A Preliminary Study on Characterizing Syntactic Processing and Pause Patterns in Bilingual English-*Bahasa Indonesia* Specific Language Impairment

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ABSTRACT

A 12-year-old boy received a diagnosis of an unspecified "language disorder," suggesting the possibility of Specific Language Impairment (SLI) along with atypical pausing behavior. Interested to find out the possibility of incorporating pausing behavior into SLI diagnosis, this research sought to explore the distinctions in pause patterns between the spoken *Bahasa Indonesia* (BI) and English of Indonesian children, utilizing data from the child with suspected SLI (sSLI) and a control group for comparative analysis. Employing a quantitative approach and analyses related to phonology, syntax, and bilingual language production, the study revealed that the child with sSLI tended to display longer and more frequent pauses than the control group, particularly during communication in BI. Despite multiple influencing factors, pause patterns had the potential to serve as an indicative tool and a means to integrate bilingualism into the diagnosis of SLI.

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1. INTRODUCTION

Specific Language Impairment (SLI) is a type of speech impairment in which the cause is not related to hearing loss, neurological problems, or a result of any primary cause. Rather, SLI itself is a primary condition that causes a person to have delayed speech and language development, making their language develop behind their age peers. A person with SLI may, for example, have difficulty organizing words, applying grammatical rules, learning new words, and formulating complex sentence structures. This often makes their speech hard to comprehend (NIDCD, 2019). Furthermore, according to Angelopoulou (2018), examining pauses could serve as an exploration of the temporal structure of speech and as an indicator of internal cognitive functions, including processes like accessing, selecting, and retrieving words, monitoring, articulatory planning, and memory. According

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to Best (2005), pauses were one of the behaviors that children with SLI engaged in when they were searching for words.

A 12-year-old boy was diagnosed with an unspecified "language disorder." This diagnosis led to a possibility of the presence of Specific Language Impairment (SLI), a speech difficulty in which no clear cause could be concluded. He was also bilingual, with *Bahasa Indonesia* as his mother tongue and English as a second language. Upon further examination and data extraction, there seemed to be an abnormality in his pause patterns, which became the focus of this study.

Pausing behavior, such as how long and frequent the pauses of a speaker are, can influence the comprehensibility and impression of a dialogue to the listener. The placement of pauses within sentences, for example, could determine their meanings and intentions (Bae et al., 2015). Furthermore, the more irregular they were, the more likely it was to be challenging for the interlocutor to be perceived positively (Kendrick & Torreira, 2015). Therefore, understanding and using pauses in the right way is essential for effective communication, as they contribute significantly to the depth of interaction.

Irregular pausing, such as producing more frequent pauses than the listeners might expect, may have been one of the indicators of the presence of SLI (Guo et al., 2008). Understanding this can help speech therapists develop their diagnosis and possibly rule out other developmental disorders. According to Sormani (2010), in addition to indicating the underlying linguistic processing, understanding and measuring speech disruptions could also distinguish how children with and without SLI develop due to the sensitive nature of the measurements.

In Indonesia, the prevalence of language and speech impairment or delay in children was estimated to be around 1% to 32% in the normal population (Dewanti et al., 2016). This number was affected by many factors, one of them being the method of diagnosis in question. Furthermore, this number also encapsulated various kinds of impairment that affected speech delay that were not exclusive to SLI. Up until now, there has not been enough exploration with the goal of developing diagnostic instruments for SLI in *Bahasa Indonesia* children (Anjarningsih & Puryanti, 2022). A repetition test was developed by Anjarningsih and Puryanti (2022) in order to identify children with speech delay from those who were developing normally. Word repetition was able to differentiate the two groups at the age of 5 years old, and non-word repetition set apart children with a speech delay from normally developing children at the age of 7 years to 1-month-old. The use of the term speech delay in Anjarningsih & Puryanti (2022) was based on Bishop et al. (2017), but instead, health practitioners often used the more general term "speech delay" to conclude their diagnosis for SLI (Daulay et al., 2022).

