Diagnostic Criteria for Childhood Apraxia of Speech: A Survey Study
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Results
Conclusions/Discussion
Participants who read the position statement (n=89)

- The diagnostic criteria for childhood apraxia of speech (CAS) used among SLPs are highly variable and often contradictory.
- 43 different characteristics were identified as essential features of CAS.
- 33 different characteristics were identified as essential features of CAS.
- 28/45 of the characteristics identified by Forrest were also identified. 90% of Forrest's top 20 characteristics were identified.

Comparison of data found by Forrest (2003) and results of the present study shows that there is no more agreement among professionals regarding key features of CAS than there was five years ago. See table 1 & figure 1.

3. Did the ASHA position statement (2007) have an impact on the characteristics being used?
- No dramatic differences in the diagnostic characteristics used for CAS were seen among those that had read the ASHA position statement and those that had not. In fact, there was 90% agreement between the two groups on the ten most important characteristics. See table 1 & 2.

Regarding the top four characteristics identified in this study, participants in Group 1 showed more consensus regarding their importance as diagnostic features of CAS than participants of Group 2. See figure 1.

- Participants from both groups in this study rated diagnostic characteristics similarly with regards to their level of importance for CAS. See figure 2.
- Characteristics which were rated higher by Group 1 include: better on automatic speech than intended, inconsistent productions with increased utterance length, limited phonemic repertoire, and vowel distortions; all of which were mentioned in the position statement as being features of CAS that are less likely to occur in other non-apraxic speech sound disorders. See figure 2.

Of the three characteristics listed as hallmark features of CAS in the position statement, the first, inconsistent productions, was identified by 75% of participants in Group 1 and 56% of participants in Group 2. The second, lengthened and disrupted coarticulatory transitions, was not identified by any participants. The third, inappropriate prosody, was identified by 10% of participants in Group 1 and 3% of participants in Group 2.

Some comments from participants regarding the impact of the ASHA position statement on their process of diagnosing CAS included:
- "Brought up more questions than answers."
- "I felt more comfortable labeling it.
- "Avoid direct diagnosis as primary."

Clinical & Research Implications
- The survey population of this study is assumed to have an increased interest in CAS just by having attended the workshops at which it was administered. Considering that only ~17% of participants had read the ASHA position statement on CAS, the participants in this study likely represent a subset of SLPs who are interested in the topic of CAS.
- Additionally, only 50% of participants that had read the position statement reported it impacted their process of identifying CAS, suggesting a need to generate a position statement that is more functional for practicing SLPs.
- With the continued ambiguity of the diagnostic criteria for CAS, this disorder will likely go over diagnosed until this information becomes available.

Limitations
- Having an opened ended question on the same page as a closed-set question that included a list of characteristics, may have skewed the results of question number one.
- The lack of a control group of SLPs who had not been exposed to the original survey question was not used, possibly impacting the validity of comparison results.
- The characteristics used for rating in survey question number two had all been previously cited as important diagnostic features of CAS.

Background

The diagnostic criteria for childhood apraxia of speech (CAS) used among SLPs are highly variable and often contradictory.

- At present, there is no validated list of diagnostic features of CAS that differentiates this symptom complex from other types of childhood speech sound disorders. (ASHA, 2007, p.4)
- Clearly the major source of over diagnosis of CAS is the inconsistent and conflicting behavioral features purported to be diagnostic signs of CAS. (ASHA, 2007, p.6)

ASHA (2007) position statement on CAS included three characteristics cited as hallmark features of CAS: 1) inconsistent errors on consonants and vowels in repeated productions of syllables or words 2) lengthened and disrupted coarticulatory transitions between sounds and syllables. 3) Inappropriate prosody, especially in the realization of lexical or phonological stress.

Forrest (2003) examined the diagnostic characteristics used by 75 SLPs in association with CAS.
- Findings: 49 different characteristics were being used.
- Conclusion: the diagnostic criteria for CAS lacks clarity and no single characteristic is used consistently among professionals.

Forrest (2003) also identified the top 20 characteristics used in association with CAS.
- 90% agreement between the two groups on the ten most important characteristics.
- The exact wording of Forrest's original survey question was not used, possibly impacting the validity of comparison results.

