

Phonological Development in Child Language Acquisition: A Study of a Child with Speech Delay

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Abstract

Children acquire language through interaction with other children, their parents, and their surroundings. Acquisition of language may influence children's success at school. The language aspect that children acquire first is phonology. In acquiring language, children whose language development is slower than their peers may experience speech delay. Thus, the present study emerges to investigate the phonological development of a three-year-old child who is diagnosed with speech delay as well as to examine the factors that support the development. Using a qualitative approach, this study was a case study that employed a single participant. The results of the study indicated that the participant's language ability developed significantly after several months of receiving therapy. He displayed an ability to produce imitative sounds and non-imitative ones. The spontaneous utterances were also meaningful compared to what he had before the therapy. The evaluation revealed that the development of the subject was affected by the exposure to language at home. Speech simulation and screen time limitation were keys to improving his language ability.

Keywords: *Child language acquisition, phonological development, speech delay, speech therapy*

1. INTRODUCTION

Language is an essential aspect of human life as it is a means of daily communication. First language acquisition is an indispensable part of the language development phenomenon as it is related to the process experienced by children from the very early period of their lives. Language development is crucial to all aspects of children's lives and one of the best predictors of educational achievement (Rafferty, 2014). This is supported by Bakken et al. (2017), stating that the early development of children can affect their later functioning at school. This reflects that early development is crucial for a child's well-being.

Language acquisition occurs in a more natural setting where children use the language for everyday communication. The language acquired by children may be receptive or expressive. Damico & Ball (2019) state that receptive language is the ability to comprehend written and spoken language through listening, reading, or other forms of communication like sign language; while expressive language is the ability to communicate ideas or thoughts using speech, writing, gestures and other forms of communication. Besides, children also acquire the aspects of language such as phonology, morphology, syntax, and semantics. Among these aspects, children acquire phonology first because it is the surface structure of the language that is exposed to the children (Menyuk & Brisk, 2005). A child, in acquiring L1 grammar, goes through different stages of development, reflecting intermediate mental grammar on the way to adult grammar. We can still find a great deal of systematicity in children's language behavior, although multiple versions of a rule may be in use.

During the language development period, parents and caregivers have to notice the milestone of language acquisition experienced by children. If the language that children acquire does not match the milestones, then it can be a sign of some language problems. One of the language problems that children may experience is speech delay. Children diagnosed with speech delays can still acquire language similar to the typically developing children. The language acquisition of speech-delayed children is, however, considerably slower than that of typically developing children of the same age (Shetty, 2012). Istiqlal (2021) describes that a child with speech delay experiences imperfect pronunciation of certain words and tends to only give non-verbal responses to certain stimuli.

As claimed by Sunderajan & Kanhere (2019), various factors can delay children's speech development, including biological, family, and environmental factors. Biological factors are congenital medical conditions such as birth asphyxia, seizure disorder, and oropharyngeal deformity; family factors are lack of good parenting, multilingual conversation at home, the size of the family; and other factors such as trauma, inadequate stimulation for children to produce speech, and the overtime to watch television. Understanding these causative factors can help parents' early detection of delayed speech development in their children. It is in line with the concept "earlier is better" proposed by First Words Project (2015), which includes either the early diagnosis and treatment for the children to foster them to improve speech production. Early intervention is important in children's language development because speech delays are related to difficulties in reading, writing, paying attention, and socializing for children (McLaughlin, 2011).

In intervening, parents can seek help from the teachers at school if the children have been registered at the particular school. A study conducted by Sari (2018) notes that teachers

can intervene by producing words using clear articulation that can be easily followed by children, correcting the pronunciation errors made by children until they can pronounce them correctly, asking children to tell their experiences, introducing children to literation from an early age, and labeling objects around children so they become familiar with alphabets and know how to mention it correctly. Not only that, but this study also confirms that parents still have a big role in the intervention because children spend more time at home with their parents and family than at school. Thus, parents are also expected to do what the teachers do in school to familiarize children with the appropriate habit of communication as well as limit the children's screen time.

A speech therapist can also assist parents in language intervention in addition to teachers at school. The study conducted by Manipuspika & Sudarwati (2019) highlights therapeutic methods such as oral motor therapy, modeling method, learning while playing, and behavioral therapy methods that can be applied in speech delay therapy. These methods are expected by the therapists to be done at home as well because language intervention at home takes a bigger role in children's speech therapy. This study reports that among the three children who received speech therapy, two of them experienced phonological language development.