Additionally, the pausing behavior of a bilingual speaker who speaks English and the *Bahasa Indonesia* pair itself was also something worth exploring, considering that a spoken language may have affected the pause patterns of its speakers (Campione & Vronis, 2002). When it comes to children with SLI or sSLI who are bilingual, understanding their pauses distribution may add to the complexity of their linguistic processes. Not only can pause patterns act as a possible diagnostic tool, but making a comparison of the pause patterns of the two languages (English and *Bahasa Indonesia*) spoken by the children can also help identify language-specific difficulties that may exist.

In research on pauses, there is a general consensus that a silent interval is categorized as a "pause" if it lasts for 250 milliseconds or more. This criterion was established by Goldman-Eisler (Boomer, 1968; Stanislawski et al., 2021). While some

researchers have considered pauses of shorter duration, such intervals are deemed ineffective for this study. Pauses lasting less than 250 milliseconds might have been indicative of normal breathing patterns and may not have signified any speech-related issues in an individual (Boomer, 1968; Guo et al., 2008).

The existing studies concerning pauses of SLI children or the general population have resulted in various results. Befi-Lopes et al. did a study in (2013) and (2014). They measured the median and mean length of pauses in children's utterances. They also categorized the pauses into their positions based on word classes. The studies revealed that the duration of silent pauses was longer in children with SLI for both open and closed-class words. Furthermore, in both groups of children, silent pauses were shorter when they were placed before open-class words. In (2014), the study was redone by Pedott et al., and it resulted in the same thing.

While Befi-Lopes and Pedott et al. (2014) categorized the pauses according to their positions, Tavakoli (2011) also did a similar thing, except that the participants observed were not from an SLI group. Rather, Tavakoli compared the pauses of L2 learners to native speakers of English by categorizing them into mid-clause pauses and end-clause pauses. The study resulted in the L2 learners producing longer and more frequent silent pauses in the middle of the clause than at the end of the clause.

Although the central impairment in children with Specific Language Impairment (SLI) lay in the morphosyntactic aspects of language (Kaderavek, 2015; Rescorla & Lee, 1999), such as inflectional suffixes (progressive aspect -ing, regular past tense -ed, -s plural) and pronoun usage, investigating these aspects thoroughly in initial diagnosis might be too taxing for clinicians in Indonesia. Finding out patterns of pauses that may characterize SLI may be a more practical and feasible alternative. Indeed, Leonard (2014) stated that the existence of unusually long pauses in speech was one of the characteristics of word-finding difficulties that manifested in SLI children's school age. Therefore, determining the patterns of pauses that may differentiate the speech of children with SLI and typically developing children is of utmost importance in the development of SLI diagnostic instruments in Indonesia. In aphasia, speech rate was one of the features in the speech of speakers that were reliably rated by clinicians measuring the speakers' fluency (Gordon & Clough, 2022).

In addition to the lexical side of language processing, investigating pause patterns may also unravel syntactic diagnostic characteristics of SLI in bilingual English-*Bahasa Indonesia* speakers when the locations of the pauses were taken into account. Children with SLI encountered problems with the production of clauses (e.g., Araya et al., 2023; Frizelle & Fletcher, 2013), and investigating pause patterns within clauses and at clause boundaries would shed light on whether this was also the case in the current set of data.

Through the findings so far, there seems to be a lack of exploration of how a bilingual's pause pattern would be different in an English and *Bahasa Indonesia* pair, especially if they are someone with SLI. Therefore, this study aimed to find out the differences between children's *Bahasa Indonesia* and English pause patterns as represented by the child with sSLI and a control group to compare him with. The differences would contribute in constructing aspects for identifying and diagnosing SLI in bilingual *Bahasa Indonesia*-English speakers.

Furthermore, to give more detailed results, this study also aimed to break down and categorize the pauses into in-clause pauses and clause-boundary pauses. This was similar to what Tavakoli (2011) and Tavakoli, Nakatsuhara, and Hunter (2020) did. Tavakoli mentioned that end-clause pauses may have been associated with thought organization.

On the other hand, mid-clause pauses were more likely to be related to other kinds of linguistic and/or cognitive processes. This might give hints about the differences between the child's language processing when speaking in *Bahasa Indonesia* and English. According to Parera (2009) and Tarmini & Sulistyawati (2019), in both English and *Bahasa Indonesia*, a clause is a unit comprising at least one subject and one verb or predicate. Statistical comparisons between the performance of participants with SLI and other language disorders such as aphasia and that of control groups had been done by previous studies (Meir et al., 2015; Moscati & Vottari, 2016; Vender et al., 2016). These comparisons assisted in ascertaining that the differences between the two groups were important and not just due to chance.

