ANALYZING THE SPEECH SOUND STRUCTURES OF INDONESIAN CHILD LANGUAGE

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ABSTRACT

In the acquisition of language, there could be gradual construction and systematic development of the children's linguistic skills. In their communication, the children speak the words, but their sounds may not be as complete as the adults. This difference between the child and adult language has attracted the attention of scholars in language acquisition to examine if there are specific structures of the child language. This research focuses on the structures of the child's speech sound to see what aspects could explain the difference between child and adult language. The data were the speech of 37 children (Male = 20; Female = 17) with the age range of 1;2 (one year two months) to 5;2 (five years two months). The data was transcribed, and its phonological aspects classified. PRAAT software (version 6.2.02) was used to study the phonetic properties that support the explanation of the phonological aspects, especially for intensity, duration, and pitch. The study revealed some important aspects of the child language, i.e., syllable deletion, nasal assimilation, velar fronting, lateral substitution, vowel lowering and raising, and pitch harmony. This study may shed new light on the research of speech sound structure for promoting children's literacy programs in Indonesia.

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A. Introduction

Language as a learning process is perpetual and perennial in the individual, where it will be modified depending on the interaction with the environment in which it develops.[1] The beginnings of communication occur in the first months of the children's life, which is in their first encounters with other children and the surrounding adults.[2] In the acquisition of

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[1] Rufan Luo et al., "Maternal Question Use and Child Language Outcomes: The Moderating Role of Children's Vocabulary Skills and Socioeconomic Status," *Early Childhood Research Quarterly* 59 (2022): 109–20, https://doi.org/10.1016/j.ecresq.2021.11.007.

[2] Dana E. Bernier and Katherine S. White, "Toddlers' Sensitivity to Phonetic Detail in Child Speech,"

language, there could be gradual construction and systematic development of the children's linguistic skills.[3] The basic factors such as age, intelligence, memory, attention and motivation intervene in their development and acquisition of language.[4] Those factors can determine the degree of maturity of the linguistic and communicative competences of the children. At the same time, adults can help them in the process of linguistic development because the development process can possibly slow down if they do not stimulate it.

During the development process, the children might be performing expressive behaviors[5] with their speech sounds for communication interaction.[6] They are capable of anticipating the language that accompanies situations so that their words are very tied to specific contexts. In their communication, the children speak the words, but their sounds may not be as complete as the adults. Through adult and child interaction, the children's speech production can be improved as a part of

their language acquisition development.[7] This difference between the child and adult language has attracted the attention of scholars in language acquisition to examine if there are specific structures of the child language. Language acquisition studies the way in which language is acquired during childhood.

The structures of the child language have been studied from various aspects such as syntactic, pragmatic, semantic and phonological aspects.[8] In this paper, by taking the data of Indonesian children's spoken words, the phonological aspects of the child language are discussed. It focuses on the structures of the child's speech sounds to see what aspects could be explained for the difference between child and adult language.

There are still relatively few studies that discuss the phonological aspects of children's language. In those studies, the analysis is usually based on the transcription of the data records containing valuable information about developmental phonology. As found by Carter and

Journal of Experimental Child Psychology 185 (2019): 128–47, https://doi.org/10.1016/j.jecp.2019.04.021.

[3] Quigley Jean and Nixon Elizabeth, "Parent-Child Directed Speech in Dyadic and Triadic Interaction: Associations with Co-Parenting Dynamics and Child Language Outcomes," *Early Childhood Research Quarterly* 58 (2022): 125–35, https://doi.org/10.1016/j.ecresq.2021.09.005.

[4] Susan M. Gass, Jennifer Behney, and Luke Plonsky, *Second Language Acquisition: An Introductory Course*, 5th ed. (New York: Routledge, 2020), https://doi.org/10.4324/9781315181752.

