secondary behaviors)
**Normative Fluency Data**

*Hugo Gregory: SDA (Systematic Disfluency Analysis)* (see reference)

<table>
<thead>
<tr>
<th>Severity Level</th>
<th>Less Typical Types Qualitative Features (LTT)</th>
<th>More Typical Types (MTT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt; 2%</td>
<td>&gt; 10%</td>
</tr>
<tr>
<td>Borderline</td>
<td>2% - 3%</td>
<td>or &gt; 10% of both</td>
</tr>
<tr>
<td></td>
<td></td>
<td>More typical audible/visible types of disfluencies (fillers, interjections, etc.)</td>
</tr>
<tr>
<td>Mild</td>
<td>3% - 8%</td>
<td>10% - 15%</td>
</tr>
<tr>
<td>Moderate</td>
<td>8% - 15%</td>
<td>Greater #s</td>
</tr>
<tr>
<td>Severe</td>
<td>12% or more</td>
<td>Significantly high</td>
</tr>
</tbody>
</table>

Normal Speakers

- **2 or less stutters in 100 syllables or 2 or less stutters in a minute sample is normal.**
  - These are Less Typical Type (LTT): sound/syllable/whole word repetitions, blocks, and prolongations

  Or........

- 8 or less disfluencies in 100 syllables = normal

- This includes the More Typical Types (MTT): interjections, revisions, phrase/word repetitions
Fluency Severity Rating Scale: Bruce Ryan

Use method A for both parts I and II or use method B for both parts I and II.

<table>
<thead>
<tr>
<th></th>
<th>(1) Mild</th>
<th>(2) Mild-Mod.</th>
<th>(3) Moderate</th>
<th>(4) Moderate-Severe.</th>
<th>(5) Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. (a) Frequency of Blocks: Include prolongations &amp; repetitions or</td>
<td>2-5%</td>
<td>6-10%</td>
<td>11-18%</td>
<td>19-24%</td>
<td>25% or more</td>
</tr>
<tr>
<td>(b) Stuttered words per minute**</td>
<td>.6-5</td>
<td>6-10</td>
<td>11+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>II. (a) Duration – Average of 3 longest blocks or</td>
<td>Up to 1 sec.</td>
<td>2-4 secs.</td>
<td>5-9 secs.</td>
<td>10-15 secs.</td>
<td>16 secs. or more</td>
</tr>
<tr>
<td>(b) Total Words spoken per minute</td>
<td>90-99</td>
<td>70-89</td>
<td>69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>III. Secondary Characteristics: Sounds, head moves, facial grimaces, etc.</td>
<td>Not noticed by average person</td>
<td>Distracts from content of communication</td>
<td>Displays obvious/severe secondaries</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Recommended Procedure: Tape record speech samples of 200 words minimum for baseline. Tally frequency of blocks to compute percentage. Average 3 longest blocks to determine duration.