CHAPTER III
RESEARCH METHODOLOGY

This chapter presents the methodology used in this study. As mentioned in Chapter I, this study seeks to investigate the sound production of Indonesian autistic children, especially fricative sounds and to identify the kind of phonological patterns occur in their speech, also whether or not their speech sound production in the form of single-word production is better than in the form of spontaneous speech in conversation. The rest of this chapter presents the predictions, design, data collection, procedures of data analysis, and examples of data analysis.

3.1. Predictions

This study aims to provide valid and reliable data for the phonological features on speech production of Indonesian autistic children. Based on the results from the previous studies, there two predictions which were used in this study:

1. Indonesian autistic children may produce more sounds imperfectly (not only fricative sounds) and may produce more phonological patterns in their speech production. This prediction relies on Ingram’s (1986) idea that problems in sound production and phonological patterns are universal. Therefore, if they are truly universal, then it would be reasonable to expect to find them operating not only in the speech of normal children but also in the speech of children with impairments, especially children with autism.

2. Autistic children will produce sounds better in the form of single-word production of pronunciation test than in the form of spontaneous speech in conversation phase. This prediction relies on Tager-Flusberg et al.’s (2005, p. 354) notion that “pronouncing written words and spelling tend to be the strengths for children with autism”.

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3.2. Research Design

This study primarily applied a descriptive qualitative design supported by some quantification in the form of how the data were recorded in percentages. A qualitative research was appropriate to employ because the present study works in natural settings rather than fully controlled. In particular, this study is a case study which involved autistic children whose ages range from 9 to 10 years. This design relies on Denzin & Lincoln’s (2005 in Creswell, 2007, p. 36) notion that, “Qualitative research involves an interpretive, naturalistic approach to the world”. It means that qualitative research, study things in their natural settings, attempting to make sense of, or interpret phenomena in terms of the meanings people bring to them. Therefore, this design is in line with the aims of this study which is to investigate the sound production of autistic children in spontaneous speech and in single-word production.

3.3. Data Collection

This part consists of the research site and participants, data collection techniques, and data transcription of the study. Further descriptions can be seen in the following sections.

3.3.1. Research Site and Participants

This study was conducted at one school for special needs children in SLB Autisma YPPA, Bukittinggi. Four children were recruited as participants and they were directly chosen and assigned by the institution. The chosen children are confirmed to meet DSM-IV criteria for diagnosis on autism by the director of the institution. The purposive sampling was used in this study and the participants who were purposively chosen were based on the following criteria: boy and girl, autistic children, ages range from 9 to 10 years old, easily mingle with new people, have better pronunciation in speech, and have been being students in the selected school for at least 2 years.
The study only involved a small number of participants (four children) which comprised of three boys and one girl. The decision of not choosing more participants is intended to avoid sampling error (Oppong, 2013).

3.3.2. Data Collection Techniques

The collection of data and the observation of the participants were conducted from April 21st to April 29th, 2014. This observation was conducted by paying close attention to the process of how the participants produced sounds in their speech.

In terms of data collection technique, the data were collected through two different tasks, namely Conversation phase and the Pronunciation test. In the conversation phase, the voice of participants’ spontaneous speech was recorded along the session of their class with their teacher in Individual Therapy Class. This technique relies on Tager-Flusberg’s (2000) notion that “in the field of child language, the richest source of data comes from spontaneous speech samples” (p. 315). Each participant spent two hours with their teacher who worked on oral language development through conversation and small games.

In addition, the pronunciation test was administered to obtain more data. All the participants received the same pronunciation test to complete. They were tested individually and were required to read 188 single words. This test was administered to participants because the data taken from conversation phase were limited and were not cover all target phonemes. The process taken to complete this pronunciation test was also recorded for each participant. Moreover, the time for participants to complete this test was not limited.