[5] Vanessa V. Volpe et al., "Early Growth in Expressive Communication and Behavior Problems: Differential Relations by Ethnicity," *Early Childhood Research Quarterly* 47 (2019): 89–98, https://doi.org/10.1016/j.ecresq.2018.10.002.

[6] Natalia M. Rojas and Rachel M. Abenavoli, "Preschool Teacher-Child Relationships and Children's Expressive Vocabulary Skills: The Potential Mediating Role of Profiles of Children's Engagement in the Classroom," *Early Childhood Research Quarterly* 56 (2021): 225–35, https://doi.org/10.1016/j.ecresq.2021.04.005.

[7] Aliyah Morgenstern, Marie Leroy-Collombel, and Stéphanie Caët, "Self- and Other-Repairs in Child–Adult Interaction at the Intersection of Pragmatic Abilities and Language Acquisition," *Journal of Pragmatics* 56 (2013): 151–67, https://doi.org/10.1016/j.pragma.2012.06.017.

[8] Evan Kidd and Rowena Garcia, "How Diverse Is Child Language Acquisition Research?," *First Language*, January 28, 2022, 014272372110664, https://doi.org/10.1177/01427237211066405.

Gerken, it was discussed that syllables were omitted in children's language production.[9] Their study has shown that children actually have syllable knowledge, but that knowledge is implemented in different ways during language development.

Moreover, in the study conducted by Carlson, Sonderegger, and Bane, there was an exploration of the structure of a phonological network of the children's spontaneous speech.[10] In their study, it can be seen the role of the phonological network structure in the vocabulary acquisition experienced by children. In addition, the study on the phonological variation in the child language by Pye, Mateo, Pfeiler, and Stengel, has shown that there is an influence of the phonological structure of adults on the range of speech variations in children and this is related to the operation of individual processes in children's language development.[11]

However, from the previous studies on the phonological aspects of children's language, we still require more case studies to explain how is actually the speech sound structure of the child. Our current study focusing on the speech structure of children's speech can contribute to a deeper understanding of the phonological aspects of children's language. Then, the study on the phonological aspects of the child language hopefully gives insights into the field of language acquisition and helps adults (parents and teachers) with more understanding about the process of language development and learning of their children or students. The findings might be used to motivate the enrichment of stimulated interaction with the children[12] and the learning materials for the students[13] so that they can improve their verbal fluency[14] as part of their language skills.[15]

There is a gradual construction in the language acquisition process, and there is a systematic development of linguistic skills in children.[16] Children pronounce

[9] Allyson Carter and Louann Gerken, "Do Children's Omissions Leave Traces?," *Journal of Child Language* 31, no. 3 (2004): 561–86, https://doi.org/10.1017/S030500090400621X.

[10] Matthew T. Carlson, Morgan Sonderegger, and Max Bane, "How Children Explore the Phonological Network in Child-Directed Speech: A Survival Analysis of Children's First Word Productions," *Journal of Memory and Language* 75 (2014): 159–80, https://doi.org/10.1016/j.jml.2014.05.005.

[11] Clifton Pye et al., "Analysis of Variation in Mayan Child Phonologies," *Lingua* 198 (2017): 38–52, https://doi.org/10.1016/j.lingua.2017.07.001.

[12] Naja Ferjan Ramírez, "Fathers' Infant-Directed Speech and Its Effects on Child Language Development," *Language and Linguistics Compass* 16, no. 1 (2022): e12448, https://doi.org/10.1111/lnc3.12448.

[13] Christoph Mischo, Katrin Wolstein, and Svenja Peters, "Professional Vision of Early Childhood

Teachers: Relations to Knowledge, Work Experience and Teacher Child-Interaction," *Early Years* 23 (2022): 1–17, https://doi.org/10.1080/09575146.2022.2028129.

[14] Priscila do Nascimento Marques, Rosinda Martins Oliveira, and Jane Correa, "Contributions of Executive Functions and Linguistic Skills to Verbal Fluency in Children," *Child Neuropsychology* 28, no. 8 (2022): 1031–51, https://doi.org/10.1080/09297049.2022.2042502.