With the discussion of how speech-delayed children acquire their phonological development, this present study complements the knowledge in this area by providing a case of how phonological acquisition was obtained by a speech-delayed child. The research questions are twofold: 1) What is the phonological development of the language acquired by a child with a speech delay? and 2) What are the factors influencing the phonological development of the child?

2. LITERATURE REVIEW

2.1 The Milestone of Child Language Acquisition

The phases of typical speech development are cooing, babbling, one-word stage, two-word stage, and telegraphic speech (Yule, 2017). This typical pattern of speech development can be seen in the table below.

Table 1: The pattern of speech development

Age	Speech Development
1 – 6 months	During the first few months of life, the child gradually becomes capable of producing sequences of vowel-like sounds, particularly high vowels similar to [i] and [u]
6 – 8 months	Between six and eight months, the child is sitting up and producing several different vowels and consonants, as well as combinations such as ba-ba-ba and ga-ga-ga
12 – 18 months	Between twelve and eighteen months, children begin to produce a variety of recognizable single-unit utterances. This period is characterized by speech in which single terms are used for objects such as “milk,” “cookie,” and “cat”
18 – 20 months	Depending on what we count as an occurrence of two distinct words used together, the two-word stage can begin around eighteen to twenty months, as the child's vocabulary moves beyond fifty words.
2 – 2.5 years	Telegraphic speech is characterized by strings of words (lexical morphemes) in phrases or sentences such as <i>this shoe all wet, cat drink milk, daddy go bye-bye.</i>

(Source: Yule, 2017)

2.2 The Factors Influencing Child Language Acquisition

The factors that influence child language acquisition have been discussed in some studies. Some of these factors are presented as follows.

Age. The influence of age on language development is significant. For instance, age influences the acquisition of sounds and the occurrences of phonological processes (Ceron et al., 2017). Ceron, et.al (2017) claim that children will be able to acquire more complex phonemes as their cognitive and articulatory skills develop during maturation. Salnita et al. (2019) also mention that language acquisition will continue to develop as children grow older. This is because language develops within their physical feature, associated with speech organs and muscles that allow them to produce speech.

Socioeconomic Status (SES). Many research findings support that socioeconomic status can influence children's speech and language development. Dodd et al. (2003) claim that children from better socioeconomic backgrounds tended to acquire language faster than children from lower ones. Poor speech and language development in children from lower socioeconomic backgrounds may be linked to the nature of their language intake in terms of quality and quantity. Pace et al. (2017) add that SES may influence children's language development in terms of their learning process, caregiver-child interaction associated with quantity and quality of language input and parental warmth and sensitivity, and the availability of learning materials and resources.

Cognitive development. The way children cognitively process language affects their development of language abilities. Faster processing speed can have an immediate impact on language development by allowing operations to be performed more quickly, and it also can have an indirect impact by increasing the functional capacity of working memory (Rose et al., 2009). This view is supported by Deák (2014), who argues that there is a link between working memory resources and language ability which includes language learning. Still, the nature of the link remains unclear. Therefore, it is reasonable to assume that processing speed limitations will make it difficult for children to follow the audio stream they hear, thereby interfering with the development of lexical and grammatical features necessary for language development.

Interaction. Parent-child interaction is another factor influencing child language acquisition. Safwat and Sheikhany (2014) highlight that parent-child interaction is the key factor in children's language development. The authors note that the insufficient parent-child interactions in providing the stimulation to enhance children's language acquisition have an impact on children's language outcomes that are not optimal. In addition to that, children also acquire language through interaction with their peers. Mashburn et al. (2009) mention that children's interaction with their peers who have the same or higher average language abilities has a positive impact on their language development. Children who receive more language stimuli will have greater language development and can better produce the words used in their surroundings.

2.3 Speech Delay

Children whose speech development is considerably below the standard for children of the same age are deemed to have speech delays. Children with speech delays have speech

development that is normal in typically developing children of a younger age; the abilities to produce speech are acquired in the standard sequence but at a slower rate than the average one (Leung & Kao, 1999; Shetty, 2012). Because speech delay in children is linked to reading, writing, attention, and sociability issues, parents need to be aware of the developmental milestones of the language experienced by the children (McLaughlin, 2011).

3. RESEARCH METHOD

3.1 Research Design

This present study was a case study aimed to document the phonological development of a speech-delayed child at the Pediatric Neurodevelopmental Therapy Center (PNTC), Karanganyar. This study identified the development that the child made and the factors influencing the development.