3.3.3. Data Transcription

The recordings of conversation phase and pronunciation test were transcribed and used as the primary source. This is in line with Atkinson and Heritage (1984 in Silverman, 1993) who states as follows:

The production and the uses of transcripts were essentially ‘research activities’. It permitted the researcher to have direct access to the data and enabled them to reuse it in a variety of investigations and can be re-

Prior to the transcription, the recorded speech was transcribed in the form of orthographic transcription with the assistance of one shadow teacher in the research site. The involvement of the shadow teacher to assist this data transcription was intended to minimize transcribing error. The transcriptions were then compared and any disagreements were resolved through negotiation. If a disagreement could not be resolved, the particular word under discussion was discarded by the writer.

For the purpose of analysis, the phonetic transcription was then made by the writer by following the International Phonetic Alphabet system. In consideration of the fact that children normally have little difficulty with vowels (Templin, 1957; Locke, 1969 as cited in Piper, 1984), and because the analysis of the data showed that participants had no difficulty with vowels, only the consonant sounds were focused in this study. An example of transcription is presented below.

**Raw Data: Voice Transcription of Conversation**

* (Orthographically)

Teacher : “Lihat ibu nak! Berapa umurmu?”
Participant : “Sebuluh tahu.”
Teacher : “Bagus, pandai sekali! Kapan kamu lahir?”
Participant : “taga satu febwyai dua yibu empat.”
Teacher : “Oke, pandai! Berapa umurmu?”
Participant : “sebuluh tahu”
Teacher : “Dimana rumahmu?”
Participant : “Bintu Kabun.”
Teacher : “PINTU KABUN!”
Participant : “Bintu Kabun.”

The texts in bold indicate the important words which were then transcribed into phonetic transcription as follows:

**Teachers, participants, and conversations:**

<table>
<thead>
<tr>
<th>Teacher</th>
<th>“Lihat ibu nak! Berapa umurmu?”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant</td>
<td>“Sebuluh tahu.”</td>
</tr>
<tr>
<td>Teacher</td>
<td>“Bagus, pandai sekali! Kapan kamu lahir?”</td>
</tr>
<tr>
<td>Participant</td>
<td>“taga satu febwyai dua yibu empat.”</td>
</tr>
<tr>
<td>Teacher</td>
<td>“Oke, pandai! Berapa umurmu?”</td>
</tr>
<tr>
<td>Participant</td>
<td>“sebuluh tahu”</td>
</tr>
<tr>
<td>Teacher</td>
<td>“Dimana rumahmu?”</td>
</tr>
<tr>
<td>Participant</td>
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</tr>
<tr>
<td>Teacher</td>
<td>“PINTU KABUN!”</td>
</tr>
<tr>
<td>Participant</td>
<td>“Bintu Kabun.”</td>
</tr>
</tbody>
</table>
### Table 3.1 Example of Phonetic Transcription

<table>
<thead>
<tr>
<th>Word</th>
<th>Target phoneme</th>
<th>Participants’ Actual Pronunciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pintu</td>
<td>/p/</td>
<td>[bin.tu]</td>
</tr>
<tr>
<td>Ribu</td>
<td>/r/</td>
<td>[ji.bu]</td>
</tr>
<tr>
<td>Sepuluh</td>
<td>/p/</td>
<td>[se.bu.luh]</td>
</tr>
<tr>
<td>Februari</td>
<td>/r/</td>
<td>[feb.wu.a.ji]</td>
</tr>
<tr>
<td>Februari</td>
<td>/r/</td>
<td>[feb.wu.a.ji]</td>
</tr>
<tr>
<td>Tahun</td>
<td>/n/</td>
<td>[ta.hu]</td>
</tr>
<tr>
<td>Tanggal</td>
<td>/l/</td>
<td>[ta.ga]</td>
</tr>
</tbody>
</table>

### 3.4. Procedures of Data Analysis

The data were analyzed by following steps. First, the data were taken from the results of phonetic transcription of conversation phase and pronunciation test. Second, the data were classified based on the classes of sound such as plosives, fricatives, and affricatives to examine how each sound was produced by participants. Third, any alternations of target sounds which were produced by participants were collected. Forth, the phonetic environments were examined by using theory from Crowley (2005) to discover the preferences of those alternations. Fifth, the collected data were identified to discover phonological patterns of participants by using theory from Ingram (1986) and a supported theory by Bowen (2009). Sixth, the data were examined to discover whether participants’ sound production in the form of spontaneous speech in conversation phase is better than in the form of single-word production in pronunciation test. The last was drawing conclusion from the whole analysis of the study.

