

Şaziye Seçkin Yılmaz. (2021). A Study on Dyslexia-Related Knowledge Levels of Speech Language Therapist Candidates. *International Journal of Early Childhood Special Education (INT-JECSE)*, 13(1): 54-61. DOI: 10.9756/INT-JECSE/V13I1.211007

Received: 16.10.2020 Accepted: 12.12.2020

Şaziye Seçkin Yılmaz¹

A Study on Dyslexia-Related Knowledge Levels of Speech Language Therapist Candidates

Abstract

Dyslexia, which states learning difficulties in reading, is a language-based disorder. The studies show that individuals with dyslexia experience significant difficulties in oral language skills other than phonology, in addition to phonological processing and reading problems. Therefore, speech language therapists play a crucial role in the diagnosis, evaluation and intervention processes of dyslexia. The aim of this study is to examine the dyslexia-related knowledge levels of speech language therapist candidates. The participants of the study consist of 92 fourth-grade students who continue their education in language and speech therapy undergraduate programs. To collect the data, "Questionnaire for Determining Dyslexia-Related Knowledge Level" was used. It was seen that the majority of the participants answered the majority of the questionnaire items correctly, but the incorrect and incomplete information about dyslexia was common among the therapist candidates, and the significant number of the therapist candidates did not know the language and speech problems in individuals with dyslexia. It was found that the dyslexia-related knowledge levels of the candidates who took a course on dyslexia during their undergraduate education were higher than that of the candidates who did not. The results of the study provide important information on the dyslexia-related knowledge and education levels of the speech language therapist candidates. The fact that the candidates who took a course on dyslexia during their undergraduate education have a higher level of knowledge on it reveals the importance of the courses given in the undergraduate programs in terms of the management of dyslexia which is a very common disorder. Considering the importance of speech language therapists in the evaluation and intervention processes of dyslexia, the results were discussed in line with the literature and suggestions for implementation and research were presented.

Keywords: Speech and Language Therapy, Learning Disability, Reading Disorder, Dyslexia.

Introduction

Dyslexia, which is under the category of specific learning difficulties, means learning difficulties in reading. Dyslexia is the learning difficulty that the individual have in learning and developing reading skills despite having a normal or higher level of intelligence, no disability (visual impairment, hearing impairment or neurological damage), and having a sufficient education on reading (American Psychiatric Association (APA), 2013). When learning to read, individuals with dyslexia have serious problems in learning to establish letter-sound relationships, establishing letter-sound relationships correctly, decoding

words, reading fluency, and reading comprehension (Hulme and Snowling, 2016). The prevalence of dyslexia, which is the most common type of learning difficulties, is stated to be 5-17% (Elliott and Grigorenko, 2014).

Attention deficit and hyperactivity disorder (Langer, Benjamin, Becker and Gaab, 2019; McGrath and Stoodley, 2019), speech sound disorder (Cabbage, Farquharson, Iuzzini-Seigel, Zuk and Hogan, 2018), dysgraphia (Döhla & Heim, 2016), dyscalculia (Göbel, 2015), developmental language disorder (Snowling et al., 2019) are the disorders that often accompany dyslexia. Dyslexia is a neurodevelopmental

Şaziye Seçkin Yılmaz¹, Faculty of Health Sciences, Department of Speech and Language Therapy, Uskudar University, Turkey. Email: saziye.seckinyilmaz@uskudar.edu.tr

disorder with a genetic transmission (D'Mello and Gabrieli, 2018; Eden, Olulade, Krafnick and Alkire, 2016). The exact causes of dyslexia are unknown, but the reading problems are explained with difficulties in the phonology component of language. Therefore, dyslexia is defined as a language-based disorder (Hamilton, 2017; Snowling and Melby-Lervåg, 2016).

The problems that individuals with dyslexia experience in reading negatively affect their success in other academic areas, too. Early diagnosis and appropriate intervention are crucial for individuals with dyslexia to cope with their difficulties. When appropriate interventions are not provided, the probability of individuals with dyslexia to continue their education decreases (Grigorenko, 2006). The problems arising from dyslexia affect not only the education life of the individual but also their professional and adulthood life (APA, 2013; Mortimore and Crozier, 2006).

Diagnosis of dyslexia is made when the children start having significant difficulties in learning and improving their reading skills, after they start school and have sufficient reading education. However, the findings of the studies examining the preschool behavioural characteristics of children diagnosed with dyslexia in the school period and analysing the predictors of dyslexia reveal that the most important predictors of dyslexia are related to language skills (Hulme and Snowling, 2016; Snowling and Melby-Lervåg, 2016; van Viersen et al., 2017). Speech delay, language disorder, speech sound disorder, problems at phonological processing skills, and family history of dyslexia are important predictors of dyslexia (Flax, Realpe-Bonilla, Roesler, Choudhury and Benasich, 2008; Puolakano et al., 2007). The fact that these predictors include language and speech skills reveals the importance of recognizing language problems experienced in the preschool period and monitoring children with problems in language skills in terms of the risk of dyslexia.

