

Original Article



# The Investigating Error Patterns in the Children in the Educational System

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## ABSTRACT

Error patterns in these children are produced in a constant manner with specific errors. The performance of these children is poor in phonological awareness, trans linguistic and reading and writing tasks. Children with stable phonological disorders perform normally in oral motor tasks and speech motor planning. Children who show such errors have language-cognitive defects in linguistic rules. It may be difficult for children to learn to pronounce words correctly. This is actually a part of their growth process. Over time, their speaking skills gradually improve. Children at any age master certain words. Most children at the age of 8 can pronounce all the sounds of different letters well and correctly. But some children have problems in pronouncing the sounds of letters and words. This means that they are unable to pronounce some sounds and words that should be pronounced without problems at their age. This disorder makes it difficult for the child to understand the lessons. Disturbance in pronouncing sounds includes the child's "Phoneme expression disorder" and "Problem in phonological process": Phoneme expression disorder: In this type of speech disorder, it is difficult for the child to pronounce some sounds correctly. For example, pronunciation of phonemes that requires special movements of the tongue in the mouth. Like the vowels "L" and "R" are difficult for him. Disturbance in the phonological process: A child with this type of speech disorder has wrong repetitions in pronouncing words. For example, he does not pronounce some phonemes of a word.

## Introduction

S temberger [1] and Bernhardt (1997) present a case study of a child with a phonological disorder named Harry (4, 8-5,4), [2] which shows a large number of production pattern coordination. Dinsen (1998) examines production mode coordination in the developing language system of three English-speaking children, subject 9

(9;3), subject 23 (8:4), and subject 29 (11:4). Later, Dinsen and Ekaner (2001) conducted another study on the coordination of production style in cross-sectional and longitudinal data of a group of children [3]. This research also confirms and emphasizes the claim of Dinsen (1998) that the type of phoneme that is the target of coordination, the production method is affected by the type of

characteristic that creates the coordination. Rose and Dos Santos (2006) examined the observed coordination in the speech of two French-speaking children, Clara (0;1-7;2) and Marilyn (0;1-11;2). This study argues that in some cases the coordination process is affected by production constraints and aims to enable the child to avoid difficult phonetic sequences [4-6]. But in other cases, the occurrence of this process is caused by phonological limitations, such as the position of reliance in the word or the phonetic form of the word (CVCV vs. CVC). Kim [7] (2010) studies the coordination patterns of production style in CVC and CVCV vocabulary produced by ten English-speaking children (12-36 months). According to this research, adverbs cause coordination process in words more than adverbs. Furthermore, this research claims that word structure affects the direction of coordination. While the coordination of the production method is affected by the place of the consonant in the word. The analysis of developmental trends shows that during the acquisition of language speech patterns, children prefer to coordinate speech forms whose production requires the use of less frequently used movements (marked) with those that use more frequently used movements (unmarked). Based on the mentioned findings, this research concludes that the language behaviors that are available to children from the pseudo-speech period and are compatible with the capacity of their production system, determine how to coordinate in the above children, not the existing patterns in the intended production goals. Also, the results show that the perceptual effects of linguistic input may have less effect on coordination patterns [8-10].

### Speech Therapy and Its Applications

**Dysarthritis:** Dysarthritis is a type of speech disorder characterized by speech and pronunciation disorders. This condition is a speech-motor disorder in which the muscles of the mouth, face, or respiratory system may be weak or have difficulty moving. Dysarthritis is a movement problem in speech and usually occurs as a result of damage to the muscles that play the main role in speech. This complication

occurs when the muscles used in speech are weak or the person has difficulty controlling them properly.

### Other Speech Therapy Applications

- Learning disorders (reading and writing);
- Speech disorders in hearing impaired children;
- Speech disorder in children with Down syndrome;
- Speech disorders in children with cerebral palsy;
- Speech disorders in autistic children;
- Voice disorder;
- Aphasia; and
- Delay in speaking.

