Phonological Limitations of Children with Cerebral Palsy

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Abstract. This study aims to explain the phonological limitations that occur due to phonological errors uttered by people with cerebral palsy, namely the case of FA and FR who are students of SLB Negeri 1 Padang, West Sumatra. Cerebral Palsy causes disturbances in the speech process so that an error occurs at the phonological level of a person when speaking. Methods: This study applies analytical observation methods, case studies, and natural observations, as well as narrative recording behavior methods. Followed by the application of recording techniques and note-taking techniques. In this research, the instrument of praat application and flashcard was used. Then it was analyzed using the articulatory equivalent method with the basic technique being the determining element sorting technique (PUP) and the next technique being the differential comparison technique (HBB). Result: The phonological limitations experienced by the two research subjects were caused by phonological errors in their speech. The phonological errors are substitution, omission, addition, and distortion with the respective percentages being 51.89%, 26.58%, 11.39%, and 10.12% (for FA) and 56.25%, 36, 25%, 1.25%, and 6.25% (for FR). Conclusion: Four phonological errors were found as a form of causing phonological limitations in the speech of the two research subjects with cerebral palsy disabilities. With dominant phonological errors in both, namely substitution phonological errors.

Keywords: phonological limitations, cerebral palsy, phonological errors

1 Introduction

According to data from the WHO (World Health Organization), cerebral palsy (which was later shortened to CP) is considered a condition that causes disturbances in a person's relationship with daily activities and the environment. People with CP are a minority group in the world—40% of people with disabilities are in developing countries. It should also be noted that CP children take up a portion such as work and even education, one-third of the total world's people with disabilities.

The results of the analysis of WHO world data from 2000 to 2013 found that the increase in people with CP in the world reached 0.6-0.7% of 1,000 live births. The United Cerebral Palsy Research and Education Foundation reports that in 2003 there were between 550,000 and 764,000 people in the United States with CP. Recent studies have shown that CP occurs in about 2.0-2.5% of people in every 1,000 live births. The National Survey of Children's Health (NSCH) in 2012–2013 and the National Health Interview Survey (NHIS) determined the prevalence of CP through parental reports among children aged 2–17 years found that there were approximately 2.6% in NSCH to 2, 9% in NHIS children in every 1,000 live births.

Based on data from the Central Statistics Agency (BPS), the number of children with special needs (ABK) in Indonesia reaches 1.6 million children. This number covers various types of disabilities experienced by children—including people with CP. The specification for the number of people with CP was put forward by Susenas (BPS) RI in 2012, there were 532,130 children or about 0.6% of the total number of children.

The results of the Riskesdas survey (Basic Health Research) conducted by the Ministry of Health of the Republic of Indonesia, the prevalence of children with CP is 0.09% of the total children aged 24-59 months. This shows that the prevalence of CP in Indonesia has a large number, namely 9 cases in every 1,000 births. CP with disabilities occurred in Indonesia in 2018 with the number of people with disabilities in Indonesia reaching 2,126,000 people, with a total number of moderate CP 717,312 and severe CP 149,458 people, the same as contributing 47.4% of the total number of people with disabilities.

Based on the percentage and number of people with CP, both globally and in detail, it certainly has made some people or related parties aware of this phenomenon. Therefore, research from various lines of science has been carried out, especially in the medical and medical fields. However, the results of the researcher's own observations, that research on CP studied from a linguistic perspective, especially at the phonological level with visualization accuracy using a praat application spectrogram is still very limited

2 Research Method

2.1 Data Collection Methods
Data obtained through analytical observation methods, case studies, and natural observations by Nunan (2005: 149-154).
a.   Analytical Observation

In this method, it is explained that researchers can directly find data based on intuition and linguistic abilities. In analytical rules, researchers know the language data to be studied. In addition to using intuition, the researcher makes generalizations based on the data collected from the corpus of the language.

b. Case Study

The Case study is a method of exploration, description, and analysis of subject data. In this study, two subjects with CP were used. This case study method is the beginning for researchers to explore the study area, both already known and previously unknown. The case study is a study which special specifications apply to certain subjects, whether individuals, groups, places, events, or phenomena, etc. That is, the case study focused on the specific scope of research conducted in order to find the results to a specific subject in detail.

c.   Natural observation

Natural observation means that the researcher places himself as an observer of the subject's speech with his environment and the researcher as the opposite of the subject's speech. This form of natural observation was carried out because the researcher wanted to test the hypothesis about the forms and symptoms of communication for people with CP.

