OBSTRUENT PROCESS IN CHILDREN WITH MENTAL RETARDATION

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ABSTRACT
Mental retardation refers to substantial limitations in habitual functioning. It is characterized by significantly sub-average functioning, existing concurrently with related limitations in two or more of the adaptive skill areas; it’s like communication skill, self-care, home living, social skills, community use, self-direction, health safety, functional academics, leisure, and work. Mental retardation manifests before age 18. Mild, moderate, severe and profound are the types of mental retardation that is classified by the psychiatrist. They have low mental cognitive skills and have difficulty in expressive languages. They have difficulty in even pronouncing a single or two syllables lexicon. The obstruent sounds play a very important role in the word formation of the Tamil language. Tamil language has the obstruents combination of stop sounds and fricatives. The aim of the study is to identify the phonological problem in obstruent of children with mental retardation in their mother tongue (Tamil). This study analyses the phonological processes in obstruent sounds of 20 children with mental retardation by using the distinctive feature analysis. The study also recommends the sound features that should be concentrated for remedial measures.

KEYWORDS: Mental Retardation, Phonological Problems, Obstruents, Phonological Process Analysis and Distinctive Feature Analysis.

Mental retardation
Mental Deficiency/Retardation is a state of incomplete mental development of such a kind and degree that the individual is incapable of adapting him/herself to the normal environment of his/her fellows in such a way to maintain existence independently of supervision, control or external support (Tredgold, 1937). It is characterized by significantly sub-average functioning, existing concurrently with related limitations in two or more of the adaptive skill areas; it’s like communication skill (speech and language), self-care, home living, social skills, community use, self-direction, health, safety, functional academics, leisure, and work. Mental retardation manifests before age 18. These children usually have problems in
the areas of speech and language. The most prevalent process and intervening step for these children in language development is acquisition of phonology.

**Obstruent in Tamil Phonology**

Tamil phonology is characterized by the presence of consonants, (i.e., Sonorants and non-Sonorants) and vowels. Tamil language phonologically does not differentiate between voiced and unvoiced of consonants; but phonetically, voice is assigned depending on a consonant's position in a word. Tamil phonology permits few consonant clusters, which can never be word initial. But the loan words in Tamil have initial consonant clusters. In Tamil phonemes, obstruents have an important role in framing the words.

An obstruent is a consonant sound such as \([k]\), or \([f]\) that is formed by obstructing airflow, causing a strong gradient of air pressure in the vocal tract. Obstruents contrast with Sonorants, which have no such obstruction. Obstruents are subdivided into stops and fricatives, stop sounds are \([p, t, k, b, d, ɡ, c, t]\), with complete occlusion of the vocal tract, often followed by a release burst; fricatives, sounds are \([f, s, ʃ, x, v, z, ʒ, ɣ]\), with limited closure, not stopping airflow but making it turbulent; and affricates, which begin with complete occlusion but then release into a fricative-like release.

**Phonological Process**

Phonological processes are the patterns that young children use to simplify adult speech. All children use these processes while their speech and language are developing. For example, very young children (ages 1 to 3) may say “\(ŋŋ\)” for “\(tnŋi\)” or “\(ṭē:v\)” for “\(ce:v\)”.

Other children may substitute the medial and final sound in words (for example, “\(vaŋtu\)” for “\(vaŋtu\)” or “mukki” for “\(muktu\)”).

Many times the children do not hear the differences in the words and will say one word to mean three different ones. For example, children who continue to delete the initial consonant from a word may say “\(tti\)” to mean each of these words: “\(paṭṭi, kaṭṭi, ciṭṭi\)”.

Up to age 3, these are appropriate productions. As children mature, they stop using these patterns to simplify words. In fact, by age 5, about 90% of children stop using all phonological processes and their speech sounds more like the adults around them.

As children stop using phonological processes, their speech becomes more understandable. This allows them to become better communicators.
The phonological process is divided into three major types. They are, substitution processes, syllable structure processes and Assimilation processes. These three major divisions are having some more sub classification in them.

**TYPES OF PHONOLOGICAL PROCESS**

<table>
<thead>
<tr>
<th>Syllable Structure Process</th>
<th>Substitution Process</th>
<th>Assimilation Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Initial/Final Consonant Deletion</td>
<td>1. Gliding</td>
<td>1. Prevocalic Voicing</td>
</tr>
</tbody>
</table>

**Normative Data**

Table 1 shows the phonological process in typically developing Tamil children that are found only in the age specified in the table.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Age</th>
<th>Phonological developmental process</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3-5</td>
<td>Backing</td>
<td>[ṭəkkaːli] for [ṭəkkaːli]</td>
</tr>
<tr>
<td>2</td>
<td>3-6</td>
<td>Fronting</td>
<td>[caːpɛːn] for [caːpɛːn]</td>
</tr>
<tr>
<td>3</td>
<td>5-0</td>
<td>Gliding</td>
<td>[coːj] for [coːɾi]</td>
</tr>
<tr>
<td>4</td>
<td>3-0</td>
<td>Stopping</td>
<td>[kəɾɛːcɛːn] for [kəɾɛːɾɛːn]</td>
</tr>
<tr>
<td>5</td>
<td>4-0</td>
<td>Cluster reduction, Syllable reduction</td>
<td>[kuːli] for [skuːli], [koːɾɛːsaːmi] for [koːɾɛːɾɛːsaːmi]</td>
</tr>
<tr>
<td>6</td>
<td>3-9</td>
<td>Assimilation</td>
<td>[mʊttʌppaː] for [mʊstʌppaː]</td>
</tr>
</tbody>
</table>

