



The effectiveness of phonemic awareness intervention in student with dyslexia

Rexsy Taruna^{1*}

1 STIKes Mercubaktijaya, Padang, Indonesia

Abstract

The purpose of this research project was to determine the impact direct instruction in phonemic blending would have on improving phonemic blending, phonic and word reading fluency. Five dyslexic students, four boys and one girl, between 7 years and 9 years received an individually adjusted phonemic blending intervention. Phonemic awareness or blending intervention was given by a speech therapist twice a week during the intervention phase (60 minutes per session; 16 sessions; 960 minutes). All five dyslexic students in this study developed phonemic blending, phonic and word reading fluency as a result of an individually adjusted phonemic awareness intervention.

Keywords: dyslexia; phonological awareness; phonemic awareness; phonemic blending; phonic

* Correspondence to:

Rexsy Taruna, Speech Therapy Program STIKes Mercubaktijaya, Padang, Indonesia Email: rexsytaruna@mercubaktijaya.ac.id

INTRODUCTION

Written language skills are very important for a student in the context of education. Unfortunately, some students have low academic achievement because their reading ability levels are not on a par with their peers. This condition is known as a specific learning disorder with impairment in reading or dyslexia (APA, 2013). Dyslexia is a language-based learning disability that has a negative impact on academic achievement, characterized by specific difficulties in accurate and/or fluent word recognition and by poor spelling and decoding abilities (APA, 2013). These difficulties are not attributable to low intelligence, lack of educational opportunities, socio-cultural environment, or obvious neurological deficits (Navas, Ferraz, & Borges, 2014).

Phonological awareness deficits are a major cause of reading disorders in dyslexia (Melby-Lervåg, Lyster, & Hulme, 2012; Knoop-van Campen, Segers, & Verhoeven, 2018). Phonological awareness deficits that affect reading and spelling accuracy do not only occur in children who speak English, but also occur in children who use Bahasa Indonesia (Jap, Borleffs, & Maassen, 2017). This happens because Bahasa Indonesia has a high level of orthographic transparency with an almost one-to-one grapheme-to-phoneme correspondence, except for the letter "e," which has two sound forms "ə" (səpeda/bicycle) and "e" (meja/table) (Winkel & Widjaja, 2007).

Phonological awareness is the umbrella term that refers to the ability to identify, discriminate, and manipulate oral language units at the word, syllable, and phoneme level (Mather & Wendling, 2012). Phonological awareness is crucial in learning to read, especially phonemic awareness (Melby-Lervåg, Lyster, & Hulme, 2012). Phonemic awareness is a subset of phonological awareness that refers specifically to the ability to blending, segmenting, and manipulate the phoneme within words (Hulme et al, 2012). For instance, the word pulau has four sounds or phonemes; /p/ /u/ /l/ /aw/. Phonemic awareness is of awareness of sounds, not letters. The word pulau has five letters, but we hear only four phonemes when the word is spoken.

Phonemic awareness contributes to the accurate acquisition of word reading, nonword reading and spelling skills. It helps student understand grapheme-phoneme correspondence (Mather & Wendling, 2012; Torgesen & Mathes, 2000). Therefore, it is very important for dyslexic students to receive systematic phonemic interventions because this type of interventions make a significant difference in reading ability (Melby-Lervåg, Lyster, & Hulme, 2012; Layes, Lalonde, & Rebai, 2015; Bishop & Snowling, 2004).

METHOD

Participants

The participants were recruited from the Speech Therapy Practice at Pekanbaru, Riau.

The inclusion criteria were:

- ◆ Age 7 – 9 years
- ◆ Using Bahasa Indonesia
- ◆ Dyslexia with or without developmental language disorders
- ◆ The diagnostic criteria for dyslexia in this study consisted of specific difficulties in accurate and/or fluent word recognition and poor spelling and decoding abilities
- ◆ The diagnostic criteria for developmental language disorders in this study consists of specific difficulties in receptive and/or expressive language and by average performance in nonverbal intelligence based on psychologist diagnostic report
- ◆ Phonological blending ability at the syllable level

All five student, four boys and one girls, age 7 years 0 month to 9 years 11 month fulfilled the inclusionary criteria.