Understanding these patterns not only contributed to the study of language structure but also provided insights into the ways individuals, both SLI and non-SLI, expressed themselves in diverse linguistic contexts. Thus, these research questions were formulated:

1) When speaking English and *Bahasa Indonesia*, how are the general pause patterns different in a child with sSLI?
2) When speaking English and *Bahasa Indonesia*, how are the clause-boundary and in-clause pause patterns different in a child with sSLI?

2. METHOD

This study used a quantitative approach to analyze the data. The details of the data extraction are as follows.

2.1 Participants

The participants consisted of a child with suspected Specific Language Impairment (sSLI) and a control group of three typically developing children of similar age. At the date of the data collection, the child was approximately 12 years and 7 months old. On the other hand, the Typically Developing Children (TDC) as the control group were aged from 12 years and 5 months old to 12 years and 10 months old (mean 12 years 8 months). All of them were native speakers of *Bahasa Indonesia* with high exposure to English as a language taught at school, taught in additional courses, and/or for communication at home. Each person in the control group was able to converse intelligibly without any meaningful errors in both languages and had never experienced any problems with speech and language in the past. Therefore, they were deemed fit to represent children whose language development is typical of their age.

2.2 Procedure

Each child was given five pictures as a stimulus. Each picture presented a scene of daily activities. The children were asked to come up with a story for each picture and tell it orally as long as possible in English and *Bahasa Indonesia*. Picture-based narrative tasks, such as in this case, have been used in a lot of studies. The nature of this kind of task was more complex than a short speech task in which the participants were only given a topic without any picture prompt, hence requiring more intense cognitive processing (Qiu, 2022). Also, by describing pictures, speakers could reveal their linguistic skills, such as their mastery of semantic and morphosyntactic features in a language (MacLachlan & Chapman, 1988; M. F. Westerveld et al., 2004; M. Westerveld & Gillon, 2010; Anjarningsih, Ulinnuha & Laksman-Huntley, 2023).

The task resulted in each child producing 10 separate stories. The oral narratives were recorded, and the recording of the English and *Bahasa Indonesia* narratives was then separated. Therefore, there were a total of eight recordings, two from each child, which were then analyzed separately.

An audio-processing application known as Audacity was used to process the data. First, irrelevant elements or interruptions were deleted. They included but were not limited to the participant asking a question in the middle of the speech. Then, the intervals between one story and another were also deleted. After that, following Stanislawki et al. (2021) and Boomer (1968), each silence that is equal to or longer than 250 milliseconds (0.25 seconds) was marked and categorized as either an in-clause pause or a clause-boundary pause.

2.3 Data Analysis

Following Best (2005), Angelopoulou (2018), and Gordon and Clough (2022). for the data analysis, these things were noted and calculated:

1. **Total duration of speech**
   The length of each recording, not including irrelevant interferences and intervals between one story and another
2. **Speaking rate**
   The number of words uttered in a minute
3. **Total duration of pauses**
   The length of all combined pauses in each recording
4. **Frequency of pauses**
   The number of silent pauses longer than 250 milliseconds in a recording
5. **Average duration of the pause**
   The total duration of pause divided by the frequency of pauses
6. **Proportion of pauses**
   The percentage of how much the pauses took up the entire speech

These six parameters were used to find the general characteristics of pauses uttered by the child with sSLI. The speaking rate was also included to find out whether the density of words uttered had any connection to the pause patterns and speaking ability. Normally, silent pauses happen between words. If there was any occasion of pause happening inside a word in the data, it was very rare. Therefore, word-per-minute was used instead of syllable-per-minute.

To find the in-clause and clause-boundary pause patterns, the breakdown was also made. It comprised the total duration of pauses, pause frequency, average duration of pauses, and proportion of pauses, calculated separately by the category of pauses. Furthermore, to validate the significance of the differences, the data from sSLI child and the control group were compared with One-Sample t-tests with a significance level of $< .05$.