3.2 Research Subject

The research subject was a child who was diagnosed having speech delay by a speech pathologist. The inclusion criteria of the subject were as follows: (1) The speech delay of the child was not to have been caused by biological factors; (2) The child lived with parents at home; (3) The subject has been receiving speech treatment from a speech therapist in therapy center; (4) The minimum duration of therapy was 5 months because 5-month-duration was considered sufficient to see the child's progress; (5) The participant provided signed consent form to involve in the research.

3.3 Data Collection

The data were collected from the documents of therapeutic notes that record the child's progress in speech production, as well as a voice recording of the child's therapy sessions. All data were transcribed. Other data were elicited from the interview with the speech therapist and the parents. Practically, the techniques used in collecting data are direct verbal interaction, voice recording, and note-taking.

3.4 Data Analysis

The steps in analyzing data were as follow: (1) The researchers identified the development in the child's phonology and compared the before and after treatment condition to see whether the improvement was significant; (2) The next step was identifying the factors determining the child's phonological development. This was taken from the therapist's and parents' interviews and the documents available to access.

4. RESULTS AND DISCUSSION

4.1 Phonological Development

The subject of this study was a three-year-old child named Z who was diagnosed having speech delay by the pediatricians. He has been joining the therapeutic programs at the PNTC (Pediatric Neurodevelopmental Therapy Center), Karanganyar, since April 2020. However, he stopped joining the program for several months because his parents were busy, so no one could take him to the therapy center.

Before joining the therapeutic programs, Z underwent an initial assessment reporting the absence of verbal communication, weak oral motor area, inconsistent eye contact, etc. Several months after receiving treatment, he showed several developments, such as making eye contact with his interlocutors, increasing focus, producing jargon, starting to imitate a little, and suddenly saying one word spontaneously.

During the observations, which were conducted from 15 December 2021 to 8 January 2022, Z was able to produce meaningful imitative and meaningful spontaneous utterances, although he more often produced meaningless ones. Besides, he could pronounce almost all vowels and consonants. There were only six consonants and three allophone vowels that did not appear during the observations. To see his ability in pronouncing Bahasa Indonesia's phonemes, see the table below is shown.

Table 2: Z's Ability to Pronounce Consonants

Consonants	Utterances	Phonetic Transcription	Meaning
/b/	<i>Bugaga</i> (52.41)	/bugaga:/	<i>Buka</i> (open)
/p/	<i>Apapaa</i> (46.38)	/apapa:/	Meaningless spontaneous utterance
/m/	<i>Mooo</i> (9.54)	/mo:/	<i>Mobil</i> (car)
/w/	<i>Wajo</i> (45.34)	/wadʒo/	Meaningless spontaneous utterance
/f/	-		
/d/	<i>Daa</i> (20.10)	/da:/	<i>Kuda</i> (horse)
/t/	<i>Terr</i> (9.21)	/tər/	<i>Helikopter</i> (helicopter)
/s/	<i>Laisoba</i> (43.22)	/laisoba/	<i>Raiso mbak</i> (I cannot)
/n/	<i>Nanaa</i> (23.21)	/nana:/	Meaningless spontaneous utterance
/r/	-		
/l/	<i>Ahlobo</i> (17.29)	/ahlobo/	Meaningless spontaneous utterance
/dʒ/	<i>Ayajajaa</i> (2.53)	/ajadʒadʒa:/	Meaningless spontaneous utterance
/tʃ/	<i>Cecyee</i> (19.46)	/tʃetʃe:/	Meaningless spontaneous utterance
/z/	-		
/ʃ/	-		
/p/	-		
/j/	<i>Iiyaa</i>	/i:ja:/	<i>Iya</i> (yes)
/g/	<i>Gaa</i> (40.31)	/ga:/	<i>Gajah</i> (elephant)
/k/	<i>Koo</i> (33.14)	/ko:/	<i>Kuda</i> (horse)
/ŋ/	<i>Eng</i> (23.51)	/əŋ/	Meaningless spontaneous utterance
/h/	<i>Hok</i> (31.02)	/hɔʔ/	Meaningless spontaneous utterance

Table 2 shows that Z could pronounce almost all Bahasa Indonesia's consonants, although not all of his utterances have meaning. The consonants /f/, /r/, /z/, /ʃ/, and /p/ did not appear during the observation, more likely because they were not features of the words Z intended to say. Moreover, not all of his utterances were spoken clearly. For example, when he said 'laisoba', we might think that this word had no meaning, but the therapist's assistant interpreted it as 'raiso mbak' ('I cannot, sis'). This finding is similar to Istiqlal's (2021) study, which concludes that a child who experiences speech delay has imperfect pronunciation because their articulation is sometimes unclear.