Instrument(s)

Phonemic blending, phonic and word reading fluency were measured using the Asesmen Membaca Awal (Early Reading Assessment). Asesmen Membaca Awal (Early Reading Assessment) is a criterion-referenced test, using Indonesian language.

- ◆ **Phonological blending**—Phonemic blending is a test that aims to identify a child's ability to combine sounds into a word. This test consists of 10 items with various Indonesian syllable patterns. A score of 1 is given to items that are answered correctly and a score of 0 is given to an incorrect response.
- ◆ **Phonic**—Phonic is a test that aims to identify a child's ability to name letters based on their sounds. This test has 30 items consisting of vowels, consonants, and diphthongs in Indonesian. A score of 1 is given to items that are answered correctly and a score of 0 is given to an incorrect response.
- ◆ **Word reading fluency**—Word reading fluency is a test that aims to assess a child's ability to read words accurately and quickly. This test has 20 items consisting of various Indonesian syllable patterns. A score of 1 is given to items that are answered correctly and a score of 0 is given to an incorrect response.
- ◆ **Data collection procedures**—This study. This study has a single-subject multiple-baseline design across behaviours replicated across five participants. The baselines were established by measuring the dependent variables on two occasions (twice a week) prior to the intervention. Phonemic awareness or blending intervention was given by a speech therapist twice a week during the intervention phase (60 minute per session; 16 session; 960 minute). The dependent variables were measured every

therapy session. All dependent variables were measured on two occasions (twice a week) post-intervention and at a follow-up 1 month later.

Table 1: Sample Instructional Sequence of Phonemic Blending

Instructional feature	What to do	Explicit instruction
Introduce the activity	Show students the puppet and explain the task.	"This is our puppet, Buster. He's still learning how to blend the sounds in words, so you're going to show him how to do it. He'll say the sounds in a word and you say the whole word."
Model explicit examples	Use the puppet to present the phonemes.	Have the puppet say /p/ /u/ /l/ /a _w /, then you say, " <i>pulau (island)</i> " Continue with in.
Provide students opportunities	Provide group turns on the remaining items in the instructional set	"Now Buster will say the sounds and you tell him the whole word." "Have the puppet say /p/ /i/ /s/ /a _w /, then ask, "What word did you hear? <i>pisau (knife)</i> . Repeat with remaining items in set.
Assess understanding	Provide individual turns. Present items in a different order than previously introduced.	Follow procedures for providing students opportunities
Ongoing assessment and feedback	Provide feedback during group and individual practice: Model the correct response, have students repeat the correct response, and review the item at least twice more or until students are sure of the correct response.	Provide feedback on blending. If a student says a phoneme or the whole word incorrectly, tell them the word, repeat the phonemes and whole word, say the phonemes again, and have them repeat the whole word. "The word is <i>pulau</i> . /p/ /u/ /l/ /a _w /, <i>pulau</i> . Now you try. /p/ /u/ /l/ /a _w /." <i>Pulau</i> . "Yes, <i>pulau</i> ."
Review	Provide individual turns on today's target sound.	Follow procedures for providing students opportunities

In this study, the researcher uses the phonemic blending intervention (blending phoneme by phoneme) protocol from The University of Texas Center for Reading & Language Arts/UTCRCLA (2004). The selection of this intervention protocol is based on the criteria as follows; (1) explicit, direct instruction that is systematic, sequential, and cumulative; (2) individualized instruction that meets the specific learning needs of each student (3) intensive, highly concentrated instruction that maximizes student engagement; and (4) multisensory instruction (UTCRCLA, 2004).

Data analysis

Analysis descriptive and paired samples t-test was conducted to evaluate the difference between the pretest and posttest scores.

RESULTS

Five student with dyslexia were included in the study (Table 2). Based on descriptive analysis, the difference in pretest and posttest scores is known on each dependent variable (Table 3). These differences can also be seen in Figure 1 – Figure 3 (Descriptives Plots). Furthermore, the paired samples t-test analysis showed that there was a significant difference between the pretest phonemic blending and the posttest phonemic blending ($t = -8.573$; $p < 0.01$), pretest phonic and posttest phonic ($t = -17.493$; $p < 0.01$), pretest word reading fluency and post test reading fluency ($t = -12.944$; $p < 0.01$).