[15] David Giguere et al., "Majority Language Skill, Not Measures of Bilingualism, Predicts Executive Attention in Bilingual Children," *Journal of Experimental Child Psychology* 213 (2022): 105256, https://doi.org/10.1016/j.jecp.2021.105256.

[16] Paul Ibbotson and Michael Tomasello, "Prototype Constructions In Early Language Acquisition," *Language and Cognition* 1, no. 1 (2009): 59–85, https://doi.org/10.1515/LANGCOG.2009.004.

words in their communication, but the pronunciation of these words may not be as complete as that of adults. The difference between children's language and adult language has been used to observe whether there are special structures present in children's language. In this paper, it is reported the research on the Indonesian child language. It focuses on the structures of the child's speech sound to see what aspects could be explained for the difference between child and adult language.

B. Method

To observe the Indonesian child language, the children's speech was used as data taken from the recorded speech of 37 children (Male = 20; Female = 17) with the age range from fourteen months (1;2) to sixty-two months (5;2). The children grow up in a family speaking Indonesian as their native language in Lampung Province, Indonesia. The children's spoken words were transcribed along with their adult counterparts and their meaning, e.g., /daʤah/ ~ /gaʤah/ 'elephant,'/tatut/ ~ /takut/ 'scared', and /tepala/ ~ /kepala/ 'head.'

Then, the phonological aspects were classified to explain how the child's words are different from the adult's ones, i.e., sound deletion (total and partial syllables), nasal assimilation, velar fronting, lateral substitution, vowel lowering and raising, and pitch harmony. The software PRAAT

(version 6.2.02)[17] was used to examine the phonetic properties of the words to explain their phonological aspects, especially for intensity, duration, and pitch.

C. Results
1. Syllable Deletion

Sound deletion can be defined as the deletion of one or more sounds in a word.[18] In the data, it is found that the deletion of sound covers the total and partial syllables. The total syllable deletion is exemplified in (1-4).

(1) /loŋ/ ~ /boloŋ/ 'holey'
(2) /na/ ~ /warna/ 'color'
(3) /la/ ~ /bola/ 'ball'
(4) /na/ ~ /kena/ 'hit'

The first syllable was deleted seemingly because it is not stressed in the word. This is supported by the observation of the child language environment producing these words.
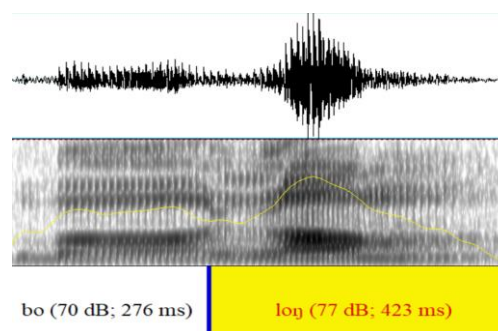
Fig. 1. Pronouncing /boloŋ/ 'holey' with the stress on the second syllable.

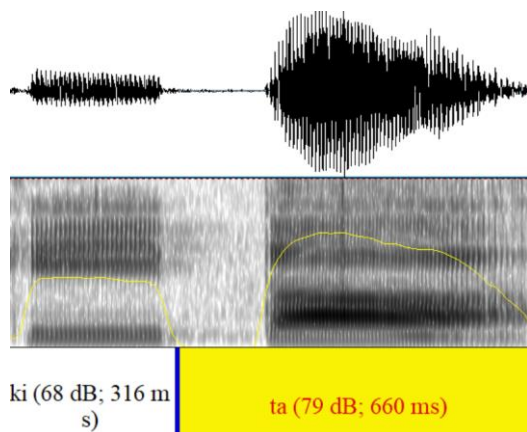In the environment, the adult spoke and introduced the words to the child with

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[17] Paul Boersma and David Weenink, "Praat: doing phonetics by computer [Computer program]" Version 6.2.02 (2021), retrieved 3 December 2021 from https://www.praat.org.