3. RESULTS AND DISCUSSION

3.1 General Pausing Characteristics (English)

Generally, the average duration and frequency of pauses in the control group ($M = 0.8$, $SD = 0.2$) were lower than in the child with sSLI ($M = 1.15$), $t(2) = 3.4$, $p = .078$. About half of the speech uttered by sSLI consisted of silent pauses. Meanwhile, the control group's

pauses took up around a quarter of their whole speech. Furthermore, the speaking rate for the TDC (M = 135, SD = 32.6) was also higher than the sSLI (M = 77.3), t (2) = 3.1, p = .092, which indicated that in the sSLI, the silent pauses replaced the number of spoken words that the TDC normally produced.

In Table 1, significant differences were present in the total duration of pauses, frequency of pauses, and the proportion of pauses. Although the total duration and frequency of pauses may have been relative to the total duration of speech, the proportion percentages did indicate that there was a notable irregularity of pauses experienced by the sSLI child.

Table 1
Results of general pausing characteristics of the participants when speaking English

Aspect	sSLI	Control Group (TDC)				p*
		A	B	C	Mean	
Total duration of speech	4m 38.83s	4m 12.52	3m 29.16s	03m 17.24s	03m 39.67s	
Speaking rate (words per minute)	77.25	172.26	120.71	111.94	134.97	0.092
Total duration of pauses	2m 20.50s	48.67s	58.23s	1m 9.89s	58.93s	0.0056
Frequency of pauses	122	75	93	71	79.67	0.025
Average duration of pauses	1.15s	0.65s	0.63s	0.99s	0.74s	0.078
Proportion of pauses in speech	50.34%	19.27%	27.83%	35.43%	26.83%	0.039

sSLI = child with suspected SLI
TDC = Typically Developing Children
*Significance level = <0.05

3.2 General Pausing Characteristics (*Bahasa Indonesia*)

When speaking in *Bahasa Indonesia*, it could be said that the majority of the sSLI's speech consisted of silent pauses as they took up more than half of the speech. This meant that less than the remaining number (39.43%) was composed of spoken words, as other mazes, such as filled pauses, were not accounted for. The proportion of pauses by the sSLI (M = 60.6), t (2) = 15.3, p = .004 was also significantly higher than in the TDC (M = 27.6, SD = 3.7). Furthermore, there was a notable gap in speaking rate between the two groups, TDC (M = 88.7, SD = 26.3) and the sSLI (M = 32.5), t (2) = 3.7, p = .066, which also showed that the sSLI spoke less than one word per second.

Table 2
Results of general pausing characteristics of the participants when speaking *Bahasa Indonesia*

Aspect	sSLI	Control Group (TDC)				p*
		A	B	C	Mean	
Total duration of speech	9m 51.17s	4m 03.69s	4m 31.87s	2m 45.71s	3m 47.09s	
Speaking rate	32.48	112.77	60.69	92.69	88.72	0.066
Total duration of pauses	5m 58.06s	57.43s	1m 23.97s	47.16s	1m 02.85s	0.0014
Frequency of pauses	188	99	86	51	78.67	0.02
Average duration of pauses	1.90s	0.58s	0.98s	0.92s	0.80s	0.01
Proportion of pauses in speech	60.57%	23.57%	30.89%	28.46%	27.68%	0

sSLI = child with suspected SLI
TDC = Typically Developing Children
*Significance level = <0.05

Both groups of children tended to pause longer when speaking in *Bahasa Indonesia*. In terms of the English and *Bahasa Indonesia* proportion of pause, there was only a 1% discrepancy in the TDC. Meanwhile, in the sSLI, the gap was close to 10%. Here, not only were the proportions statistically significant, but the average duration of pauses also differed significantly, which did not happen in the English speech. However, despite the proportion of pauses not being significantly different in both languages, a decline occurred in the *Bahasa Indonesia* speaking rate. It occured in both sSLI and TDC. This may have indicated that other factors played a role in replacing the missing number of words. As for now, some possibilities were the increasing frequency of other mazes and the fact that the average *Bahasa Indonesia* words were longer than English words, which will be discussed later in this article.