### Speech therapy and its applications

#### Stammer

Stuttering is the most common speech disorder in children, which usually begins in the early years of life when the child begins to speak, and in some cases, when the child enters school. Emotional problems and social incompatibilities are among the most important factors that play a role in the occurrence of this disorder, and it can be helped to treat stuttering with speech therapy solutions. Speech therapy for stuttering is the most effective way to treat stuttering. The sooner it starts, the better the result will be [11-13].

#### Swallowing Disorder

Swallowing disorder or dysphagia may occur at different stages of the process of swallowing food, normal swallowing is a complex mechanism, during which the food placed in the mouth changes in volume and concentration in such a way that it can easily pass through the pharynx. And the esophagus enters the stomach

to start the main stages of food digestion. Swallowing disorders may occur as a result of diseases such as stroke, cerebral palsy, etc., or may occur due to the lack of development of the infant's digestive system (in premature infants). If the problem is in the oral and pharyngeal area, the speech therapist helps to treat this disorder by providing educational programs and necessary exercises. Speech therapy for swallowing disorders is known as the most effective method of treating this disorder, which is associated with problems in swallowing food and drinking liquids [14-16].

### Speech Therapy for Delayed Oral Movement

Oral motor skills include movements of the lips, jaw, tongue and cheeks. These muscles are important for eating, drinking and speaking. Examples of oral motor activities include drinking from a straw, chewing, and blowing a toy trumpet. Children who have problems in this area may have difficulty tolerating different food textures, drinking from a cup, brushing their teeth, and may fill their mouths with too much food [17].

### Speech Therapy for the Language of Social Pragmatism

A person with pragmatic difficulties may: Say inappropriate or irrelevant things during conversations, tell stories in an incoherent way, or have very little variety in their use of language. This is normal for children who only have practical problems in certain cases. However, if these problems in using social language happen often and seem inappropriate for the child's age, there may be a pragmatism disorder. Pragmatism disorders are often associated with other language problems such as vocabulary development or grammar. Pragmatism problems can lower a person's social acceptance. A child's peers may avoid talking to a person with an ADHD [18].

### Treatment of Tongue Protrusion

Tongue prolapse (also called "Reverse" or "Immature" swallow) is a common name given to oral and mental muscle imbalances [19]. This

problem is a human behavioral pattern in which the tongue protrudes from the front gums during swallowing, speech, and while the tongue is at rest. Almost all children have a tongue protrusion swallowing pattern, but by the age of 6 or so, this problem automatically changes to a normal swallowing pattern. To correct the condition, speech pathologists design exercises that create a natural swallowing pattern as well as correct speech production. In the assessment session, the patient is given swallowing and speech tests.

### Stable Phonological Disorders

Stable phonological disorders are seen in children who use both developmental patterns of production and non-developmental patterns of production [20].

### Development of Children's Speech Sounds

The development of children's speech sounds can be analyzed in two ways: 1- Phonemic and 2- Phonetic.

Phonetic analysis refers to the way of producing speech sounds (production-motor skills). In a phonetic approach, the production of the child's voice in the context of the word is examined in terms of the degree of production accuracy and the percentage of children who have an acceptable correct production level in an age group. Phonological analysis refers to the way speech sounds are used (functions/behavior/organization of the speech sound system). Previous research focused on phonetic analysis of consonants [21-23].

### Researchers Must Decide Whether

- (1) Is a sound produced in all positions of the correct word (beginning, middle and end of the word) or only in the beginning and end positions?
- (2) The minimum percentage of children of an age group who can produce a sound correctly.

## What Should Be Considered In The Production Of Children's Faces And Voices?

In phonological acquisition, a distinction can be made between production (correct production of sound in at least two out of three positions) and phonemic mastery (for example, production of sound in all three positions correctly). Another distinction between phoneme emergence (correct production of the phoneme at least once) and phoneme consistency (correct production of the sound at least two out of three attempts) should be further considered.

### Age of Voice Acquisition

*We can Consider Three Acquisition Ages*

- Age of productions (50% of children can produce that sound in at least two correct positions);
- Age of acquisition (at least 75% of children in an age group can produce sounds correctly in all situations);
- Age of mastery (at least 90% of children in an age group can produce the sound correctly in all situations).