[18] Alan Cruttenden, *Gimson's Pronunciation of English* (London: Routledge, 2014), 313–15.

great intensity and long duration on the second syllables, as noticed in Figure 1, showing that the second syllable /loŋ/ has more intensity and more duration than the first syllable /bo/ (77 dB > 70 dB; 423 ms > 70 ms) for pronouncing /boloŋ/ 'holey.' The sound duration and intensity can be described as the physical correlates of syllable stress.[19]

In the partial syllable deletion, the vowel sound as the syllable nucleus is not deleted as found in (5-7). The first syllables of the words still have the sounds /a/ and /i/ for (5-6) and (7), respectively, instead of /ga/, /nan/, and /ki/. Meanwhile, the syllable onsets /g/, /n/ and /k/, and coda /n/ were deleted.

(5) /adʒah/ ~ /gadʒah/ 'elephant'
(6) /ati/ ~ /nanti/ 'later'
(7) /ita/ ~ /kita/ 'we'

ki (68 dB; 316 ms)   ta (79 dB; 660 ms)

Fig. 2. Pronouncing /kita/ 'we' with the stress on the second syllable.

Observing the child language environment producing these words, they are pronounced and introduced with great intensity and long duration on the second syllable by the adult, the same as the case in the total syllable deletion. Figure 2 shows that the second syllable /ta/ has more intensity and more duration than the first syllable /ki/ (79 dB > 68 dB; 660 ms > 316 ms) for pronouncing /kita/ 'we.'

The occurrence of the syllable deletion in the data can be schematized in Figure 3. The scheme predicts that the unstressed syllables might be deleted either totally (Onset + Nucleus + Coda) or partially (Onset + Coda) in the child language.
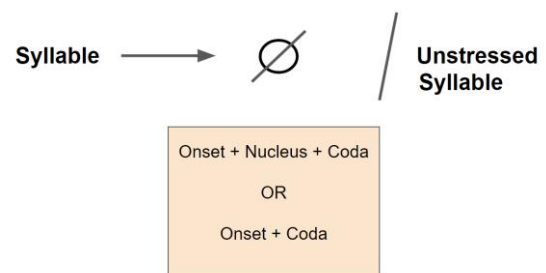
Fig. 3. Syllable Deletion

2. Nasal Assimilation

Sound assimilation consists of a phonetic process by which a phoneme is modified under the influence of another phoneme contiguous or close to the first.[20] The modified sound changes to be similar to the influencing sound. The assimilation can be total when the phoneme adopts an identical articulation to the other. It can be

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[19] Bethany MacLeod and Sabrina M. Di Lonardo Burr, "Phonetic Imitation of the Acoustic Realization of Stress in Spanish: Production and Perception," *Journal of Phonetics* 92 (2022): 101139, https://doi.org/10.1016/j.wocn.2022.101139.

[20] Paul Georg Meyer, *Synchronic English Linguistics: An Introduction* (Tübingen: Gunter Narr Verlag, 2005), 130.

partial when the phoneme acquires some of its articulatory characteristics. Further, the assimilation can be regressive when the affected phoneme appears before or progressive when it appears behind.

In the data, it is found that nasal assimilation, as exemplified in (8-10), is partial because only the articulation manner [+nasal] is adopted by the modified phoneme, but the articulation place does not change. The nasal assimilation is categorized as regressive because the affected phoneme comes first.

(8) /muɲa/ ~ /puɲa/ 'have'
(9) /ŋuɲah/ ~ /kuɲah/ 'chew'
(10) /ŋamu/ ~ /kamu/ 'you.sl.'