**Phonological Disorder/ Processing Problem**

Phonological disorder is characterized by a child's inability to create speech at a level expected of his or her age group because of an inability to form the necessary sounds. It is also called as phonological processing problem. There are many different levels of severity in phonological disorder. These range from speech that is completely incomprehensible, even to a child's immediate family members, to speech that can be understood by everyone but in which some sounds are slightly mispronounced. This phonological processing problem is commonly found in children with mental retardation.
Aim
The present study aims to find out the phonological process in obstruents among children with mental retardation, who is speaking Tamil as their first language. So the goal of this study is to find out obstruents processing by these children using phonological process and distinctive feature analysis.

Methodology
The data were collected from 20 children with mental retardation who are in the category of mild to moderate level of retardation from Cuddalore district. Data has been collected by showing picture cards, giving repetition words and story charts as stimulus. Among the 20 children 15 were male and 5 were female who fall under the age range of 8-10 years. Convenience sampling method is used for data collection. Before giving the assessment those children’s IQ levels were assessed to identify their level of retardation. The data were collected using the recorder. The recorded data were analyzed by using the phonological process and distinctive feature theory.

Phonological Process and Distinctive Feature Analysis
One attempt to describe the set of phonemes in a language is the theory of distinctive feature. A distinctive feature is an articulatory or acoustic parameter whose presence or absence defines a phoneme. Most modern phonologists argue for a binary system of indexing features: a segment either possesses or does not any one particular feature. Clearly, with a binary system of indexing the maximum number of features needed to uniquely classify the sounds of a language. Features are binary (+ or -) values of the phoneme. Each speech sound may be described as a “bundle” of features; each member of every pair of phones is distinguished from the other member by at least one feature value. Features are universal, but a given language may use a subset of features as distinctive feature. This type of analysis prevalently used by the western scholars. Speech language pathology adopted methodologies used by linguist to analyze phonological samples. The child’s (mis) pronunciations were no longer viewed as sound by sound deviation from the adults’ target. But as systematic, rule-governed productions. Both distinctive feature analyses and phonological process analyses came into clinical use.

Grunwell (1982) lists five criteria that the analysis of a speech sample should satisfy. It should (a) describe the patterns used by which these patterns used by speaker, (b) identify the
ways in which these patterns differ from those used by normal speakers. (c) Determine the implications of these disordered patterns for effective communication, (d) provide the necessary information for developing treatment goals and guidelines, and (e) provide a basis for assessing changes during treatment.

Data’s analyzed by using Phonological Process and Distinctive feature analysis

Substitution Processes

Stopping
Substituting a stop phoneme for other phonemes is called as stopping.

(i) Voiceless alveolar fricative [s] is changed as voiceless dental stop [ʃ]

Feature | [s] | [ʃ]  
---|---|---
High    | -  | +   
Continuant | +  | -   

Ex.

[tʃevʌppi] for [sevʌppi] ‘red’
[tʃi:ppi] for [si:ppi] ‘comb’

(ii) Voiceless alveolar fricative [s] is changed as voiceless bilabial stop [p]

Feature | [s] | [p]  
---|---|---
Coronal  | +  | -   
Continuant | +  | -   

Ex.

[vikne:pvari] for [vikne:svari] ‘name of the person’

On the basis of distinctive feature analysis the recommended sounds for remediation are High, coronal, Continuant and voiced.

Fronting

(i) Voiceless palatal stop [c] is changed as voiceless bilabial stop [p]

Feature | [c] | [p]  
---|---|---
Anterior | -  | +   
High      | +  | -   

Ex.

[pəʈʈai] for [caʈʈa] ‘shirt’
[pəŋgi] for [caŋgi] ‘conch’

(ii) Voiceless palatal stop [c] is changed as voiceless dental stop [tʃ]

Feature | [c] | [tʃ]  
---|---|---
Coronal  | +  | -   
Anterior | +  | -   
High      | -  | +   

Ex.

[tʃe:vɑl] for [ce:vɑl] ‘cock’

(iii) Voiced retroflex flap [ɾ] is changed as voiced alveolar fricative [ð]

Feature | [ɾ] | [ð]  
---|---|---
Anterior | -  | +   
High      | +  | -   

Ex.
On the basis of distinctive feature analysis the recommended sounds for remediation are **Anterior, High, Coronal, and Back**.

**Backing**

(i) Voiceless dental stop [ʈ] is changed as voiceless retroflex stop [ʈ]

<table>
<thead>
<tr>
<th>Feature</th>
<th>ʈ</th>
<th>ʈ</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

Ex.

