A PRELIMINARY STUDY: WORD AND NON-WORD REPETITION TASKS IN CHILDREN WITH SPEECH DELAY

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ABSTRACT

This study examined the potential of using word and non-word repetition to screen children with speech delay in Indonesia. The tasks adapted Dollaghan & Campbell (1998), which was adjusted to Indonesian. There were 32 items arranged in two sets, consisting of 16 words and 16 non-words, and four items in one, two, three, and four syllables. The sets were counterbalanced across participants. The total number of phonemes in each set was 96. This research involved two children with speech delay (aged 5;0 (year;month) coded B12, and aged 7;1 coded A12); and eleven typically developing children as a control group for each of A12 and B12. The accuracy of word repetitions of all number of syllables by B12 revealed significantly lower results than the accuracy of the control group. The accuracy of non-word repetition in this group did not show any significant differences. For the group of participants aged 7 years, the word repetition revealed significant differences, although A12 had performed normally in two-syllable words. In this group, the repetition of 3- and 4-syllables non-words by participant A12 showed significantly lower results compared to the accuracy of the control group. Clinical and developmental implications in the Indonesian context were discussed.

KEYWORDS: Speech Delay, Non-word Repetition, Word Repetition, Language Disorders in Children

INTRODUCTION

Speech delay occured when a child did not achieve the expected speech milestones for their chronological age. A child might have followed a normal development or sequential pattern; however, the ability to produce speech sounds occured more slowly than usual. The primary language delay was not associated with deficits in cognition, sensory impairment, or other developmental, medical, or other genetic diagnoses. Sometimes, a child with speech delay could overcome and catch up with the delay. However, a significant number of children would exhibit long-term language-related deficits in their academic and social skills. The impact may have included difficulties in developing intelligible speech, working memory, complex vocabularies,

advanced social skills, or a strong reading comprehension (Leonard, 2014; McCormack, McLeod, McAllister, & Harrison, 2009; McLaughlin, 2011).

Nahri (2009) conducted research on the effects of speech delay in early childhood. It revealed that speech delay could lead to several issues including children being less capable of expressing their feelings or wishes, feeling awkward to join the chitchat with their peers, and being quiet. The interlocutors, such as parents, teachers, or peers, also experienced obstacles in encouraging them to talk. In addition, another impact of speech delay was likely to appear in various aspects of children's lives including social communication, emotional and behavioral regulation, and education outcomes in the future (Dockrell dan Messer, 2004; Bryant, 2009; Reed, 2018; Zengin-Akkuş et al, 2018). Speech delay was one of language development disorders ((Bishop et al., 2017), resulting in long-term negative consequences in academic, occupational, and social spheres (for example, Durkin & Conti-Ramsden, 2007). These consequences encouraged the necessity to improve clinical service, including the initial identification and remediation of the disorder. However, speech delay was known to be less detectable and still required an effective and efficient identification procedure. Several studies (Dollaghan & Campbell, 1998; Chiat & Roy, 2007; Dispaldro et al., 2013; Kalnak et al., 2014; Piché et al., 2017; Pham & Ebert, 2020) stated that non-words repetition tasks could assist in an accurate identification of language disorders, whilst additional research was still required for other languages besides European languages.

The non-word repetition is a task given in a form of audio, and children are assigned to repeat the words they heard. The following are example items for non-word repetition (Dollaghan & Campbell, 1998);

One syllable	Two syllables	Three syllables	Four syllables
/naɪb/	/teɪvak/	/ʧinɔɪtaʊb/	/veitaʧaɪdɔɪp/
/voʊp/	/ʧoʊvæg/	/naɪʧoʊveɪb/	/dævoʊnɔɪʧig/
/taʊʤ/	/væʧaɪp/	/dɔɪtaʊvæb/	/naɪʧɔɪtaʊvub/
/dɔɪf/	/nɔɪtaʊf/	/teɪvɔɪʧaɪg/	/tævaʧinaɪg/

Figure 1
Examples of non-words (Dollaghan & Campbell, 1998)

Non-words repetition tasks (Dollaghan & Campbell, 1998; Chiat & Roy, 2007; Dispaldro et al., 2013; Kalnak et al., 2014; Piché et al., 2017; Pham & Ebert, 2020) unveiled that children with language disorders experienced a remarkable deficit in non-word repetition, notably because of the length of non-words increased in the number of syllables. Children with language disorders might have not lagged far behind their peers in one- and two-syllable non-word repetitions, but this gap had become wider as the non-words repeated were three and four syllables long. This was often interpreted as a reflection of their phonological memory skills, although their performance was also influenced by speech perception, lexical knowledge, and motoric skills (Coady & Evans,