As observed in (8), the articulation manner of the consonant sound in the first syllable onset has been affected by the consonant sound in the second syllable onset /ɲ/ into [+nasal] so that the bilabial plosive /p/ becomes the bilabial nasal /m/. In (9) and (10), the consonant sound in the first syllable onsets is affected by the consonant sound in the second syllable onsets /ɲ/ and /m/, respectively. Thus, the velar plosive /k/ changes into the velar nasal /ŋ/. The nasal assimilation in the data can be schematized in Figure 4.
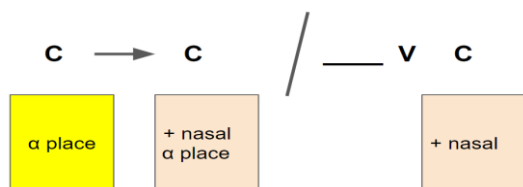

Fig. 4. Nasal Assimilation

3. Velar Fronting

The phonological process of consonant fronting occurs when the sound produced in the back of the mouth is replaced with the sound produced in the front of the mouth.[21] It is a child-specific speech since it might be difficult for the child to move the tongue in producing velar sounds.

In the data, there is velar fronting which occurs when the child substitutes the velar sounds /k/ and /g/ with the alveolar /t/ and /d/ sounds as in (11-12) and (13) respectively. It is called velar fronting. The data show that in the velar fronting, the children maintain the voiced feature of the consonant, i.e., voiceless /t/ ~ /k/; and voiced /d/ ~ /g/. The velar fronting occurs in the syllable onsets /tut/ for /kut/ in (11), /te/ for /ke/ in (12), and /da/ for /ga/ in (13).

(11) /tatut/ ~ /takut/ 'scared'
(12) /tepala/ ~ /kepala/ 'head'
(13) /dadʒah/ ~ /gadʒah/ 'elephant'

4. Lateral Substitution

Some spoken words of the children have lateral approximant consonant /l/ for flap consonant /r/ as exemplified in (14-16). It can be called lateral substitution. The flap sound produced with a single contraction of the muscles is substituted with the lateral sound produced by directing the airstream over the sides of the tongue. In learning to speak, the children might find it difficult to pronounce /r/, although the sound is available in their mother tongues.[22]

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[21] Tara Mcallister Byun, "Positional Velar Fronting: An Updated Articulatory Account," *Journal of Child Language* 39, no. 5 (2012): 1043–76, https://doi.org/10.1017/S0305000911000468.

[22] Takayuki Arai, "Physical Models of the Vocal Tract with a Flapping Tongue for Flap and Liquid Sounds," in *Interspeech 2013* (Interspeech 2013, ISCA, 2013),

(14) /kelas/ ~ /keras/ 'hard'
(15) /telbang/ ~ /terbang/ 'fly'
(16) /besal/ ~ /besar/ 'big'

(17) /mao/ ~ /mau/ 'want'
(18) /ikot/ ~ /ikut/ 'follow'
(19) /mobel/ ~ /mobil/ 'car'
(20) /ape/ ~ /apa/ 'what'

In (14), the lateral substitution is on the onset unit of the second syllable /las/ for /ras/. Meanwhile, in (15) and (16), the lateral substitution is on the coda unit of the first syllable /tel/ for /ter/ and the second syllable /sal/ for /sar/, respectively. In other words, the lateral substitution can be in the syllable onset or coda, as illustrated in Figure 5.
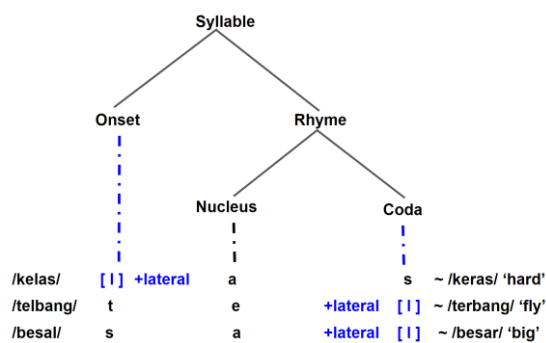

Fig. 5. Lateral Substitution in Onset and Coda

5. Vowel Lowering and Raising

Indonesian has two high vowels /i/ and /u/, three mid vowels /e/, /ə/, and /o/, and one low vowel /a/.[23] Some spoken words of the children are not correct for their vowels which can be lower or higher than those of the adults.