Language and early literacy interventions that are performed to the children under the risk of dyslexia before the children start school or in the first grade, before they are diagnosed, are much more effective than the interventions after the diagnosis. In other words, when the diagnosis of dyslexia is made, the period in which the intervention is most effective is missed. This situation is called the "dyslexia paradox" (Ozernov-Palchik and Gaab, 2016). Dyslexia paradox shows the importance of evaluating and supporting language skills in the intervention for dyslexia. Besides, the evidence-based interventions performed for dyslexia after the diagnosis are not only the ones for reading skills, but also those where reading and language skills are addressed in an individualized, systematic

and comprehensive way (Grigorenko et al., 2020; Snowling and Hulme, 2012).

Speech language therapists are among the most important elements of the team in the evaluation, diagnosis, and intervention processes of dyslexia which is a language-based reading disorder, and of language and speech disorders that often accompany dyslexia. In the Speech and Language Therapy National Core Education Program of Turkey (2016), it is stated that the therapists who graduate from the department of language and speech therapy should have the competence to be able to make functional evaluations, differential diagnosis, and intervention of dyslexia. Among the duties and responsibilities of speech language therapists during dyslexia management, there are: preventing reading problems of children with reading difficulties by supporting their language and early literacy skills; identifying children in the risk group for reading difficulties; evaluating their reading skills; conducting interventions relating their reading skills; reporting the results; and consulting the families and other professionals working with the dyslexic children. (American Speech, Language and Hearing Association, 2001).

Although speech language therapists have important roles and responsibilities in the management of reading and reading disorders, it is seen that there is a limited number of studies in the literature where their knowledge levels on reading skills and reading disorders are analysed. In one study on the dyslexia-related knowledge level of professionals working with individuals with dyslexia, it was revealed that the participant speech language therapists did not take any course about reading skills and dyslexia during their education, their knowledge levels about reading and language skill characteristics of individuals with dyslexia were high, but incorrect information that may adversely affect the evaluation and intervention processes for dyslexia was common among the speech language therapists (Seçkin Yılmaz, 2019). In a study on the education, knowledge, and self-confidence levels of American speech language therapists regarding written language disorders, the therapists who graduated in earlier periods did not take courses for written language disorders during their education, they learned about these disorders during their practices, and the therapists who had knowledge on the issue were more self-confident. (Blood, Mamett, Gordon and Blood, 2010).

The knowledge and competences of the professionals who work with written language disorders including dyslexia affect the success and academic outcomes of the individuals they work with (Moats, 2009). Therefore, when the dyslexia-related knowledge levels of speech

language therapists are high before starting to work, this is expected to increase the quality of their practices, their self-confidence, and the therapy outcomes of the individuals whom they work with. Based on these importance and requirements, this study aims to examine the levels of dyslexia-related knowledge of speech language therapist candidates. For this purpose, answers were sought for the following questions:

1. What is the dyslexia-related knowledge level of speech language therapist candidates?
2. Do the speech language therapist candidates' knowledge level regarding dyslexia differ depending on whether or not having taken a course on dyslexia during their education?

Method

Research Design

Examining the pre-service dyslexia-related knowledge levels of speech language therapists, this study was conducted in screening design which is one of the descriptive research methods.

Participants

The study participants consist of 92 fourth-grade students who continue their undergraduate education in the department of language and speech therapy in the universities in Turkey. Table 1 shows the details of the participants' gender and status of whether or not having taken a course on dyslexia.

Table 1.

The participants' details

Variable (n=92)	Frequency (n)	Percentage (%)
Gender		
Female	82	89.1
Male	10	10.9
Whether or not having taken a dyslexia-related course		
Took	42	45.7
Did not Take	50	54.3

Data Collection Tool

In the data collection, "Questionnaire for Determining Dyslexia-Related Knowledge Level", which was developed by Seçkin Yılmaz (2019) in order to examine the dyslexia-related knowledge levels of professionals who take a role in the evaluation and intervention process for individuals with dyslexia, was used. The questionnaire consists of 30 items about the

definition and causes of dyslexia and the characteristics of individuals with dyslexia, which are answered as "yes", "no", or "I don't know".

To collect the data, the questionnaire was made online. A detailed consent form regarding the purpose of the study and the content of the questions was added to the introduction part of the online questionnaire. After the consent form, three questions are asked to participants about the university they are currently studying, their gender, and whether or not they took a course on dyslexia during their education. These questions are followed by the questionnaire items.

Data Collection

The participants were contacted through the social media accounts followed by language and speech therapy students, and the link for the online questionnaire was sent to the students who wanted to participate in the study. In addition, the classroom representatives of the fourth graders at the departments of language and speech therapy were contacted and was given information about the study, and they were asked to share the link of the questionnaire in the communication environments of their class.