Table 2. Participants

	Subject I	Subject II	Subject III	Subject IV	Subject V
Age	7 years	7 years	7 years	7 years	9 years
Gender	Male	Male	Male	Male	Female
Dyslexia	Without DLD	Without DLD	Without DLD	With DLD	With DLD

Table 3. Descriptive Analysis

	Pretest PB	Posttest PB	Pretest Phonic	Posttest Phonic	Pretest WRF	Posttest WRF
N	5	5	5	5	5	5
Mean	0.800	5.000	3.000	23.400	3.600	10.200
SD	0.447	1.225	1.000	3.362	1.140	1.304

Note. PB (phonemic blending); NWF (word reading fluency)

Table 4. Results of the paired samples t-test

Pretest	Posttest	<i>t</i>	<i>p</i>
Phonemic blending	Phonemic blending	-8.573	<.0001
Phonic	Phonic	-17.493	<.0001
Word reading fluency	Word reading fluency	-12.944	<.0001

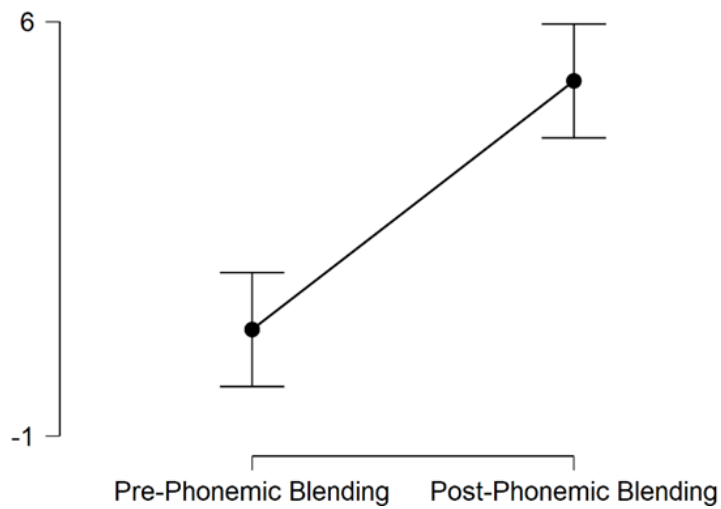


Figure 1. Descriptives Plots of Phonemic Blending

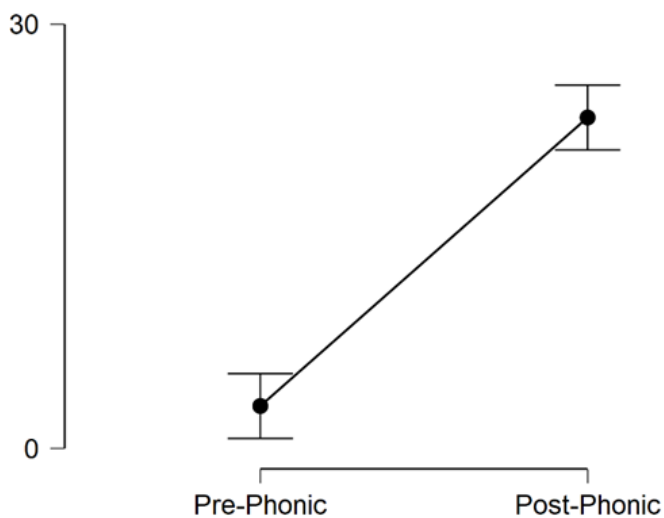


Figure 2. Descriptive Plots of Phonic

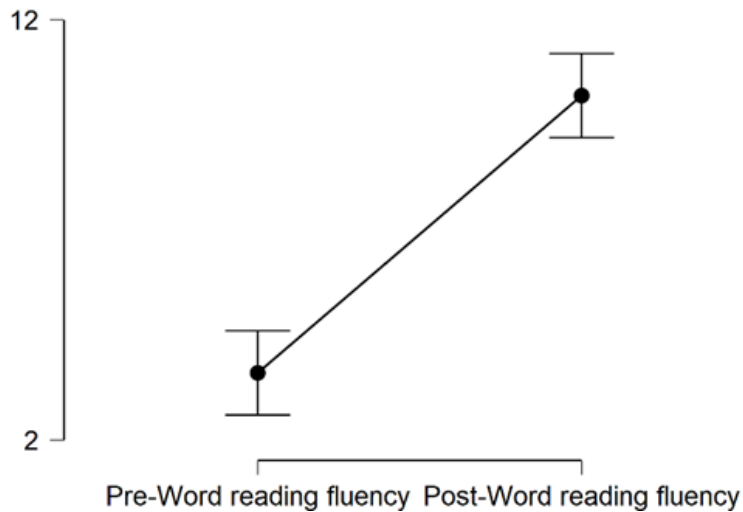


Figure 3. Descriptives Plots of Word Reading Fluency

Subject I-III: Dyslexia only

The first to third participants in this study were students with dyslexia without comorbid developmental language disorders. In Figures 4 to 6, it can be seen that there is an increase in phonemic blending, phonic, and word reading fluency in the intervention phase (3-18) when compared to the baseline phase (1-2). After receiving 16 intervention sessions (19-20), improvements occurred in all dependent variables. Post-intervention (19-20) and follow-up (21-22) generalization probe data showed that the treatment effect was maintained.

Subject IV-V: Dyslexia with developmental language disorders

The fourth and fifth participants in this study were students with dyslexia with comorbid developmental language disorders. In Figures 4 to 6, it can be seen that there is an increase in phonemic blending, phonic, and word reading fluency in the intervention phase (3-18) when compared to the baseline phase (1-2). After receiving 16 intervention sessions (19-20), improvements occurred in all dependent variables. Post-intervention (19-20) and follow-up (21-22) generalization probe data showed that the treatment effect was maintained.