In the vowel lowering, the vowels are lower, and in the vowel raising, the vowels are higher than those of the adults' spoken words. Vowel lowering and raising are exemplified in (17-19) and (20) respectively.

The vowel /o/ in /mao/ and /ikot/ is lower than the vowel /u/ in /mau/ and /ikut/ and the vowel /e/ in /mobel/ is lower than the vowel /i/ in /mobil/. Meanwhile, the vowel /e/ in /ape/ is higher than the vowel /a/ in /apa/. The vowel lowering and raising aspects are illustrated in Figure 6.
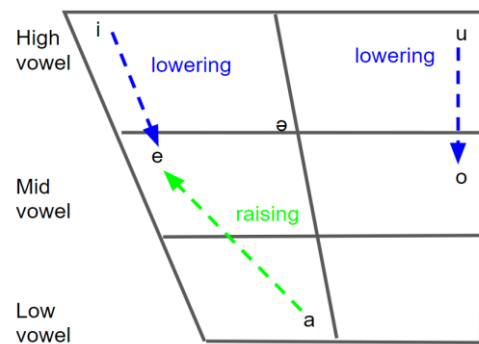

Fig. 6. Vowel Lowering and Raising

Seemingly, for these phonological aspects, the children have neutralized their vowels from either high or low into mid (-High; -Low). This vowel neutralization occurs in the unstressed syllable nucleus which is schematized in Figure 7.
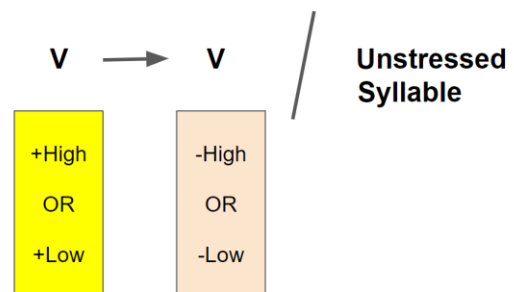

Fig. 7. Vowel Neutralization

2019–23,
https://doi.org/10.21437/Interspeech.2013-479.
[23] Craig D. Soderberg and Kenneth S. Olson, "Indonesian," *Journal of the International Phonetic Association* 38, no. 2 (2008): 209–13, https://doi.org/10.1017/S0025100308003320.

6. Pitch Harmony

In the verbal interaction between the child and the adult, when the new words are introduced and learned, some words may not match their segmental aspects, as discussed in sound deletion, nasal assimilation, velar fronting, lateral substitution, and vowel neutralization. However, for their suprasegmental aspects, especially for the pitch contour of the directed speech, the child can pick up the contour. The pitch contours of the words spoken by the child match those of the words spoken by the adult. In other words, the child has attention to the sound prosody as the input for learning the language. This can be called pitch harmony. This supports the case studies exploring the spoken language of the children using the prosody[24] in their comprehension and production[25] and examining the prosody roles in shaping their attention and guiding their learning.[26]

As found in (21), the adult uttered /tradisional/ 'traditional' with Rise + Fall + Rise pitch contour at the end. Although the child uttered /ional/ which is not as complete as the adult did segmentally, i.e. with total syllable deletion for /tra/ and /di/, and partial syllable deletion for /si/, it is found that the child's pitch contour is similar, i.e. Rise + Fall + Rise at the end of the utterance as seen in Figure 8.