The table above also showed the phonemic shift done by Z. For example; he pronounced the word 'buka' as 'bugaga'. It was a voicing in which he changed the velar

plosive consonant from the voiceless /k/ into the voiced one /g/. He also doubled the last syllable of the word.

Excerpt 1

TA1 (52.38): Buuka, ndang bu...(Open, come on...)

/bu:ka ndaŋ bu/

P (52.41): Bugagaa

/bugaga:/

Table 3: Z's Ability to Pronounce Vowels

Vowels	Utterances	Phonetic Transcription	Meaning
/i/	<i>Iyaa</i> (21.52)	/iya:/	<i>Iya</i> (yes)
/ɪ/	-		
/e/	<i>Iyee</i> (49.54)	/ije:/	Yay
/ɛ/	-		
/u/	<i>Bugaga</i> (52.41)	/bugaga:/	<i>Buka</i> (open)
/ʊ/	-		
/o/	<i>Gogo</i> (29.40)	/gogo/	<i>Gol gol</i> (ball/playing football)
/ɔ/	<i>Moo</i> (9.54)	/mo:/	<i>Mobil</i> (car)
/ə/	<i>Emo</i> (19.07)	/əmo/	<i>Moo</i> (cow's sound)
/a/	<i>Gaa</i> (40.31)	/ga:/	<i>Gajah</i> (elephant)

Table 3 showed that Z could pronounce almost all vowels of Bahasa Indonesia, except the allophones of the /ɪ/, /ɛ/, and /ʊ/, which are rarely pronounced throughout the therapy session.

Excerpt 2

TA1 (26.23): Aayam, mana ayam? Bukaan (Chicken, where is chicken? No)

/a:yam mana ayam buka:n/

P (26.27): Bukan (No)

/bukan/

The excerpt above showed echolalia produced by Z. According to Lewis (2013), echolalia was the occurrence when children repeat sounds, words, phrases, or larger language chunks. Here Z was stimulated to say the word 'ayam'. However, he repeated the word 'bukan' spoken by the therapist's assistant when she told him that he was wrong because the picture he took was not a chicken.

During 16-18 months of age, generally, echolalia occurs, and it should be decreased or even end when the child is about 2 years old (Yule, 2017). This is in line with the fact that children who experience speech delays will have the same speech development as children who develop typically, but their acquisition is slower than the general one (Leung & Kao, 1999; Shetty, 2012).

Excerpt 3

T (51.48): Mau pake ini? Mau, mau? Mau? (Do you want to use it? You want, you want? Do you want it?)

/mau pake ini mau mau mau/

P (51.52): Iyaa (Yes)

/iya:/

We can see that he could say 'iya' to show that he agreed with what the therapist said. The therapist expected him to say 'mau' as she repeated that word multiple times, but Z still responded to her using the word 'iya'.

Excerpt 4

TA1 (17.43): Sini mintaa (Here, give it to me)

/sini minta:/

P (17.44): Emoo (No)

/əmo:/

From the example above, it can be seen that Z was able to show rejection by saying emo on his own accord, even though the form of the word was still incomplete. The original form of that word was emoh /əmoʰ/. He omitted the last consonant /h/ in his pronunciation of that word.

4.2 The Factors Influencing Phonological Development

The following factors influenced Z's phonological development based on the perspective of his parents and speech therapist.

4.2.1 Oral Motor Therapy

One of the therapeutic methods given to Z was oral motor therapy, in which the therapist gave massage around his oral cavity using her thumbs and an ice cream stick. This method was used to stimulate his oral movement because it could improve the function of the oral motor organs. It was in line with the assessment results, which stated that Z had a weak oral motor area. The weak oral motor area was due to Z's underactive speech.

4.2.2 Drill Method

According to the speech therapist, Z did not always want to imitate, so he wanted to speak spontaneously. Therefore, the therapeutic method to stimulate him to speak was the drill. The drilling method is a speech therapy technique that stimulates children to speak through consistent repetition. This method required the speech therapist to actively repeat the words to make Z remember; then, he would say those words himself if he wanted to speak. The language stimulation in this study emphasized word repetition so that the participant would remember the words. It was hoped that when he wanted to say a word, he could produce it as he had that word stored in his memory. This finding was slightly different from the study by Manipuspika & Sudarwati (2019), which reported that language stimulation was

more emphasized on imitation. This difference was due to the different research settings in which the participant of the present study was not willing to imitate the speech therapist.