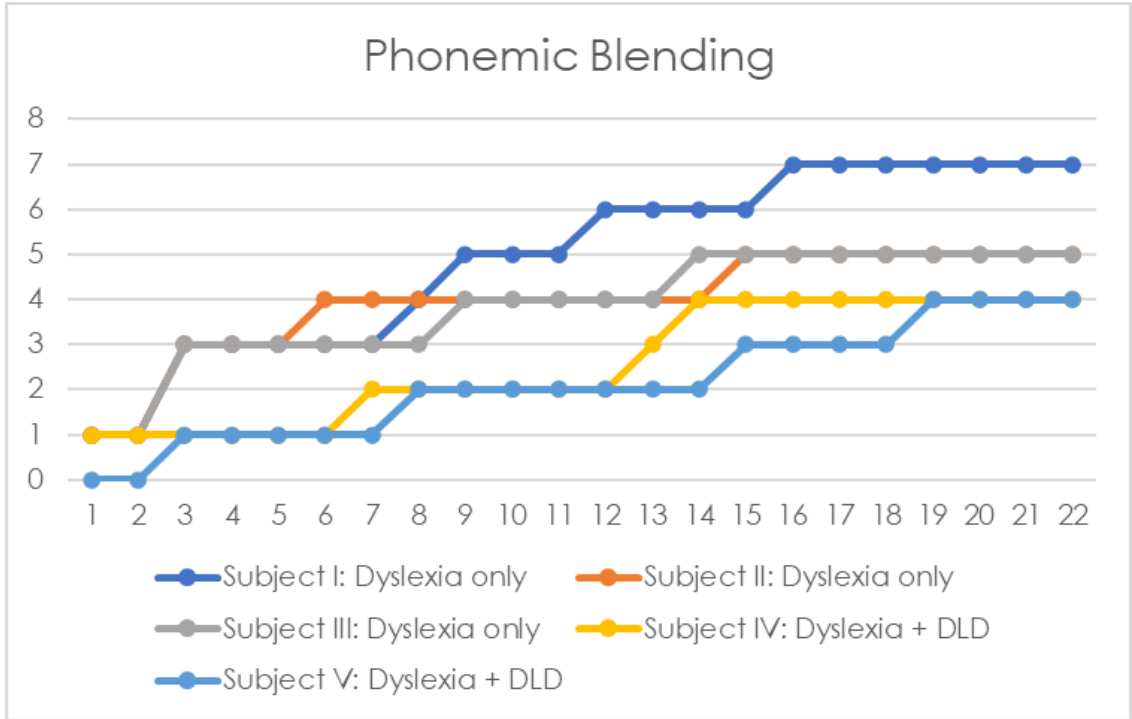


Figure 4. Phonemic Blending

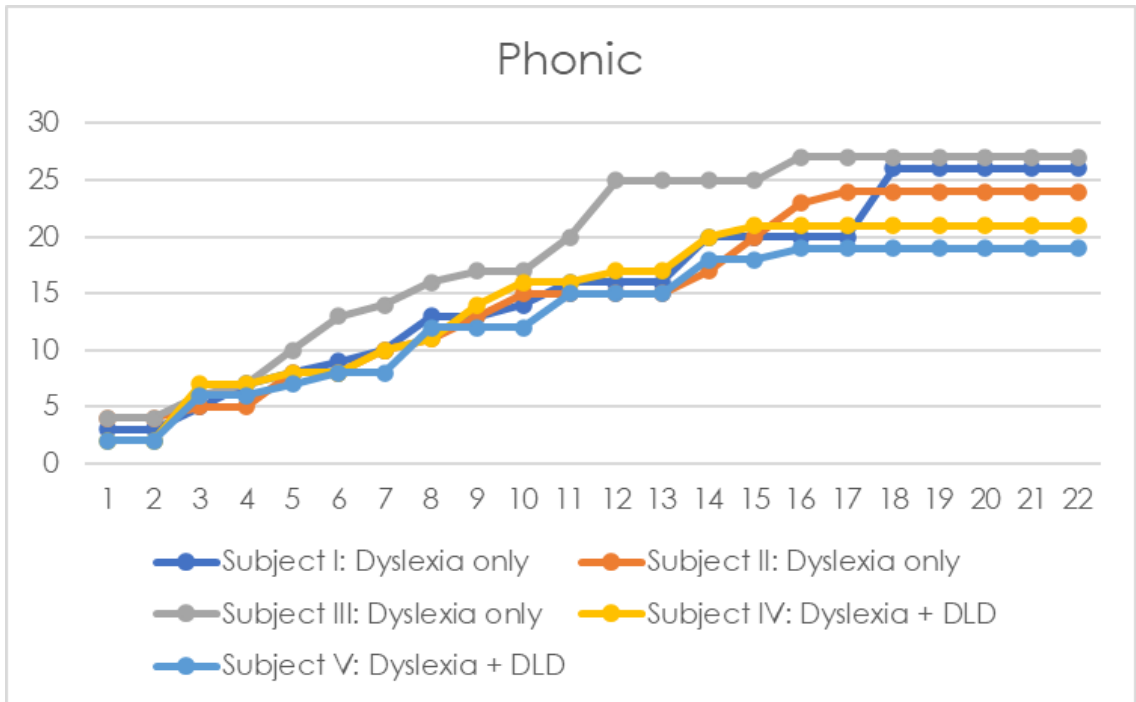


Figure 5. Phonic

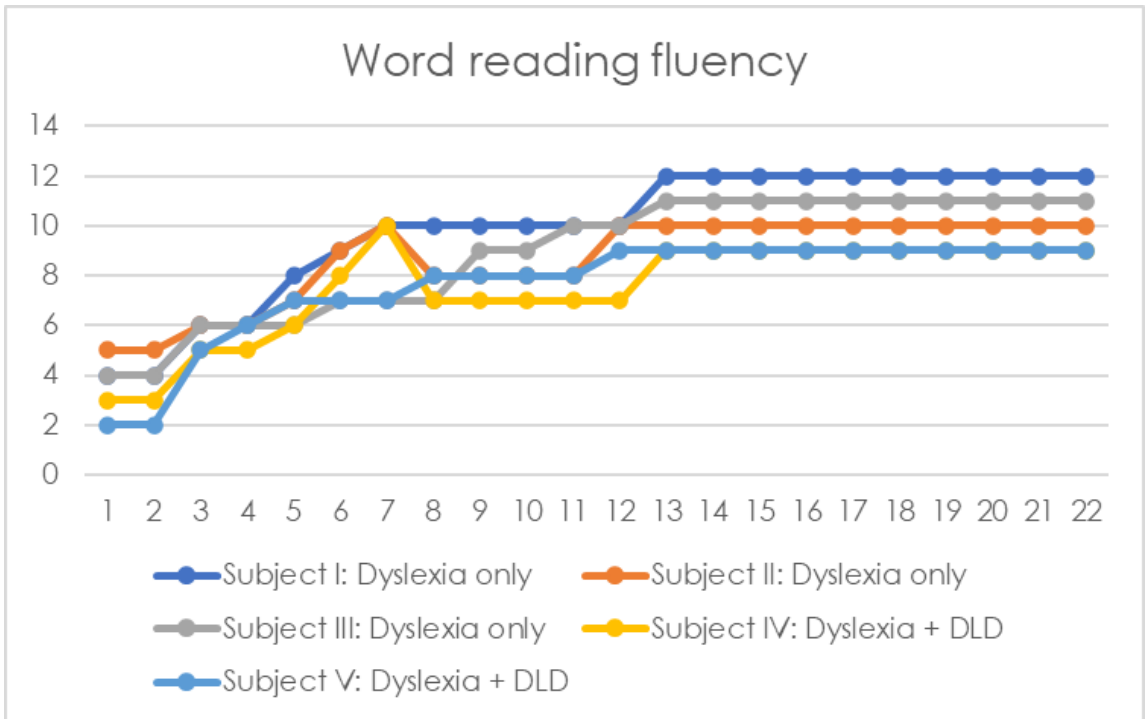


Figure 6. Word reading fluency

DISCUSSION

This study identified that dyslexics without comorbidities and dyslexics with comorbid developmental language disorders obtained significant benefits after receiving 960 minutes of phonemic blending intervention. Phonemic awareness and reading ability have a positive relationship. The higher the phonemic awareness, the higher the reading ability (Miller, Sanchez, & Hynd, 2003). In a meta-analysis research, it was found that there was a significant effect of the phonemic intervention on early reading ability (NICHD, 2000). Furthermore, the effectiveness of the phonemic awareness intervention on early reading ability was significantly better in Pre-K and grade 