2008). This was proven with the findings that concluded that non-words repetition had a significant relationship with a child's phonological skill, for non-word repetition imitated the phonological components of children's tasks in learning new words. Children had to take the acoustic form from new words and create a strong representation to support subsequent repetition of the words, while associating this acoustic representation to the real-world reference around them (Gathercole & Baddeley, 1990; Gathercole et al, 1994; Adams and Gathercole, 1995; Dollaghan and Campbell, 1998; Casalini et al., 2007; Chiat & Roy, 2007; Miniscalco & Gillberg, 2009).

One potential advantage from non-word repetition was a cross-language possibility (Dispaldro et al., 2011). This meant that non-word scenarios could be established in various languages. This had a clearly practical potential; if non-word repetition tasks could accurately distinguish children with language disorders in a new language, the identification efforts could be streamlined in monolingual or even bilingual populations. On the other hand, non-word repetition could provide better indicators of children with language delay which could result in persistent and specific language disorders; hence, it could determine early preventive ways to minimize the deficits in children's language skills including social communication, emotion and behavior regulation, and education.

Although cross-linguistic exploration from non-words repetition had doubled recently, most studies solely focused on European languages (Marinis & Armon-Lotem, 2015). Some Asian languages had begun to be researched, such as Cantonese (Stokes et al, 2006) and Vietnamese (Pham et al, 2018; Pham & Ebert, 2020). Indonesian should also be considered for an examination, for it provided distinct linguistic characteristics, which did not exist in European languages. Checking on the performance of children in non-word repetition tasks in various languages could strongly attest to their functions in identifying language disorders, especially speech delay as well as to contribute to the understanding about the mechanism which underlied the disorder. Developing a particular language tool that enabled practitioners and experts to detect speech delay accurately was a vitally practical goal for early identifications of children.

Furthermore, it was necessary to compare the performance of non-word repetition and performance on word repetition to evaluate the potential of non-word repetition as a clinical tool as well as examine the accuracy of the repetition tasks as conducted by Chiat & Roy (2007), and Displadro et al, (2013). The words used in repetition tasks were words listed at Kamus Besar Bahasa Indonesia (Standard Indonesian Dictionary, 2021), such as 'makan', 'meja', 'kursi', 'belajar', etc. Word repetition involved activation of phonological forms from the lexical representations in long-term memory; this lexical representation did not only reflect on the phonological knowledge but also semantic knowledge. The influence of long-term knowledge on the storage of temporary words in English had been confirmed that accuracy was higher in the word repetitions compared to the non-word repetitions. The length of syllables was likely to affect the accuracy of word repetition differently in typical and clinical groups (children with speech delay). In children with normal development, based on the length of syllables, the repetition of words was not too distinct from non-word repetition (Chiat & Roy, 2007; Dispaldro et al., 2009, 2011; Metsala & Chisholm, 2010; Roy & Chiat, 2004). Nevertheless, Chiat & Roy (2007), working on comparing children who developed their language skills normally and children suffering from language delay on the tasks of original word and non-word repetition, found a significant difference between the two groups as proven from word repetition performance. Even though the

difference of word repetition was not obvious, Dispaldro (2013) concluded that there was "a greater word susceptibility in the clinical sample compared to the typical sample". This statement needed to be examined in Indonesian, whether the performance of the word repetition was different between children with speech delay and children with typical language development.

The following were the objectives of the research:

- Explaining the accuracy values of non-words and word repetition in Indonesian-speaking children.
- Comparing the performance of word and non-word repetition in children who spoke Indonesian.
- Evaluating the potential of word and non-word repetition in identifying children who experienced speech delay.

INSTRUMENT, PARTICIPANTS, AND DATA PROCESSING

Instrument

The researchers examined the participants by adapting the repetition tasks of words by Dispaldro (2011) and non-word repetition by Dollaghan & Campbell (1998) into an Indonesian version. Both instruments were arranged in the same pattern consisting of sixteen words in each set: four words in each of the four-syllables length (one, two, three and four syllables). Meanwhile, the syllables consisted of consonant-vowel and ended with consonants (CVC CVCVC, CVCVCVC, CVCVCVCVC). Each set contained 96 phonemes.