Then, the researcher will obtain speech reactions that occur during the research process, analyze, and compile various speech errors produced by people with CP. This stage is supported by the observation method. Sugiyono (2013: 145) explains that this method is appropriate for respondents whose quantity is not too large. Method of collecting data;

Observations are divided into two categories, namely participant observation and non-participant observation.

The researcher uses the participant observation method, which requires the researcher to interact and engage directly with the two research subjects—FA and FR. The data collection method is in line with the narrative recording behavior method proposed by Sattler (1992). Researchers observed the behavior and speech produced by FA and FR. In addition to behavior and speech, this method also provides an opportunity for researchers to focus on seeing the abnormality experienced by the research subject in speaking.

In applying this method, researchers will also use several techniques in collecting data. Wray, et al. (1998) explained that there are several techniques in collecting linguistic data, namely recording, taking notes, questionnaires, and interviews. In this case, the researcher only used two techniques, namely recording and noting.

a. Recording Technique

The researcher recorded FA and FR utterances using a cell phone. The purpose of this recording is to listen to the sounds of the language produced. Cellular phones are used as recording devices that are used as an anticipatory tool, when at any time the software used cannot work optimally or experiences interference. The recording device will be conditioned when in the field. When the condition of the subject is calm, the researcher will place the recording device in the researcher's own shirt pocket or even hold it directly by bringing it closer to the source of the speech. This is done so that the utterances can be recorded cleanly in order to make it easier for researchers to analyze the data properly and correctly.

b. Noting technique

In this technique the researcher takes notes. Recording is carried out simultaneously with recording activities. Then, in this case the researcher records the data that has been obtained on the data card to be classified. Classification is done based on the sound spoken or the group of words contained in the picture card. The note-taking technique is also carried out as an anticipation if the recording made may not sound clear or even corrupt.

2.2 Data Analysis Methods and Techniques

In this case, the equivalent method is used. The equivalent method is a method whose determining tool is outside or independent and does not become part of the language (langue) in question. The equivalence method used is the articulatory equivalence method, which determines the language-forming organ or speech organ (Sudaryanto, 2015: 15).

First, the data will be transcribed. Data transcription is the activity of converting recorded oral data into written data. Transcription is the first thing done in the data analysis stage. This is done so that the analysis can be done more easily and directed. The next step is to identify the data. Identification is the activity of determining certain parts of the data source. In identification activities, the data in question is entered into a data card and numbered with a certain system.

Then, is to do the classification. Classification or grouping is an activity to classify data according to a predetermined research problem. Classification activities are carried out so that the analysis can be carried out regularly. Classification is done on the next data card. In the process of data analysis, the two research subjects will be able to obtain phonemes that are capable and not able to be produced. From the production, the limitations of the phonological errors expressed by the two research subjects will also be analyzed, either substitution, omission, addition, or even distortion.

Then, Kesuma (2007) gives an example of the application of sound production. For example, the consonant sound /p/ can be identified as a sound produced by the junction of the

upper and lower labium. After the articulatory equivalent method was applied, the researchers then used basic and advanced techniques. The basic technique is the determining element sorting technique (PUP) in the form of searching data by sorting out the determinants of the research conducted.

Mastoyo (2007: 51) states that the determining element sorting technique is a data analysis technique by sorting out lingual units which are analyzed with a determining tool. As has been explained that the determining tool is articulatory phonetics, the distinguishing power is the speech organ or organ. The next stage is the application of advanced techniques. The next technique is the differential comparison technique (HBB). Kesuma (2007: 53) explains that the distinguishing comparison technique is a data analysis technique with a determining tool in the form of comparative power that distinguishes between lingual units whose identity is determined.

Based on this description, when people with CP experience phonological limitations, for example /buku/ > /muku/ and /baju/ > /aju/ can be distinguished because the first example includes phonological errors in the form of substitution of the phoneme /b/ > phoneme /m/ and the second example is a phonological error in the form of omission on the phoneme /b/.