In general, the production skills of 4-year-old children with natural development are very similar and at the adults level. Children's production and phonetic skills are improved and completed until they are almost 8 years old. It should be noted that the production method of different children is different and it is not necessary to follow the same and specific process [24-26].

### Factors Affecting the Clarity of Speech Sounds

*Factors That Affect Speech Clarity Include*

- Number and type of speech sound errors;
- Stability of errors [27];
- Frequency of errors; and

- Phonological patterns.

### Error Stability

It indicates the rate of errors in the language. The higher the stability of the error, the higher the occurrence of errors in words. As a result, the listener's understanding of the speaker's speech is incomplete and difficult. The number of contexts in which the child produces the sound correctly gives us some indications about "Error stability". The lower the stability of the error, the easier it is to correct. If the child's errors are unstable in different contexts, it is easier to correct sounds than when those errors are stable in different contexts [28].

### Phonological Patterns/Processes

Analyzing phonological processes can reveal children's error patterns. Phonological process is called systematic changes of sound or simplification of sounds.

### Types of Phonological Processes

- Removing the final consonant in the word;
- Delete unstressed syllable;
- Often weak and unstressed syllables are deleted at the beginning of the word and sometimes in the middle of the word;
- Peer-to-peer;
- Reduction of concordance cluster;
- Internal phonetic addition: A component, which is usually an unstressed vowel, enters the syllable;
- Heart/displacement [29];
- Coalescence: Properties of two adjacent coordinates are combined and a new sound replaces the previous two sounds; and

- Assimilation (assimilatory/harmony process).

One sound is affected by another sound, then both sounds become similar and sometimes become the same. These changes in sound can be forward-looking assimilation.

### The Reasons for the Usefulness of Phonetic Pattern Analysis in Speech Sounds Disorders

- The analysis of phonological patterns describes and describes the overall phonological system of the child for us.
- Analysis of phonological patterns, use of patterns in facilitating treatment: When we choose an error pattern to treat, we can improve the errors caused by that error pattern.

### Continuation of Natural Processes

Early simplification processes usually indicate a child's speech disorders. Some pronunciation patterns are similar to the pronunciations seen in normal children. Continuous use of early processes indicates a developmental disorder. Therefore, the occurrence of continuity in natural processes is one of the characteristics of child's speech disorder. The most basic phonological processes, such as simplification, indicate the fixation of early pronunciation patterns and the inability to progress phonologically.

### Time Mismatch

Some of the initial simplification processes occur again in later stages of phonological development. This situation is called time mismatch. For example, velar harmony, which should exist in older stages, can still be seen at the age of five.

### Unusual and Non-Conventional Processes of Speech Sounds Disorder

Available information on the phonological processes of children's speech comes from limited population studies. Most of the authors

pay attention to the sample data present in daily language development studies of one or two children. Therefore, one should act cautiously in interpreting what is claimed to be natural or unnatural. The processes that occur in children's impaired speech, but these processes are not reported in the development of normal speech, are called unusual and non-conventional processes [30].

### Systematic Sound Preference

Voice patterns in which one part or two parts are used for a large number of sounds. Sometimes it substitutes a specific sound for the number or even all of the phonemes in a specific sound category (for example, fricatives). In fact, they do not produce special sounds in their speech and instead they simplify their production of sounds until they learn the standard adult phonetic system. This simplification probably includes factors such as: The limitations are lack of full physiological and understanding maturity and lack of awareness and linguistic knowledge of the child.

### Possibilities about Phonological Patterns

- One explanation for the occurrence of an error pattern may be that the child did not understand the adult's word well and misunderstood it.
- The base vocabulary for the target word is the mentioned word.
- The performance of the child's understanding system should be appropriate and there should be lexical coordination between what the child has understood and what he has stored in his vocabulary in his mind with the adult's standard production, but the child should have a phonological production rule (e.g., removing the final consonant).
- Maybe the child has a "Motor" production problem (understanding is healthy, but there is a problem in terms of movement).