To ensure that the non-word repetition would not be influenced by the knowledge of the subject's vocabularies, non-words were created in such a way that there were no syllables (CV or CVC) corresponding to words in Indonesian. According to Dollaghan et al (1997) the dependency of non-words repetition was found in the language processing, rather than the accumulation of the language knowledge. Therefore, it was advised to avoid non-words that resembled the target language (Indonesian) but they would seem similar in phonemic structures. Both stimulus sets were coordinated with the length in phonemes, syllables, and syllable structures.

To minimize articulation difficulties, items were set up to exclude the consonant /r/ in order not to distract the process of pronouncing something, for children tended to inaccurately pronounce the following phonemes as they found difficult sounds. In addition, the consonant /r/ was one of the phonemes which were difficult for children to master. To confirm the accurate repetition of a word and non-word, there were not any consonants and vowels that appeared more than once. This was done so that children were able to say the phonemes clearly, especially in the length of 3 and 4 syllables.

The repetition tasks were provided in audio files uploaded to a laptop. The examiner and the child wore their own headset connected to the laptop to listen to the stimulus together. Before doing the task, children were given two chances to practice. Children listened to each word once and were asked to repeat the audio loudly. The task started after children had listened to the instruction: "Hello, now I will say several words. Repeat the words after me exactly as I said." The responses from the subjects were recorded using two recording tools, namely Remax RPJ voice recorder and Digital Voice Recorder to transcribe. The following is a list of the original words and

non-words. The sets were counterbalanced across participants.

Table 1
List of words and non-words

Item	1 syllable	2 syllables	3 syllables	4 syllable
Words	Bus	Balok	Ketimun	Ditemukan
	Cek	Tikus	Pelukis	Metabolis
	Nol	Gelas	Botanik	Kehidupan
	Lap	Loket	Musikal	Komunitas
Non-Words	Sub	Kolab	Numitek	Nakumetit
	Kek	Kutis	Sikulep	Silobatem
	Lon	Lages	Kinatob	Napudihek
	Pal	Tekol	Lakisum	Satinumok

The participants' answers were recorded on answer sheets. Each correct answer was given 1 point and wrong answer 0 point. In the experiment, there were several possibilities to be noted and considered as correct, for instance; the addition /ə/ in the beginning of a sentence were considered as the impact of dialects or coda alterations caused by suffix substitution /-d/ → /-t/.

Participants

Participants were 24 children with an age range of 5;0 – 7;10 (years;months). All participants lived in Depok and used Indonesian as their mother tongue. Parents and teachers reported the absence of speech delay and hearing disorders in participants in the control groups. Participant A12 (age=7;1) was diagnosed as experiencing speech delay, and A1 to A11 children were parts of the control group whose chronological age was adjusted with that of participant A12 (mean of chronological age of control group=7;4); Participant B12 (age=5;0) had a record of familial speech delay. To add, B1 to B11 children were the control group whose chronological age was adjusted with B12's (the mean of chronological age in control group=5;7). A12 and B112 children were chosen to observe the potentials of the use of repetition tasks in a child who had and had never been formally diagnosed as having speech delay. The demographic profile of the participants is provided in Table 2.

Table 2
Demographic data of participants

Code	Gender	Age	Education	Code	Gender	Age	Education
A12	M	7;1	Kindergarten	B12	M	5;0	Not yet
A1	F	7;2	Primary School	B1	F	5;1	Not yet
A2	M	7;6	Primary School	B2	M	5;0	Kindergarten
A3	M	7;0	Primary School	B3	M	6;1	Kindergarten
A4	F	7;0	Not yet	B4	M	6;0	Kindergarten
A5	M	7;0	Primary School	B5	M	6;0	Kindergarten
A6	F	7;0	Primary School	B6	F	5;0	Kindergarten
A7	M	7;4	Primary School	B7	F	6;0	Kindergarten
A8	M	7;5	Primary School	B8	M	6;0	Kindergarten
A9	M	7;8	Primary School	B9	M	5;1	Not yet
A10	M	7;8	Primary School	B10	F	5;5	Not yet
A11	F	7;10	Primary School	B11	F	6;0	Kindergarten

Data Processing

The performance of participants was assessed using the phoneme percentage method produced in a correct way (PPC: Dollaghan & Campbell, 1998). The followings are the criteria of the correct phoneme percentage according to Dollaghan & Campbell (1998): Each phoneme (consonant or vowel) was considered correct or wrong based on the accuracy (1=correct, 0=incorrect)

- The replacement and omission of phonemes were wrong, whereas phoneme distortion was considered correct.
- To observe how far a participant was able to represent the target phonemes, the addition of phonemes did not count as an error. Besides, addition, according to its definition, did not reflect on the disappearance of information of the target phonemes themselves.