[ʈakkaːli] for [ʈakkaːli] ‘tomato’

[ʈʌkkaːli] for [ʈʌkkaːli] ‘snail’

(ii) Voiceless retroflex stop [ʈ] is changed as voiceless velar stop [k]

<table>
<thead>
<tr>
<th>Feature</th>
<th>ʈ</th>
<th>k</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coronal</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Back</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>

Ex.

[kʌmʈʌɾ] for [ʈʌmʈʌɾ] ‘tumbler’

[kappaː] for [ʈʌppaː] ‘container’

(iii) Voiceless bilabial stop [p] is changed as voiceless velar stop [k]

<table>
<thead>
<tr>
<th>Feature</th>
<th>p</th>
<th>k</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

Ex.

[nupkʌm] for [ʈuppʌm] ‘subtlety’

[kaːj] for [paːj] ‘mat’

(iv) Voiceless dental stop [ʈ] is changed as voiceless velar stop [k]

<table>
<thead>
<tr>
<th>Feature</th>
<th>ʈ</th>
<th>k</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coronal</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

Ex.

[kɔppi] for [ʈɔppi] ‘cap’

[ʌskɪ] for [ʌʃti] ‘ash obtained by cremation’

(v) Voiceless alveolar fricative [s] is changed as voiceless velar stop [k]

<table>
<thead>
<tr>
<th>Feature</th>
<th>s</th>
<th>k</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coronal</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

Ex.

[kuːlʌm] for [suːl] ‘trident’

[kallatɔi] for [sallatɔi] and [sallatɔ] ‘fine sieve’

On the basis of distinctive feature analysis the recommended sounds for remediation are **Anterior, High, Coronal, Back and Voiced**.
Syllable Structure Process

**Initial Consonant Deletion**

1. [ɾʊɾi] for [ɾoɾi] ‘name of person’
2. [vani] for [vani] ‘sound’

On the basis of analysis the recommended sounds for remediation are *initial consonants* ‘s’ and ‘t’.

**Medial Consonant Deletion**

Delete the medial syllable from the word.

1. [vija:] for [viːja:] ‘name of person’
   [caːja:] for [caːja:] ‘name of person’ Deleted Consonant “(φ)ι”
2. [maːsɔ] for [maːsɔm] ‘mole’
   [jaːsɔ] for [jaːsɔ] ‘carpenter’ Deleted consonant “(σ)ɔ”

On the basis of analysis the recommended sounds for remediation are geminated clusters ‘tt’ and ‘cc’.

**Medial Syllable Reduction**

1. [saːɾʌm] for [saːstɾʌm] ‘treatise’
   [ʌɾɔ] for [ʌstɾiɾɔ] ‘weapon’ Deleted Syllable “(σο)σι”

On the basis of analysis the recommended sounds for remediation are cluster combination of alveolar fricative with dental stop in medial position.

2. [uːɾɪm] for [uːɾɪɾ̪ɔ] ‘suspicion’
   [kaːɲɪ] for [kaːt̪ʌɲɪ] ‘ear ornament’ Deleted Syllable “(δ)α”

On the basis of analysis the recommended sounds for remediation are dental stop cluster in medial position.

**Assimilation process**

**Bilabial Assimilation**

Voiceless alveolar fricative [s] is changed as voiceless bilabial stop [p]

<table>
<thead>
<tr>
<th>Feature</th>
<th>[s]</th>
<th>[p]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coronal</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Continuant</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

Ex.


On the basis of distinctive feature analysis the recommended sounds for remediation are *Coronal and Continuant*.

**Dental Assimilation**

Voiceless velar stop sound [k] is changed as voiceless dental stop [t]

<table>
<thead>
<tr>
<th>Feature</th>
<th>[k]</th>
<th>[t]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coronal</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Anterior</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>High</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Back</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

On the basis of analysis the recommended sounds for remediation are *Coronal and Continuant*. 
Ex.
[muṭṭi] for [muṭṭi] ‘liberation’
[paṭṭi] for [paκṭṭi] ‘devotion’

On the basis of distinctive feature analysis the recommended sounds for remediation are Anterior, High, Coronal, and Back.

**Nasal Assimilation**

Voiced bilabial stop sound [b] is changed as Voiced bilabial stop sound [m]

<table>
<thead>
<tr>
<th>Feature</th>
<th>[p]</th>
<th>[m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sonorant</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Nasal</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Voiced</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>

Ex.
[pʔmpəɾ̃] for [pʔmməɾ̃] ‘top’
[rʔməɾ̃] for [rʔmpəɾ̃] ‘tool is used for sawing’

On the basis of distinctive feature analysis the recommended sounds for remediation are using phonemes Sonorant, Nasal and Voiced without these features.

**CONCLUSION**

The above said phonological problems are usually overcome by normal children at the age level of 3-5. But children with mental retardation have more phonological process even at the age of 8-10 years. These phonological problems are mostly found among the girls. But female population is not more in the schools or in the home where the study is carried out. Identified phonological processes of obstruents are recommended for remediation, they are, [t̪], [p], [s], [t̪a], [t̪], [c], [s̪i], [k]. The distinctive features recommended are anterior, back coronal, high, continuant and voiced features on the whole for the 20 children.

**References**