1 students. In particular, this study showed that Subject V who was 9 years old showed the lowest phonic performance and word reading fluency.

This study also found that phonic ability in dyslexics with comorbid developmental language disorders was 6 points lower than dyslexics without comorbidities. The same thing was found in ability on word reading fluency in dyslexics with comorbid language development disorders 2 points lower when compared to dyslexics without comorbidities. Differences in phonic and word reading fluency between dyslexics without comorbidities and dyslexics with comorbidities occur because of differences in phonological memory abilities..

Phonological memory is one of the most important phonological processing abilities for reading skills (Torgesen & Burgess, 1998; Wagner & Torgesen, 1987). Phonological memory skills consist of verbal short-term memory and verbal working memory. Taruna & Syaf (2018) in their study found that dyslexics without comorbidities only had a deficit in verbal working memory (VWM), while verbal short-term memory (VSTM) abilities were within normal limits. In contrast to dyslexics with comorbid developmental language disorders, who have deficits in two phonological memory abilities, namely VSTM and VWM.

CONCLUSIONS

The purpose of this research project was to determine the impact direct instruction in phonemic blending would have on improving phonemic blending, phonic and word reading fluency. The children in general have benefited from the 16 sessions of intervention through the exposure to phonemic blending intervention. All five children in this study developed their phonemic blending, phonic and word reading fluency as a result of an individually adjusted phonemic awareness intervention.