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- The number of correctly repeated phonemes was divided by the total amount of phoneme target, resulting in the value of **Percentage Phonemes Correct (PPC)** for each length of word and the non-word series.

The audio recordings of ten subjects selected randomly (30%) were transcribed independently by skilled listeners. The percentage of phoneme-by-phoneme agreement of the validity assessment ranged around 91-99%, 94% as the mean, with the alpha level value of .50 < alpha < .70, namely .608. Therefore, the assessment of items was categorized as consistent (reliable).

The values were processed statistically using a software called singlism.exe.

ACCURACY VALUE OF WORD AND NON-WORD REPETITION IN INDONESIAN-SPEAKING CHILDREN

Word repetition was implemented to 24 participants. Table 3 shows the complete results.

Table 3
Accuracy values of word repetition

Code	1 syllable	2 sylla-bles	3 sylla-bles	4 sylla-bles	Code	1 sylla-bles	2 sylla-bles	3 sylla-bles	4 sylla-bles
A12	**10**	**18**	**24**	**24**	**B12**	**10**	**19**	**26**	**31**
A1	12	18	25	35	B1	12	20	28	35
A2	12	20	27	35	B2	11	19	28	36
A3	12	20	28	36	B3	11	20	27	36
A4	12	20	27	35	B4	12	20	27	36
A5	12	18	28	36	B5	12	20	28	35
A6	11	20	28	36	B6	12	20	28	36
A7	12	20	27	35	B7	12	20	28	35
A8	12	20	28	31	B8	10	20	28	35
A9	12	20	28	36	B9	12	20	28	33
A10	12	20	28	34	B10	12	20	27	35
A11	12	18	28	36	B11	12	19	28	36

The lowest value of word repetition in the range of one syllable was at 10 phonemes, and three participants got this value, namely A12, B8, and B12. A12 and B12 were children with speech delay, whereas B2 was a typically developing child. The lowest value of two-syllable repetition was 18, and this result was obtained from A1, A5, A11, and A12. The participant A12 obtained the lowest value of three-syllable repetition. In addition, the lowest value of four-syllable repetition was at the number of 24, resulting from participant A12. Unlike the results of non-word repetition, the participant with speech delay (A12) acquired the lowest values of all ranges in word repetition. Word repetition involved the activation of phonological forms from the lexical representation in long-term memory, leading participant A12 to get the values. The lexical representation did not only reflect on phonological knowledge but also semantic knowledge. The influence of long-term knowledge in temporary words storage was confirmed, since children with speech delay experienced higher accuracy deficits compared to children whose language skills were developing (English: Chiat & Roy, 2007; Metsala & Chisholm, 2010; Roy & Chiat, 2004); Italian: Casalini et al., 2007; Dispaldro et al., 2009, 2011; and Swedish: Sahlén et al., 1999).

The values of word repetition accuracy in control group A were: (1) one syllable ranged from 11 to 12 correct phonemes, (2) two syllables ranged from 18 to 20 correct responses, (3) three syllables ranged from 25-28, and (4) four syllables were around 31 to 36 correct phonemes. As a comparison, participant A12, having speech delay, repeated words with 10, 18, 24, and 24 phonemes correctly. The mean accuracy values of control group A were 11.9; 19.5; 27.5; and 35 consecutively. Control group B got the mean accuracy values around 10-12 phonemes correct from one syllable; 19-20 from two syllables; 27-28 from three syllables; and 33-36 for four syllables. To compare, participant B12 with speech delay repeated 10, 19, 25, and 31 phonemes correctly. Control group B acquired the mean of accuracy value of 9.18, 18.7; 18.73; and 32.64. By seeing participants A12 and B12, age did not affect the accuracy of word repetition, for A12, aged two years older than B12, did not get higher values.

The results of non-word repetition are shown in Table 4, with accuracy values of all participants based on the experiment of non-word repetition using Percentage of phonemes correct (PPC) method pioneered by Dollaghan & Campbell (1998).