Table 1. Summary of results.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Group 1 (n=18)</th>
<th>Group 2 (n=71)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inconsistent productions</td>
<td>15 (75%)</td>
<td>31 (43%)</td>
</tr>
<tr>
<td>Lengthened and disrupted coarticulatory transitions</td>
<td>13 (70%)</td>
<td>37 (52%)</td>
</tr>
<tr>
<td>Inappropriate prosody</td>
<td>3 (15%)</td>
<td>6 (8%)</td>
</tr>
<tr>
<td>Motor planning/programming problems</td>
<td>3 (15%)</td>
<td>4 (5%)</td>
</tr>
</tbody>
</table>

Table 2. Top 10 characteristics identified by participants who had read the ASHA position statement (n=22) with frequency and percent for each.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inconsistent productions</td>
<td>15</td>
<td>75%</td>
</tr>
<tr>
<td>Lengthened and disrupted coarticulatory transitions</td>
<td>10</td>
<td>50%</td>
</tr>
<tr>
<td>Presence of vowel errors</td>
<td>8</td>
<td>40%</td>
</tr>
<tr>
<td>General oral–motor difficulties</td>
<td>4</td>
<td>20%</td>
</tr>
<tr>
<td>Low phonetic inventory</td>
<td>4</td>
<td>20%</td>
</tr>
<tr>
<td>Slow progress in therapy</td>
<td>3</td>
<td>15%</td>
</tr>
<tr>
<td>Motor planning/programming problems</td>
<td>2</td>
<td>10%</td>
</tr>
</tbody>
</table>

Table 3. Top 10 characteristics identified by participants who had not read the ASHA position statement (n=45) with frequency and percent for each.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inconsistent productions</td>
<td>9</td>
<td>40%</td>
</tr>
<tr>
<td>Lengthened and disrupted coarticulatory transitions</td>
<td>7</td>
<td>31%</td>
</tr>
<tr>
<td>Presence of vowel errors</td>
<td>6</td>
<td>26%</td>
</tr>
<tr>
<td>Poor sequencing of sounds</td>
<td>4</td>
<td>18%</td>
</tr>
<tr>
<td>Inconsistent productions with increased utterance length</td>
<td>4</td>
<td>18%</td>
</tr>
<tr>
<td>Inappropriate prosody</td>
<td>3</td>
<td>13%</td>
</tr>
<tr>
<td>Motor planning/programming problems</td>
<td>3</td>
<td>13%</td>
</tr>
</tbody>
</table>

Table 4. Comparison of average characteristic ratings between Group 1 (read position statement) and Group 2 (had not read position statement).

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Group 1 (n=18)</th>
<th>Group 2 (n=71)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Inconsistent productions</td>
<td>3.50</td>
<td>2.50</td>
</tr>
<tr>
<td>2. Lengthened and disrupted coarticulatory transitions</td>
<td>3.25</td>
<td>2.50</td>
</tr>
<tr>
<td>3. Inappropriate prosody</td>
<td>2.50</td>
<td>2.00</td>
</tr>
<tr>
<td>4. Slow progress in therapy</td>
<td>2.50</td>
<td>2.00</td>
</tr>
</tbody>
</table>

References:

Purpose

Define the diagnostic characteristics used in association with CAS and examine the impact of the ASHA position statement on CAS.

Research Questions:
- 1. What are the diagnostic characteristics currently being used by SLPs in association with childhood apraxia of speech?
- 2. Have these characteristics changed since Forrest's study in 2003?
- 3. Did the ASHA position statement (2007) have an impact on the characteristics being used?

Subjects

A total of 137 SLPs were surveyed at three professional conferences addressing the diagnosis and treatment of childhood apraxia of speech (Alabama, Utah, and New Mexico).

Participants were divided into two groups:
- Group 1: those who read the position statement (n=22)
- Group 2: those who had not (n=110)

If the participant did not specify, the survey data was not analyzed (n=6).

Materials

Survey consisted of four questions:
- 1. List the most essential diagnostic features of childhood apraxia of speech.
- 2. Rank characteristics cited by Forrest (2003) according to level of importance using a 1-4 rating scale. See table 4 for list of characteristics used for rating.
- 3. Have you read the ASHA position statement on CAS?
- 4. If yes, did it impact the process you use to diagnose CAS?

Procedures

Surveys were administered at the beginning of each conference before any information on CAS had been presented.

All specific directions needed for completion were contained within the survey. No additional instructions were given.

Data Analysis

Group 1: For survey question #1, 20 responses were used for analysis. One was not used due to lack of clarity in the response, and 1 was blank. For survey question #2, a total of 18 surveys, which included ratings for all characteristics, were used for analysis.

Group 2: For survey question #1, 89 responses were used for analysis. Two were not used due to lack of clarity in the responses, and 18 were blank. For survey question #2, a total of 88 surveys, which included ratings for all characteristics, were used for analysis.

For the purpose of comparing results with Forrest (2003), 4 of her original characteristics were grouped with other similar characteristics, resulting in a total of 45 characteristics, versus her originally listed 49.