(21) Rise + Fall + Rise: /iona/ ~ /tradisional/ 'traditional'
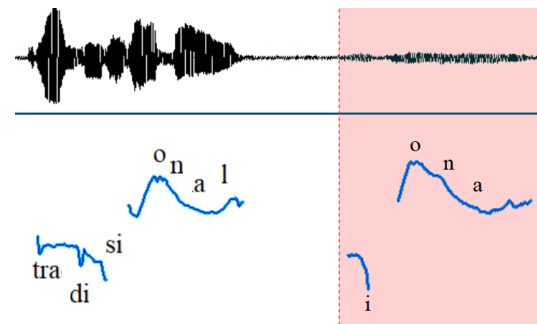
Fig. 8. The pitch contour of Rise + Fall + Rise in pronouncing /iona/.

In (22), the adult uttered /krakatau/ 'Krakatoa' with Fall + High Rise pitch contour and the pitch went up very high at the end. Then, the child uttered /aʔatau/ which is not as complete as the adult did, i.e. with partial syllable deletion for /kra/ and the glottal /ʔ/ substituting the velar /k/, but the pitch contour is similar, i.e. Fall + High Rise at the end of the utterance as seen in Figure 9.

(22) Fall + High Rise: /aʔatau/ ~ /krakatau/ 'Krakatoa'
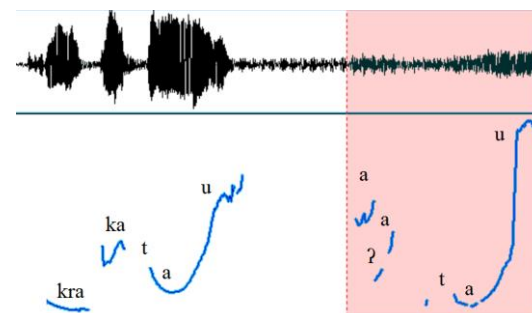
Fig. 9. The pitch contour of Fall + High Rise in pronouncing /aʔatau/.

[24] Mengru Han, Nivja H. De Jong, and René Kager, "Prosodic Input and Children's Word Learning in Infant- and Adult-Directed Speech," *Infant Behavior and Development* 68 (2022): 101728, https://doi.org/10.1016/j.infbeh.2022.101728.

[25] Susanto Susanto, "A Case Study of Prosodic Phrasal Grouping and Intonational Prominence in Language Acquisition," *English Review: Journal of English Education* 4, no. 2 (2016): 289–95, https://doi.org/10.25134/erjee.v4i2.342.

[26] Mira L. Nencheva, Elise A. Piazza, and Casey Lew-Williams, "The Moment-to-Moment Pitch Dynamics of Child-Directed Speech Shape Toddlers' Attention and Learning," *Developmental Science* 24, no. 1 (2021), https://doi.org/10.1111/desc.12997.

From the observation in general, it is found that there are some aspects in the child language, i.e., syllable deletion, nasal assimilation, velar fronting, lateral substitution, vowel lowering and raising, and pitch harmony. More specifically, for the syllable deletion, as discussed by Carter and Gerken,[27] English-speaking children omit the first syllable of their three-syllable word 'Cassandra.' They argue that it may be related to the initial unstressed syllable. The study by Dodd, Holm, Hua and Crosbie has also indicated that there is the deletion of weak syllables in British-English-speaking children's speech.[28] The present study, by observing the child language environment, namely the target words spoken by adults around the child, support their argument that the syllable appears to be omitted because it is not pronounced stronger than the other syllables.

For children to learn to speak takes time in development and practice in everyday situations, and the child's verbal language in their communication efforts with the environment actually connects sound with meaning.[29] Like other aspects of development, language acquisition may be unpredictable. It depends on their interaction with their surroundings because, in fact, children are born not only to talk but also to interact socially.[30]

The phonological aspects of children's language discussed in this study are certainly part of development and practice in the context of children's development in language acquisition. In this case, parents or teachers can play a role in improving children's pronunciation to help children speak and communicate[31] and stimulate[32] the experience of using language[33] especially for building vocabulary knowledge[34] which is needed in increasing children's linguistic knowledge,[35] including phonology.