3.3 Breakdown of Clause-Boundary Pauses and In-Clause Pauses (English)

Pauses that were considered clause-boundary pauses were those that were placed between the last word of a clause and the first word of the subsequent clause. On the other hand, in-clause pauses were those that appeared in the middle of a clause. Here are some examples: ("/" represents in-clause pause and "//" represents clause-boundary pause):

sSLI : "Emma / is playing with / butterflies // while her parents are sitting / and eating"
TDC(A) : "Dad sweeps the floor with / the broom // he usually sweeps trash and dust"

Table 3
Results of pauses breakdown based on their location in the clauses of the participants when speaking English.

Aspect	sSLI		Control Group (TDC)						Mean	
			A		B		C			
	CB	IC	CB	IC	CB	IC	CB	IC	CB	IC
Total duration of pauses (in second)	69.11	71.25	21.53	27.15	20.11	38.12	43.88	26.01	28.51	30.43
Frequency of pauses	32	90	34	41	30	63	35	36	33	46.67
Average duration of pauses (in second)	2.16	0.79	0.63	0.66	0.67	0.61	1.25	0.67	0.86	0.65
Proportion of pauses (in percent)	24.79	25.55	8.53	10.75	9.61	18.22	22.25	13.19	12.98	13.85

CB = Clause-Boundary
IC = In-Clause

In terms of proportion, the percentage of clause-boundary pauses was almost equal to the percentage of in-clause pauses in both groups. The proportion of in-clause pauses led by only less than one percent in both sSLI and TDC. It was also expected that the frequency of IC pause was higher than CB pause as there could only be one pause in a clause boundary while there could be multiple pauses within a clause. Instead, what is worth mentioning is the difference in the average duration.

For both groups, despite IC pauses (M = 57.5, SD = 24.64) appearing more frequently than CB pauses (M = 32.75, SD = 2.22), t (3) = 2.001, p = 0.09, the average duration of clause-boundary pauses (*M* = 1.78, *SD* = 0.71) was longer than that of in-clause pauses (*M* = 0.68, *SD* = 0.76), *t*(3) = 1.38, *p* = 0.21. While TDC had 0.21 seconds of discrepancy

between the two kinds of pauses, sSLI's average duration of CB pause is 1.37 seconds longer than his IC pause average. This was more than six times the gap TDC has. It also implied that sSLI took more time to move between clauses.

3.4 Breakdown of Clause-Boundary Pauses and In-Clause Pauses (*Bahasa Indonesia*)

Some examples of these pauses in this category are:

sSLI : *"Sekeluarga sedang membersihkan / sebuah kamar // ibunya sedang mengepel"*
[The family are cleaning / a room // the mother is mopping]
TDC(B) : *"Mamanya menyedia/kan makanan // terus ada keran air yang / terbuka"*
[The mother provides food // and there is a faucet that / is open]

The *Bahasa Indonesia* data also showed that the average duration of CB pauses was longer than IC pauses in both groups. There was a 3.33-second difference in sSLI and a 0.05-second difference in TDC. However, this time, there was a little bit of difference in the proportion of pauses compared to the English data.

Table 4
Results of pauses breakdown based on their location in the clauses of the participants when speaking in *Bahasa Indonesia*.

Aspect	sSLI		Control Group (TDC)						Mean	
			A		B		C			
	CB	IC	CB	IC	CB	IC	CB	IC	CB	IC
Total duration of pauses (in second)	228.26	129.80	27.48	29.95s	19.53	64.44	30.51	16.65	25.84	37.01
Frequency of pauses	54	134	44	55	23	63	26	25	31	47.67
Average duration of pauses (in second)	4.23	0.97	0.62	0.54	0.85	1.02	1.17	0.67	0.83	0.78
Proportion of pauses in speech (in percent)	38.61	21.96	11.28	12.29	7.18	23.70	18.41	10.05	11.38	16.30

CB = Clause-Boundary
IC = In-Clause

So far, sSLI's *Bahasa Indonesia* speech was the only data in which the CB pause proportion took up more duration than the IC pause proportion. This may be expected when looking at how large the gap in average pause duration is between CB pause and IC pause. In addition to that, the average pause duration of IC pauses in TDC ($M = 0.7$, $SD = 0.2$) was still shorter than the one in sSLI ($M = 1$), $t(2) = 1.6$, $p = .255$, although the difference is not statistically significant. Furthermore, if the table for English data showed that the proportion of IC and CB pause was almost equal and only had a discrepancy of less than one percent in both groups, when speaking *Bahasa Indonesia*, the typically developing children produce 4.92% more proportion of IC pause in their speech.