## Evaluation of Speech Sounds Disorders

### *Speech Comprehension Test*

In the early years of speech and language pathology research, it was thought that children with production errors were unable to understand the differences between their errors and standard adult production, and many phonological problems were thought to be the result of comprehension deficits. The result of these assumptions was that the clean evaluation of speech sounds, which included a wide range of contrasts of sounds, became a standard flow of evaluations.

### **Phonological Contrast Test**

It means understanding and distinguishing between the standard and correct productions of adults and their own production errors. Assessing the child's awareness of phonological contrasts gives us information about the child's phonological perception system. Therefore, if we suspect that the child's phonological errors are due to his comprehension deficit, comprehension tests can be useful. One method for clean evaluation is to contrast the error sound with the target sound. For this, we need a large number of pairs of minimum constants in which the error noise is contrasted with the error noise.

### **Assessment of Intelligibility in Speech Sound Disorders**

#### *Speech Clarity*

It means the percentage of words that are understood in a person's speech sample. The clarity of self-motivated speech shows the ability and sufficiency of a person's verbal communication. It is the most important factor when determining a person's need for therapeutic intervention and for evaluating the efficiency and effectiveness of therapeutic strategies. It is also a factor that is often cited by speech and language pathologists and ordinary listeners when judging the severity of phonological disorder. The clarity of speech changes under the influence of various

variables, such as: The level of communication (single word - conversation), the topic of the discussion, the speed of speech, the familiarity of the listener with the speaker, the tone of speech and the fluency of the speaker's speech.

### **Speech Clarity Evaluation Methods in the Treatment of Speech Sounds Disorders**

There are several methods for evaluating speech clarity. The most valid approach is open-set word identification procedure. It is measured to calculate the percentage of words that can be understood from the verbal sample (open and easy). The child's speech sample is heard by a listener other than the examiner, and based on the number of words understood by him, the percentage of speech clarity is calculated:

- A normal one-year-old child can understand 25% of his speech by strangers.
- A normal two-year-old child should understand 50% of his speech by strangers.
- A normal three-year-old children 75% (in different studies between 50-80%) should be understandable and clear.
- A normal four-year-old child should be clear 85% of his speech.
- A normal five-year-old child should understand 95% of his speech by strangers.

Children three years old and older whose speech is not understandable to others are candidates for treatment.

### **Assessing the Severity of Speech Sounds Disorders**

The severity of the phonological disorder means how important and noticeable the speech sound disorder is. Its level is determined by headings such as mild, moderate, and severe. Numerical or continuous

ratings are used to show the severity of the disorder. Therapists use both methods of individual components and the whole word to determine the degree of severity. An objective way to measure the severity of the problem in children with developmental phonological disorders is PCC (percentage of correct consonants). For PCC, it is necessary for the examiner to judge whether the individual sounds produced during continuous speech are correct or incorrect.

### *How to Do PCC*

Record a sample of the person's continuous speech. Note only the consonants in the words; we calculate the total number of correct consonants and express it as a percentage compared to the total number of expressed consonants.

- Mild 85-100%;
- 65-85% mild to moderate;
- 50-65% moderate to severe; and
- Less than 50% severe.

### **Disorders of Speech Sounds and Assessment of Irritability**

Researchers say that children who can imitate syllables or words that have the target sound are more likely to be able to spontaneously correct that error sound. Irritability testing is only a general guide. To identify clients who correct their phonetic errors without our therapeutic intervention.

### **Examining Error Patterns in Speech Sounds Disorders**

We extract the child's error patterns or phonological processes as described above.

### **Stability Test**

Stability testing is needed to decide whether the child's errors are stable or unstable. Determining whether the errors are stable or unstable is necessary to determine the treatment course.

### **Treatment of speech sounds disorders**

The goal of phonological-based treatments is to suppress error patterns that reduce intelligibility. These techniques use meaning to encourage reorganization of the vocal system. A phonics program based on a combination of phonological disorder theories and children's learning style was presented. This program is designed to facilitate the change in phonological skills by targeting the child's awareness and using meta-linguistic features and the nature of phoneme opposition. Children need to actively participate in learning activities. Children are encouraged to acquire and reorganize phonological information. Various studies have shown that treatment based on phonological contrasts is the best treatment for children with stable phonological disorders.