3 Findings

Regarding the phonological limitations experienced by the two research subjects, it was found that there were four phonological errors, namely substitution (phoneme replacement), omission (reduction or elimination of phonemes), addition (addition of phonemes), and distortion (irregularity of phoneme changes). These four types of phonological errors occur in both FA and FR utterances. However, the percentage of each of these phonological errors has a significant difference, even though there are phonological errors that are almost the same quantity. This is visualized in the following pie chart.
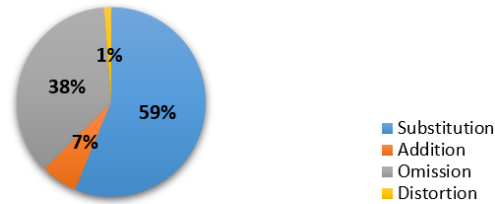
FA Phonological Error Percentage
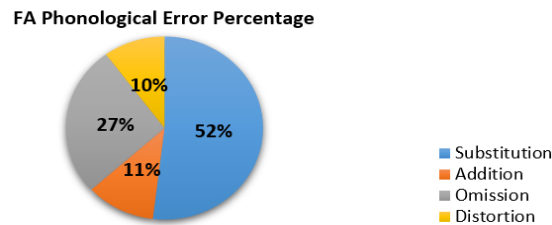
Fig 1. Percentage of Phonological Errors Spoken by FA

Based on the table in the previous sub-chapter and the diagram above, it can be seen the tendency of phonological errors uttered by FA. These results can be used as indicators to describe the phonological limitations of the sound produced by the research subjects. FA tends to make substitution errors or sound substitution with a percentage of 51.89% followed by omission sound errors which reach 26.58%. Sound errors in the form of distortion are in the next sequence with a percentage of 10.12%.

Finally, the addition of sound errors ranks last with a percentage of 11.39%. Thus, it can be understood that the percentage of the number of sound errors that are dominant or often experienced by FA is sound substitution or substitution. With the total number of sound errors that were uttered 79 times (41 x substitution, 9 x addition, 21 x omission, and 8 x distortion).

Persentase Kesalahan Fonologis FR

Fig 2. Percentage of Phonological Errors Spoken by FR

Phonological errors spoken by FR can be seen based on the table and diagram above. This percentage is used as an indicator to describe the phonological limitations of the sounds uttered by the research subjects. FR tends to make substitution errors or sound substitution with a percentage of 56.25% followed by sound omission errors which reach 36.25%. Sound errors in the form of additions are in the next sequence with a percentage of 6.25%.

Finally, the distortion sound error ranks last with a percentage of 1.25%. Thus, it can be seen that the percentage of sound errors that are dominant or often experienced by FR is sound replacement or substitution. With a total of 80 sound errors that were uttered (45 x substitution, 5 x omission, 29 x addition, and 1 x distortion).
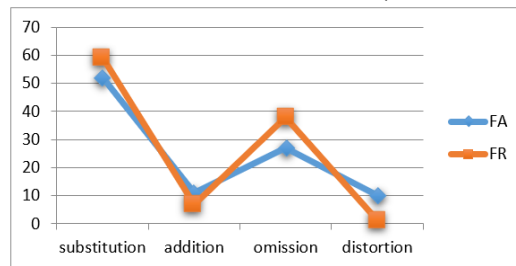
Fig 2. Comparison of the Percentage of Phonological Errors Spoken by FA & FR

Based on the visualization of the graphic presentation above, it can be understood that FA and FR are equally dominant in making sound errors by replacing sounds or substitutions. In addition, errors stated by FA & FR also ranged from 5—9 times the error occurred. Then in the second order after the substitution sound error is the omission error. And omission errors are both the second most common mistakes spoken by the FA and FR. However, in the phonological distortion error, FA seems to do it more, ie 8 times error, while FR only makes 1 distortion error.

4 Conclusion

Four phonological errors were found as the cause of phonological limitations in the speech of the two research subjects with cerebral palsy disabilities. The phonological errors are substitution, omission, addition, and distortion with the respective percentages being 51.89%, 26.58%, 11.39%, and 10.12% (for Fahri) and 56.25%, 36, 25%, 1.25%, and 6.25% (for Fatir). With dominant phonological errors in both, namely substitution phonological errors.

From the previous description, it is clear that even though FA and FR have the same disability, they have different types of extremities so that it affects the speech results of both. This differentiation is influenced by internal factors and external factors. Internally, this is clearly directly related to the disability he has, namely CP of a different type. The difference in the position of the lesion that interferes with the work of the motor nervous system affects the results of the two speeches.

Then, the age difference between the subjects is also quite far, which is 4 years adrift. Then from external factors, the two subjects came from the environment and received different social interactions. FA often interacts with neighbors around his house, apart from attending school. In contrast to FR, which can't run properly, FR is only at home apart from going to school. These factors clearly have an influence on the differentiation of the two utterances. This can also be a reference for further research to consider other factors, such as psychological, cognitive, affective, and psychomotor factors.

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