4.2.3 Home Program

Z attended therapy for an hour once a week, usually on Wednesdays. The amount of time spent doing therapy was very limited; thus, the results would not be optimal if home intervention by parents did not support it. Hence, PNTC had a program that involved parents in providing language intervention. Maintaining good and continuous eye contact with the child while speaking to him is very important. Those suffering from delayed speech usually will have a lack of attention, so keeping eye contact is important. Parents are encouraged to give a rich language environment full of language exposure to boost children's language progress. The home program also included screen time limitations for the child. This is due to the observation by the therapist concluding that gadgets and television led to underdeveloped speech and problems with focus and concentration. Sari's (2018) study also reports that parents of children with expressive language development disorders also do this.

4.2.4 Speech Stimulation

Another factor contributing to Z's speech delay was his surroundings, which had a small number of children and a lack of parent-child communication due to the busy schedule of Z's parents. These two factors made him less stimulated to speak. As a result, the home program he was given required him to be more involved in communication with his parents, siblings, and surroundings. His parents decided to send him to a childcare center. Not only were his parents taking care of him while they were at work, but they also wanted him to communicate and play with his peers. His mother stated that his peers were already proficient at communicating, and she hoped that it would encourage him to talk as well. The study conducted by Mashburn et al. (2009) indicates that children's interactions with their peers may have a unique and important role in their development. Their study shows that children who have the opportunity to engage with their peers who have average or even greater average language abilities will have a positive impact on their language development. Furthermore, the speech therapist stated that Z's activity would increase at the childcare center, allowing him to avoid using devices and watching TV.

When Z was at home, his mother frequently asked him questions that prompted him to say more than just yes or no. For example, when she asked him about what he saw earlier or what he learned from 'bunda' (caregiver) at the childcare, he often smiled. He used to smile in response to utterances he could not or did not want to respond to. His mother would sometimes purposefully swap between yes and no questions numerous times to check if he truly comprehended what she was saying. This finding is similar to the study conducted by Sari (2018), which notes that parents more often involve children in two-way communication, such as talking with them about their surroundings or their activities in school. Z's mother understands that the key factor in overcoming the speech development issue experienced by her son is language exposure through stimulation to speak.

4.2.5 Socioeconomic Status (SES)

The phonological development experienced by Z may also be linked to his socioeconomic background. His parents work as teachers, which can be the reason for their awareness of his language development and difficulties. Therefore, they realized they needed to make some efforts to overcome the issue, such as consulting with pediatricians, giving him speech therapy, enrolling him in a childcare center, and giving him language stimulation to speak. These interventions were rolled out because Z's parents could afford them. It is in line with Pace et al. (2017), who state that socioeconomic status (SES) influences a child's language development in terms of language input, parental sensitivity, and the availability of learning resources.

5. CONCLUSION

The current study provides an overview of the phonological development of a speech-delayed child named Z after undergoing therapy for several months. He can produce meaningful imitative, meaningful spontaneous, and meaningless speech during the observation. This is regarded as development as he did not produce any speech prior to therapy. Bahasa Indonesia's phonemes that did not appear to be produced during the observation were the consonants /f/, /r/, /z/, /ʃ/, /ɲ/, /x/ and the allophones of the vowel /ɪ/, /ɛ/, /ʊ/. Even though he can pronounce almost all vowels and consonants of Bahasa Indonesia, his speech is occasionally unclear and meaningless. Furthermore, the oral motor therapy and drill method provided by a speech therapist at the therapy center, as well as the home program carried out by his parents, which requires him to have limited screen time and abundant language exposure, have been found to influence his phonological development positively. However, the findings of the present study may not apply to all children with speech delays. Certain factors may explain why some children reach different phonological milestones.

It is acknowledged that the present study is limited to the phonological development of a speech-delayed child. Thus, a recommendation is made for future researchers to develop their research on the phonological development experienced by children with other language disorders. In addition, further research can also discuss the other factors that influence children's language development that has not been discussed in the present study. Different research settings can result in different findings. Therefore, further research in a different setting needs to be conducted to increase knowledge about the language development of children with language development disorders to be more varied.

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