### **The Minimal Pairs Contrast Method**

The minimum pair method is often used when the analysis of the error patterns used are clear patterns. This method is used when two or more speech sounds are produced in the same way due to problems in their characteristics.

*Reason:* Their special features are not generated or their components have been removed. The treatment method is based on cognitive language. It focuses on creating sound contrasts necessary to distinguish one word from another. This method is well used by people who remove the consonant at the end of the word.

### **Treatment Steps for Speech Sounds Disorders**

1) Based on the phonetic errors of the child.

Choose the sound that contrasts with the target sound. For example, if the child says shape, tape or she, tea instead of /ʃ/ and /t/, choose 5 pictures for each of the words that have the target sound.

2) Involve the references in the training of mutual pairs, at the perceptual level. For example, I want you to show me a picture

whenever I say a name. Pre-assess the referent's motor production for each of the words that have the wrong phoneme in them. If necessary, practice and train him to produce the target phoneme.

3) Make the reference to produce each of the minimal words in question in an imitative way.

4) Force the references to train the minimum adversarial pairs. At the production level, for example, I want you to tell me the name of every image I show you. When you say the word toe, I will take this photo.

5) Insert the references in the task where the person has to combine each of the minimal words with transitional expressions (e.g., I want you to point to the picture and name it by saying: I have a...).

6) Separation of transitive expressions in such a way that both minimal words are used in one expression. In cases where you do not find a pair of mutually meaningful words suitable for that sound, you can use words close to the minimal pairs. Here, it may be one of the meaningless words that you can create an imaginary image for the meaningless word and point to it during production. Sometimes minimal pairs include a word that has the target sound and another word that is not necessarily produced incorrectly. Often, this problem is to work on the contrast between the target voice and one or more other voices that contain several different coordinates compared to the target voice, which is called maximal opposition contrast. The steps of this method are the same as the above method, with the difference that the target sound is the most different from the contrasted sound in the discriminant coordinates.

### Multiple Oppositions Therapy

It is a kind of treatment method that simultaneously compares a large number of target sounds (for training) with one sound. This method is in contrast with the single contrastive methods (i.e. those that are maximal or minimal apposition). The Multiple

Contrast method is designed for children who have multiple voice disorders and are characterized by severe to profound phonological deficits. The goal here is to help the child reorganize his voice system. By focusing on minimal (minimum) opposite pairs, the speed of training progress in this method is high.

### Conclusion

It is a specific language disorder in which a child is able to use an expressive language that is below the appropriate level for his mental age, but his language comprehension is normal. There may be problems with vocabulary, producing complex sentences, and remembering words, and there may or may not be abnormalities in expression (speech). Stuttering affects speech fluency. This problem begins in childhood and in some cases continues throughout life. This disorder is characterized by a disorder in the production of speech sounds, which is also called "Non-psychotic". Most people have minor setbacks from time to time. For example, some words are repeated and some words are preceded by "Um" or "Ah". These are not necessarily problems, but when a person produces too many of them, they can disrupt communication. For some people, communication problems only occur during certain activities, such as talking on the phone or speaking in large groups. However, for most people, communication problems are present in some activities at home, school, or work. Some people may limit their participation in certain activities. Such "participatory limitations" often occur because a person is concerned about how others will react to his or her unintelligible speech. Other people may try to hide their stuttering by changing the words in their sentence (circling), pretending to forget what they wanted to say, or speaking less. Other people may feel that they are excluded from participating in certain activities because of their stuttering. It is clear that the impact of stuttering in everyday life can be influenced by how the person and others react to this disorder. Phonemic memory includes encoding and storing phonemic information (phonetic



characteristics and phonological rules) in short-term or active memory. Good phonological memory performance is related to reading (and language) skills. To evaluate phonemic memory, the activity of repeating non-words and repeating numbers is used. In older children, repetition of polysyllabic words is also used to assess phonological memory.

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