What could be concluded so far was that clause-boundary pauses were longer than in-clause pauses in both languages, but the frequency of the latter made it exceed the proportion of the former, except this did not apply to the SLI-suspected child when speaking in *Bahasa Indonesia*. It was because the duration of his clause-boundary pauses was so long that the frequency was no longer indicative.

3.5 Silent Pauses in Bilingual Children with SLI

The findings of this study confirmed that the child with sSLI shared similarities in pause patterns with SLI children based on previous findings, such as him having more frequent pauses (Guo et al., 2008), lower speaking rate (Redmond, 2004), and higher average duration of pauses (Befi-Lopes et al., 2013; Pedott et al., 2014) compared to his peers. This was because, as argued by Guo et al. (2008), language ability heavily influenced speech disruptions such as pauses. As a child's ability developed, they would naturally reduce their production of pauses or other disruptions. Children with SLI were considered to have lower linguistic ability compared to their peers. This hindered them from eliminating the pauses that typically developed children of their age would not produce.

How listeners perceive pauses may play a role in initial suspicion for SLI. Some studies concluded that longer pauses were associated with lower tolerance for the interlocutors; hence, the initial suspicion for SLI must not be ignored. Price (2021), for example, found that as the pause duration increased, the communication's effectiveness and likability decreased. This is especially applied in conversational situations, where the interlocutors expect immediate answers from the speakers. As reported by (Kendrick and Torreira, 2015), starting from 700 milliseconds, pauses before responses become more likely to be perceived as dispreferred (negative) responses. In turn, the shorter it takes for a speaker to respond to an interlocutor's utterance, the more likely it will be perceived positively. Most responses that are perceived positively are shorter than 300 milliseconds.

However, in continuous speech, such as in this case, there may be a different standard of how long pauses should be. Pauses, especially those that appeared within phrases, were often associated with hesitation (Duez, 1982). These kinds of pauses were referred to by Duez as hesitation pauses and could take up around 10% of the total duration of silent pauses. They were more likely to happen in spontaneous speech, such as interviews, than in elaborate speech, such as political speeches, which may have been scripted, learned, memorized, or practiced beforehand.

In this study, the children's speech fell into the category of spontaneous or semi-spontaneous speech. Although they were given some time to come up with their narratives, none of them took any notes, created any form of visual aid, or practiced before they started to speak. Therefore, there was also a probability that between those in-clause pauses, some hesitation pauses were inserted. This may have made the children's pause proportion greater than what it should have been when they had regular conversations.

Whether different languages had different standards for the duration of pauses was also something inconclusive. Here, in both groups, the average duration of pauses was longer in *Bahasa Indonesia* than in English. Interestingly, Campione & Véronis (2002) found that the mean duration of pauses in English, French, and German only differed by 0.005 seconds or less. On the other hand, compared to English, Italian pauses were shorter by 0.45 seconds, and Spanish pauses were longer by 0.1 seconds on average. It was unknown whether there was a certain factor for that, but it suggested that languages may have played a role in determining the duration of pauses to some extent. Still, what had been found here suggested little to no correlation between the duration of pauses and their pause proportion in speech. Rather, what needed to be investigated further was the speaking rate. Assuming the children's *Bahasa Indonesia* speaking rate was equal to their English-speaking rate, there was a possibility that their proportion of pauses would decrease drastically, provided that no filled pauses or other kinds of disruptions were added or subtracted.

Previously, it was mentioned that one of the causes may have been the fact that *Bahasa Indonesia* words tended to be longer than English words. This was at least true for the children's words of choice that appeared often here. These are some examples:

English	: clean	(1 syllable)
Bahasa Indonesia	: *membersihkan*	(4 syllables)
English	: cook	(1 syllable)
Bahasa Indonesia	: *memasak*	(3 syllables)
English	: feed	(1 syllable)
Bahasa Indonesia	: *memberi makan*	(5 syllables, 2 words)
English	: help	(1 syllable)
Bahasa Indonesia	: *membantu*	(3 syllables)
English	: bring/brought	(1 syllable)
Bahasa Indonesia	: *membawa*	(3 syllables)