Table 4
Results of non-word in participants' responses

Code	1 sylla-ble	2 sylla-bles	3 sylla-bles	4 sylla-bles	Code	1 sylla ble	2 sylla-bles	3 sylla-bles	4 sylla-bles
A12	**7**	**18**	**20**	**27**	**B12**	**12**	**18**	**23**	**26**
A1	12	18	26	35	B1	11	18	25	34
A2	12	20	28	35	B2	8	19	24	34
A3	12	20	28	34	B3	8	20	23	34
A4	12	18	22	33	B4	12	19	26	33
A5	9	19	21	30	B5	12	20	23	22
A6	8	17	24	31	B6	12	20	26	34
A7	8	19	23	33	B7	12	20	27	36
A8	7	18	25	32	B8	12	18	25	35
A9	9	19	24	32	B9	12	20	27	34
A10	9	18	23	32	B10	11	20	27	36
A11	10	20	25	32	B11	9	20	22	31

The results of the entire non-word repetition were acquired from 24 children, which consisted of 22 typically developing children, and 2 children with speech delay. The highest value was at the numbers of 12, 20, 28, and 36 phonemes for each number of syllables. Of the data provided in the table, the lowest value of word repetition consisting of one syllable was 7 phonemes obtained by two participants, namely A8 and A12. A8 was a typically developing child, whereas A12 was a child experiencing speech delay. The lowest value of two syllables was 17, acquired by participant A6. The lowest value of non-word repetition in the range of three syllables was 20, obtained by participant A12. Meanwhile, participant B5 acquired the lowest value of four syllable non-words, namely 22.

For control group A, the range of values for 1 syllable was 7-12 correct phonemes, for 2 syllables 18-20 phonemes were correct, for 3 syllables 21-25 phonemes were correct, and for 4 syllables 32-35 were correct. . This was compared to the repetition accuracy of participant A12 of 7, 18, 20 and 27 phonemes respectively. For the average accuracy value (mean) from control group A is 9.18; 18.7; 18.73; and 32.64 respectively.Then, for control group B, the range of values for 1

syllable was 8-12 correct phonemes, for 2 syllables 18-20 phonemes were correct, for 3 syllables 22-27 correct phonemes, and for 4 syllables 22- 36 correct. This is compared with the repetition accuracy of participant B12, namely 12, 18, 23 and 26 phonemes respectively. The means of accuracy value of control group B were 10.8; 19.3; 24.8; and 32.4 respectively. Furthermore, it appeared that the age difference of 2 years also had no effect on the performance of participants A12 and B12. Both exhibited similar accuracy values, and even the older A12 scored slightly lower.

COMPARING THE PERFORMANCE OF WORDS AND NON-WORDS REPETITION BY INDONESIAN-SPEAKING CHILDREN

For group A in one-syllable words, the statistic calculation using singlims.exe showed 9.82 as the mean of control group, 1.89 as the Standard Deviation (SD), and there were significant differences between values of participant A12 and values of control group (Significance test (Crawford & Howell[1998]) on difference between individual's value and control sample: t = -6.096; One-tailed probability $p < .05$). For two syllables, no significant differences were identified (mean control group=19.45, SD= .93; t=-1.543; $p > .05$). Nonetheless, there were significant differences from three syllables (mean control group=27.45; SD= .93; t=-3.552; $p < .05$) and four syllables (mean control group=35; SD=1.48; t=-7.116; $p < .05$).

Of non-words with one syllable, the results of group A were that the mean of control group =9.82, SD=1.89, and any differences A12's values and control groups' values were not significant (t = -1.428; one-tailed probability $p > .05$). For the two syllable items, there were not any significant differences (the mean of group control==18.7, SD=1, $p > .05$). However, significant differences (ps $< .05$) were found in three syllables (the mean of control group =18.73; SD=1) and four syllables (the mean of control group =32.64; SD=1.57).

Of words with one syllable, the mean value of control group in group B was 11.64 with its SD .67. There was a significant difference between the value of the participant B12 and control group (t = -2.344; one-tailed probability $p < .05$). Another significant difference (mean value of control group = 19.8, SD= .40, $p < .05$; t = 1.915; p $< .05$) was found in words with two syllables. The results of 3-syllables (the mean value of control group=25; SD= 1.79; t = 1.070; $p > .05$) and 4-syllable words (the mean value of control group = 33; SD= 3.90; t = 1.718; $p > .05$) showed a significant difference as well.