REFERENCES

- American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition: DSM-5* (5th ed.). American Psychiatric Publishing
- Bishop, D. V. M., & Snowling, M. J. (2004). Developmental Dyslexia and Specific Language Impairment: Same or Different? *Psychological Bulletin*, *130*(6), 858–886. <https://doi.org/10.1037/0033-2909.130.6.858>
- Hulme, C., Bowyer-Crane, C., Carroll, J. M., Duff, F. J., & Snowling, M. J. (2012b). The Causal Role of Phoneme Awareness and Letter-Sound Knowledge in Learning to Read. *Psychological Science*, *23*(6), 572–577. <https://doi.org/10.1177/0956797611435921>
- Jap, B. A. J., Borleffs, E., & Maassen, B. A. M. (2017). Towards identifying dyslexia in Standard Indonesian: the development of a reading assessment battery. *Reading and Writing*, *30*(8), 1729–1751. <https://doi.org/10.1007/s11145-017-9748-y>
- Knoop-van Campen, C. A. N., Segers, E., & Verhoeven, L. (2018). How phonological awareness mediates the relation between working memory and word reading efficiency in children with dyslexia. *Dyslexia*, *24*(2), 156–169. <https://doi.org/10.1002/dys.1583>
- Layes, S., Lalonde, R., & Rebai, M. (2015). Effectiveness of a Phonological Awareness Training for Arabic Disabled Reading Children: Insights on Metalinguistic Benefits. *Bellaterra Journal of Teaching & Learning Language & Literature*, *8*(4), 24. <https://doi.org/10.5565/rev/jtl3.621>
- Manther, N., & Wendling, B. J. (2012). *Essentials of Dyslexia Assessment and Intervention* (1st ed.). Wiley
- Melby-Lervåg, M., Lyster, S. A. H., & Hulme, C. (2012). Phonological skills and their role in learning to read: A meta-analytic review. *Psychological Bulletin*, *138*(2), 322–352. <https://doi.org/10.1037/a0026744>

- Miller, C. J., Sanchez, J., & Hynd, G. W. (2003). Neurological correlates of reading disabilities. In H. L. Swanson, K. R. Harris, & S. Graham (Eds.), *Handbook of learning disabilities* (pp. 242–255). New York, NY: Guilford Press
- National Institute of Child Health and Human Development (NICHD). (2000). Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: Reports of the subgroups (NIH Publication No. 00-4754). Washington, DC: U.S. Government Printing Office. Retrieved November 11, 2005, from <http://www.nichd.nih.gov/publications/nrp/report.htm>
- Navas, A. L. G. P., Ferraz, R. D. C., & Borges, J. P. A. (2014). Phonological processing deficits as a universal model for dyslexia: evidence from different orthographies. *CoDAS*, *26*(6), 509–519. <https://doi.org/10.1590/2317-1782/20142014135>
- Taruna, R., & Syaf, A. (2018). Working and Phonological Memory in Dyslexia and SLI Children in Indonesia: Preliminary Studies. *Asia Pacific Journal of Developmental Differences*, *5*(2), 177–188
- Torgesen, J. K., & Burgess, S. R. (1998). Consistency of reading-related phonological processes throughout early childhood: Evidence from longitudinal–correlational and instructional studies. In J. L. Metsala & L. C. Ehri (Eds.), *Word recognition in beginning literacy* (pp. 161–188). Mahwah, NJ: Erlbaum
- Torgesen, J. K., & Mathes, P. M. (2000). *A basic guide to understanding, assessing, and teaching phonological awareness*. Austin, TX: PRO-ED.
- UTCRLA. (2004). *Reading Strategies & Activities Resource Book. For Students at Risk for Reading Difficulties, Including Dyslexia*. University of Texas System
- Wagner, R. K., & Torgesen, J. K. (1987). The nature of phonological processing and its causal role in the acquisition of reading skills. *Psychological Bulletin*, *101*(2), 192–212. <https://doi.org/10.1037/0033-2909.101.2.192>
- Winkel, H., & Widjaja, V. (2007). Phonological awareness, letter knowledge, and literacy development in Indonesian beginner readers and spellers. *Applied Psycholinguistics*, *28*(1), 23–45.