In *Bahasa Indonesia*, a prefix of "me-" or one of its variants was needed to form a word into a proper verb in the simple present tense. This may have been one of the biggest factors that suppressed the average *Bahasa Indonesia* speaking rate on top of the fact that the root words were already longer compared to their English equivalent. Interestingly, in an experiment conducted by Krivokapić (2007), it was found that the length of a phrase did affect the pause duration adjacent to it. According to Krivokapić, the longer the phrase was, the more likely it would result in a longer pause before or after the phrase. If, as mentioned before, *Bahasa Indonesia* words were generally longer than English words in terms of syllables, it was safe to assume that *Bahasa Indonesia* phrases were also longer than English phrases as phrases themselves were composed of words. Therefore, it could be one of the reasons why children in both groups tended to produce longer pauses in *Bahasa Indonesia*.

Furthermore, it also needs to be noted that the participants were L1 speakers of *Bahasa Indonesia* who had gotten high exposure to English in their school and/or home environment. Williams & Korko (2019) found that both silent pause duration and silent pause frequency were lower in advanced learners of English as a second language. They were compared to those who had lower intermediate proficiency in English. This suggested that someone's language proficiency could have an impact on their pause patterns.

However, the examined participants in this study produced longer pauses when speaking their mother tongue, which they were assumed to have native proficiency in. Here, the child with sSLI especially presented a drastic increase in his proportion and average duration of pauses when speaking *Bahasa Indonesia*. The fact that more than 60% of his *Bahasa Indonesia* speech comprised silent pauses was naturally beyond what was expected from a 12-year-old native *Bahasa Indonesia* speaker when compared to his peers. Therefore, it may have indicated that there were different factors involved other than language proficiency.

It was also possible that the differences in pausing behavior between the two languages were caused by the typical behavior of bilinguals. A lot of bilinguals had a tendency to be more dominant in one language than the other. In addition, due to the burden of mastering two linguistic systems, they may be slower in their linguistic development compared to monolinguals (Paradis et al., 2003). However, Paradis et al. also added that bilingualism itself may not cause development delay in one of the languages they were speaking, even in children with SLI. Still, despite this fact, (Meir et al., 2015) managed to

find an occurrence where monolingual children outperformed bilingual children when they were speaking Russian. Meir et al. also added that these monolingual children had not been exposed to "cross-language interference" as much as bilinguals had experienced. Therefore, based on Paradis' explanation, it was possible that the children here had more advanced development of English linguistic skills despite having *Bahasa Indonesia* as their mother tongue.

In short, one important result that seemed to converge in the sSLI child's two languages was that the significant differences between his silent pauses and those of the control group were the frequency and proportion of the silent pauses. The sSLI child paused 1.5 times more frequently than the control children in English and 2.4 more frequently in *Bahasa Indonesia*. As for the proportion of pauses in the speech of the sSLI child, 50% of his speech in English was silent pauses and 60% in *Bahasa Indonesia*. These parameters could be used as a starting point in SLI diagnosis in the two languages.

3.6 Clause-Boundary Pauses vs. In-Clause Pauses

One consensus between the *Bahasa Indonesia* and English syntactic rules is that a clause is defined as a unit that consists of at least one subject and one verb or predicate (Parera, 2009). In a written narrative, it would be easy to determine which one was a sentence and which one is a clause. However, that was not the case with oral narratives. Therefore, a strategy that speakers often utilized and was noticed here was the frequent use of conjunctions or connectors to signal the start of a new subject-and-predicate unit.

The findings here also showed that the frequency of clause-boundary pauses was lower than in-clause pauses. As mentioned before, it was to be expected due to the fact that one clause could only have one pause, while multiple in-clause pauses may have existed within one clause. However, this actually did not align with the findings of Hawkins (1971), whose study resulted in clause-boundary pauses, especially those appearing before conjunction, being of higher frequency than pauses in other locations. Hawkins argued that it was because the speech-planning occurred at clause boundaries. Furthermore, Hawkins also mentioned the work of Halliday (1967), which explained how the clause served as the place where the structuring of the information content happened. To quote Hawkins:

> “The high frequency of pauses at clause-boundaries thus reflects the wide range of options which confront the speaker at that point. Decisions of many kinds have to be made-of content, of syntactic structure, of information distribution” (Hawkins, 1971).