In group B, the task of non-words containing one syllable showed that the mean value of control group was 1 .8, and its SD was 1.67. Significant differences were not found in participant B12's value and the control group value (t = .757; one-tailed probability $p > .05$). Also, of two syllables, there were not any differences (control group value = 19.45, SD= .82, $p > .05$; t = 1.693; $p > .05$). Similar findings were shown in non-words with three syllables (the mean value of control group = 25; SD= 1.79; t = 1.070; $p > .05$) and four syllables (the mean value of control group = 33; SD= 3.90; t = 1.718; $p > .05$).

Table 5 provides a brief result of the study in this part.

Table 5
Summary of differences between control groups and participants with speech delay (+ indicated significant difference; - indicated insignificant difference)

	Group A (7 years old)	Group B (5 years old)
Words		
1	+	+
2	-	+
3	+	+
4	+	+
Non-words		
1	-	-
2	-	-
3	+	-
4	+	-

For the word repetition, there were significant differences in all syllable lengths between group control group B and participant B12. The differences were also observed in the age of 7 (group A), excluding words with two syllables. For words with two syllables, the performance of participant A12 was within the normal range. The performance of non-words in the younger (group B) did not indicate any differences in all syllable lengths. The differences showed up at the age of 7 (group A) in three- and four-syllable long non-words.

EVALUATION OF THE POTENTIAL NON-WORD AND WORD REPETITIONS IN IDENTIFYING CHILDREN SUFFERING FROM SPEECH DELAY

According to the results elaborated in the two previous sections, the pattern of general performance in two different age group was revealed. The word repetition task was seen to differentiate participants with speech delay starting from the age of 5. The differences were still identified at the age of 7, excluding words with two-syllables long. There was a possibility that it resulted from a number of Indonesian words consisting of two syllables, and a chronological development in the processing of language in participant A12. In other words, the distinct performance at the age of 7 occurred on the infrequent syllable length, namely 1 syllable, 3 syllables, and 4 syllables. There was not a difference of non-word repetition shown at the age of 5. Nonetheless, at the age of 7, the performance of non-words with three- and four-syllables long displayed differences between participant A12 and other typically developing participants.

Specifically, the result of non-word repetition exhibited that items with more than 2 syllables were likely to be used as indicators to distinguish children with speech delay from those whose language skills developed normally. By relating the results to the age of participants with speech delay, there did not seem to be any significant differences for 5-year-old participants.

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CONCLUSION

This study examined the potential of the use of word and non-word repetition tasks to screen children with speech delay in Indonesia. In general, this study added to language repertoire besides Eropean languages, and increased the number of Asian languages revealing similar results (Marinis & Armon-Lotem, 2015). The results showed that repetition tasks had a great potential to distinguish children with speech delay from typically developing children, both those who had been diagnosed as experiencing speech delay and those that had not been diagnosed but showed symtomps of speech delay. This was in accordance with previous studies (e.g., Dollaghan & Campbell, 1998; Chiat & Roy, 2007; Dispaldro et al., 2013; Kalnak et al., 2014; Piché et al., 2017; Pham & Ebert, 2020). The involvement of the research participants from two different age groups showed the potential by showing the role of syllable length to both groups. If non-words with 1, 2, 3, and 4 syllables at the age of 5 failed to differentiate children with speech delay from those whose language skills developed normally, non-words of 3 and 4 syllables were able to differentiate them in the age group of 7.

To sum up, in line with Dispaldro et. al. (2013) who concluded that there was "a greater word susceptibility in clinical samples compared to typical samples", this study revealed that word repetition of 1, 2, 3, and 4 syllables was capable of distinguishing children with speech delay and whose language skills developed normally as shown in both age groups. Furthermore, to maximize the potential of word repetition for Indonesian children, the question items should consist of two sets, namely words and non-words. Non-word repetition tasks could provide more items for 3 and 4 syllables. In addition, as a multilingual country, one potential advantage of non-word repetition was that the identification could be streamlined in bilingual populations (Dispaldro et al., 2011), and the tasks used Indonesian. The application of this potential could contribute to screen and identify children with speech delay. It was also expected to prevent difficulties in their live from happening, both academically and socially (Dockrell and Messer, 2004; Bryant, 2009; Reed, 2018; Zengin-Akkuş et al, 2018; Bishop et al., 2017; Durkin & Conti-Ramsden, 2007). Notwithstanding, further research can identify the correlation between Phonological Short Term Memory (PSTM, Dispaldo et al., 2013) by using word and non-word tasks developed in this study and incorporated more participants.

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