[27] Carter and Gerken, "Do Children's Omissions Leave Traces?," 575.

[28] Barbara Dodd et al., "Phonological Development: A Normative Study of British English-speaking Children," *Clinical Linguistics & Phonetics* 17, no. 8 (2003): 617–43, https://doi.org/10.1080/0269920031000111348.

[29] Tiia Tulviste and Anni Tamm, "Is Silence Golden? A Pilot Study Exploring Associations Between Children's Language Environment and Their Language Skills in Estonian-Speaking Families," *Journal of Experimental Child Psychology* 207 (2021): 105096, https://doi.org/10.1016/j.jecp.2021.105096.

[30] Vibeke Grøver et al., "Do Teacher Talk Features Mediate the Effects of Shared Reading on Preschool Children's Second-Language Development?," *Early Childhood Research Quarterly* 61 (34 2022): 118–31, https://doi.org/10.1016/j.ecresq.2022.06.002.

[31] Colleen K. Vesely et al., "A Place Where My Children Could Learn to Read, Write, and Play': The Search for Early Care and Education Among Undocumented Central American Immigrant Mothers," *Early Childhood Research Quarterly* 56 (2021): 306–19, https://doi.org/10.1016/j.ecresq.2021.03.016.

[32] Alison George, "Baby Brain Expert: 'Ums' and 'Ers' Help Children Learn," *New Scientist* 210, no. 2809 (2011): 27, https://doi.org/10.1016/S0262-4079(11)60915-9.

[33] Arielle Borovsky, "Developmental Changes in How Children Generalize from Their Experience to Support Predictive Linguistic Processing," *Journal of Experimental Child Psychology* 219 (2022): 105349, https://doi.org/10.1016/j.jecp.2021.105349.

[34] Jessica Lawson-Adams, David K. Dickinson, and J. Kayle Donner, "Sing It or Speak It?: The Effects of Sung and Rhythmically Spoken Songs on Preschool Children's Word Learning," *Early Childhood Research Quarterly* 58 (2022): 87–102, https://doi.org/10.1016/j.ecresq.2021.06.008.

[35] Gyu-Ho Shin, "Awareness Is One Thing and Mastery Is Another: Korean-Speaking Children's Comprehension of a Suffixal Passive Construction in Korean," *Cognitive Development* 62 (2022): 101184, https://doi.org/10.1016/j.cogdev.2022.101184.

D. Conclusion

By analyzing the speech sounds of the children in our data, it can be found that there are some phonological aspects such as syllable deletion, nasal assimilation, velar fronting, lateral substitution, vowel lowering and raising, and pitch harmony. In the syllable deletion, the unstressed ones might be deleted either totally (Onset + Nucleus + Coda) or partially (Onset + Coda). In nasal assimilation, the articulation manner [+nasal] is adopted regressively by the modified phoneme without changing its articulation place. In the velar fronting, the velar sounds are substituted with the alveolar ones without changing their voiced feature. In the lateral substitution, the lateral approximant sound substitutes the flap sound either in the syllable onset or coda. In the vowel lowering and raising, the vowel sound in the unstressed syllable nucleus is neutralized from either high or low into mid (-High; -Low). In pitch harmony, the pitch contours of the words spoken by the child are similar to those of the words spoken by the adult.

These findings in the present study aim not to generalize the speech sound structures of the Indonesian child language but to explore the cases in the data deeply. The findings hopefully give insights into the field of language acquisition, and by reflecting on the aspects of the children's speech sounds, they might be used to motivate the enrichments of the stimulating interaction with the children and the learning materials for the students.

As the systematic analysis of speech sound structures of the Indonesian child language, this study provides a deeper understanding of the nature of age-based language development in Indonesia. Further research could compare the speech sound structure of child language of different countries or the longitudinal change throughout child language development. The findings can also shed new light on the research of phonetics and communication for promoting children's literacy programs in Indonesia.

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