If that is the case, it was only natural that the duration of clause-boundary pauses should have been longer than pauses at other places, even though the duration was not the primary matter that Hawkins observes. A child with SLI, especially, needed more time to form a clause because "they have more difficulty activating linguistic elements" (Guo et al., 2008, p.13). Guo et al. also referred to Kowal et al. (1975) about how children with SLI would utilize speech disruptions, which included pauses, to buy them time while activating these elements.

Furthermore, in English, the duration of the sSLI child's silent pauses and proportion of silent pauses in his speech were twice as long as that of the control groups. In *Bahasa Indonesia*, almost all parameters of silent pauses in clause-boundaries and in-clause were more than twice longer/bigger than those of the control groups. Therefore, it was safe to state that when parameters regarding silent pauses were twice as long/big or more between an sSLI child and an age-matched control group, this could signal the existence of SLI.

Another interesting thing about the findings in this study is that the clause-boundary pauses were always longer in both groups except for the typically developing children when speaking in *Bahasa Indonesia*, even though the comparison with English was relatively insignificant. Suppose there was any difference in English and *Bahasa Indonesia* clausal structures that may have affected pause patterns in the child with sSLI. It could be that in *Bahasa Indonesia*, in some cases, a subject was not actually necessary for a dependent clause to be called a clause. This could happen in a complex sentence where the subject of the first clause was the same as the following clause (Tarmini, 2019). This was because the subjects were assumed rather than explicitly expressed. However, the occurrence of pauses before these kinds of clauses was pretty rare in the examined children's speech. If we set aside this fact and treat the occurrences as if they happened in English, it would probably only affect the *Bahasa Indonesia* clause-boundary and in-clause pause ratio by a trivial amount.

Finally, from the breakdown of the patterns, we learned that what drastically increased the sSLI child's *Bahasa Indonesia* pause proportion was the duration of clause-boundary pauses. In the end, it may come back to Krivokapić's conclusion about longer phrases affecting the duration of pauses. Otherwise, the possible causes might have been something to do with the child's linguistic background or other factors, which need to be investigated further.

4. CONCLUSION

The study found that children with specific language impairment (sSLI) exhibited longer and more frequent pauses when speaking *Bahasa Indonesia* compared to English. Typically developing children, however, paused longer in *Bahasa Indonesia* but had similar pause frequencies in both languages. Regardless of language, children with sSLI displayed pause characteristics consistent with SLI patterns found in previous studies. Moreover, the study highlighted how analyzing silent pauses in bilingual sSLI speakers could integrate lexical and syntactic analyses, revealing difficulties in composing utterances, including halting speech within clauses and at clause boundaries. These prolonged and frequent pauses suggested word-finding and clause-planning issues in both languages. Further breakdown showed that in-clause (IC) pauses were more frequent or equal to clause-boundary (CB) pauses, which were longer. Longer CB pauses may indicate efforts to enhance speech quality and organize ideas effectively. Additionally, pause length might be influenced by adjacent phrase lengths.

Differences in pause characteristics between sSLI and typically developing children, as well as similarities between sSLI and SLI patterns, suggest the potential of pause patterns as diagnostic tools for SLI. The study aimed to determine if certain pause patterns could serve as early indicators of SLI in bilingual children. It's crucial to consider that languages may have unique pause usage, as demonstrated by previous research. Investigating language-specific characteristics, especially in *Bahasa Indonesia*, could offer further insights into silent pause usage in SLI or sSLI children. The study had scope limitations, such as not analyzing filled pauses (e.g., "um," "uh") and occasional elongated syllables, which may impact speaking rate. Additionally, detailed research on morphosyntactic deficits in bilingual *Bahasa Indonesia*-English SLI is warranted. Future studies on these topics could enhance understanding of speech rhythm and processing strategies in SLI and typically developing children.

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Authors' Contribution
Harwintha Y. Anjarningsih conceived the idea for the research, advised during the planning of the design of the research, advised during the writing of the first draft of the article, revised the first draft of the article before submitting to the journal, and revised the submitted draft according to the feedback from the editor and reviewer. Nurul Huda designed the analysis, recruited the participants in the control group, conducted the analysis, and wrote the first draft of the article. Angkita W. Kirana recruited the participant with sSLI, and collected the data from this participant.

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