In order to determine the percentage of phonological patterns observed in participants’ speech production, the writer needed to compute numerical data by using a simple scaling composed by Thorsten (1992 in Salma, 2013, p. 35).

\[
P = \frac{F \times 100\%}{N}
\]

Note:
- P = Percentage
- F = Frequency
- N = Overall Number
3.5. Example of Data Analysis

Once the phonetic transcription was complete, the further analysis then was started. Example of the analysis of the data is exemplified in the table below.

Table 3.2 Example of Data Analysis

<table>
<thead>
<tr>
<th>Syllable Node</th>
<th>Phoneme</th>
<th>Word</th>
<th>Participants’ Actual Pronunciation</th>
<th>Deviation</th>
<th>Phonological Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset</td>
<td>/p/</td>
<td>Pintu</td>
<td>[bintu]</td>
<td>p → b</td>
<td>Context Sensitive Voicing</td>
</tr>
<tr>
<td></td>
<td>/ɾ/</td>
<td>Ribu</td>
<td>[yibu]</td>
<td>r → y</td>
<td>Gliding (of liquid)</td>
</tr>
<tr>
<td></td>
<td>/p/</td>
<td>Sepuluh</td>
<td>[sebuluh]</td>
<td>p → b</td>
<td>Context Sensitive Voicing</td>
</tr>
<tr>
<td></td>
<td>/m/</td>
<td>Sembilan</td>
<td>[sebila]</td>
<td>m → ø</td>
<td>Medial Consonant Deletion</td>
</tr>
<tr>
<td></td>
<td>/ɾ/</td>
<td>Februari</td>
<td>[febwuayi]</td>
<td>r → w</td>
<td>Gliding (of liquid)</td>
</tr>
<tr>
<td>Coda</td>
<td>/n/</td>
<td>Tahun</td>
<td>[tahu]</td>
<td>n → ø</td>
<td>Final Consonant Deletion</td>
</tr>
<tr>
<td></td>
<td>/l/</td>
<td>Tanggal</td>
<td>[taga]</td>
<td>l → ø</td>
<td>Final Consonant Deletion</td>
</tr>
</tbody>
</table>

In order to answer the first question, the data were classified based on the types of sound and any alternations of the target sounds were discovered. For additional description, each of the sounds was classified into two categories in relation to the syllable structure of their occurrences in the word: syllable-onset and –coda positions. This decision followed the idea of conducting phonological analysis in children proposed by Ingram & Ingram (2001). They conducted word shape analysis (syllables) to analyze speech of children which can determine how well children do in maintaining a number of syllables in target words. In order to answer the second and the third questions, the phonological patterns of participants were identified based on all the alternations observed earlier.

After the analysis was applied in all data collection, the distribution of data which consisted of the percentages was also shown. Furthermore, the entire analyses were given in the chapter four of this study and the rest of data presentations were shown in the appendices of the study.
3.6. Phonetic Symbols and Conventions

The study uses common symbols and technical terms. There are seven important symbols that are utilized in this study. They are listed as follows:

1. **Square brackets** [ ] signifies sounds, such as in the pronunciation of word ‘kacang’ is represented by the **phonetic realization** [ka.ʧaŋ].

2. **Arrow →** designates change; placed between input of a rule and its output, as in [ŋ → n], which means phoneme /ŋ/ changes into /n/.

3. **Slash mark /** designates ‘the environment’ in which change occurs.

4. **Underscore ___** marks the location of the target segment within a string of segments.

5. **Boundary marker #** indicates initial or final position of a segment within a word.

6. **Null Sign ø** denotes deletion or omission when it follows an arrow.

7. **Braces { }** indicate that two rules can be collapsed into one rules; read “either/or.”

3.7. Concluding Remarks

This chapter has discussed the methodology applied in conducting this study. The predictions, data collection, data analysis framework, and example of data analysis have been discussed clearly. In order to answer the research questions, further data analyses and data presentation will be developed and presented in the next chapter.