Data Analysis

After the data collection, the data was downloaded from the questionnaire link in Microsoft Excel file format and transferred to the 24th version of the "Statistical Package for the Social Sciences (SPSS)". The frequencies and percentages according to their gender and status on whether or not having taken a course on dyslexia during their education were calculated. Then, the frequencies and percentages of the participants who answered each item correctly were calculated. To analyse the knowledge level of the participants according to whether or not having taken a course on dyslexia, the correct answers given to the questionnaire items were scored with "1", the incorrect answers and the answers as "I don't know" were scored with "0", and the participants' total knowledge scores from the questionnaire were calculated. The distribution between the total scores of the participants who took a course on dyslexia and the total scores of those who did not was studied with Kolmogorov-Smirnov and Shapiro-Wilk tests. Since the normality test results showed that the total scores of the groups did not have normal distribution, Mann Whitney U Test for Independent Samples was used to examine the significance of the score difference between the groups. In calculating the effect size related to the differences between the groups, $r = z/\sqrt{N}$ formula was used while Cohen's (1988) criteria were used for the interpretation. Accordingly, for the effect

size, 1 was taken as small, .3 as medium, .5 as high.

Table 2 shows the items in the questionnaire and the frequencies and percentages of the participants who answered these items correctly.

Results

Examining the Participants' Answers to the Questionnaire Items

Table 2.

The frequencies and percentages of the participants who answered the questionnaire items correctly

Items	Frequency (n)	Percentage (%)
1. Dyslexia is a learning difficulty in reading.	77	83.7
2. Problems in language skills are the basis of dyslexia.	58	63.0
3. The exact causes of dyslexia are known.*	60	65.2
4. Dyslexia can also be caused by reading less, insufficient reading education, and parents not reading at home.*	75	81.5
5. Children of parents with dyslexia are more likely to have dyslexia	55	59.8
6. Dyslexia is a rare learning difficulty.*	53	57.6
7. Dyslexia is more common in left-handed people.*	30	32.6
8. The most important difficulty experienced by individuals with dyslexia is seeing letters and words in reverse.*	33	35.9
9. Individuals with dyslexia have difficulty in combining sounds by keeping them in memory while reading.	64	69.6
10. Individuals with dyslexia have difficulty in remembering sounds of letters.	55	59.8
11. Individuals with dyslexia read incorrectly and slowly.	79	85.9
12. Individuals with dyslexia often experience difficulty in writing.	77	83.7
13. Individuals with dyslexia also fail at other academic courses.	63	68.8
14. Individuals with dyslexia may feel "stupid" or less capable than they are.	72	78.3
15. Individuals with dyslexia have difficulty in understanding language structure, especially sounds.	67	72.8
16. Individuals with dyslexia may also have difficulty in pronouncing words correctly while speaking.	37	40.2
17. Individuals with dyslexia may find it difficult to express themselves verbally.	41	44.6
18. Individuals with dyslexia may not fully understand what others want to tell during a conversation.	24	26.1
19. Individuals with dyslexia have below-average intelligence. *	80	87.0
20. Individuals with dyslexia may also experience attention deficit and / or hyperactivity disorder.	70	76.1
21. Emotional and social problems are frequently seen in individuals with dyslexia.	62	67.4
22. Dyslexia can also be seen in gifted individuals.	73	79.3
23. Most of the individuals with dyslexia are extremely skilled in art.*	17	18.5
24. Dyslexia is diagnosed only by trained specialists.	75	81.5
25. Dyslexia symptoms can be reduced by using medication. *	61	66.3
26. Dyslexia can be eliminated with intensive reading education. *	36	39.1
27. Individuals with dyslexia need extra time in exams.	68	73.9
28. Children with dyslexia should be educated in private schools created for them, not in regular schools. *	51	55.4
29. Dyslexia can negatively affect an individual's future job opportunities.	64	69.6
30. Dyslexia affects individuals throughout their lives.	58	63.0

P.S.: *Items having "No" as the correct answer

When Table 2 is examined, the items with the highest correct answer rate are; item 19 "Individuals with dyslexia have below-average intelligence." (87.0%), item 11 "Individuals with

dyslexia read incorrectly and slowly." (85.9%), item 1 "Dyslexia is a learning difficulty in reading." (83.7%), item 12 "Individuals with dyslexia often experience difficulty in writing." (83.7%), and item 4 "Dyslexia can also be caused by reading less,

insufficient reading education, and parents not reading at home.” (81.5%).

The items with the lowest correct answer rate are respectively: item 23 “Most of the individuals with dyslexia are extremely skilled in art.” (18.5%), article 18 “Individuals with dyslexia may not fully understand what others want to tell during a conversation.” (26.1%), item 7 “Dyslexia is more common in left-handed people.” (32.6%), item 8 “The most important difficulty experienced by individuals with dyslexia is seeing letters and words in reverse” (35.9%) and item 26 “Dyslexia can be eliminated with intensive reading education.” (39.1%).

Examining the Participants’ Total Scores of Dyslexia-Related Knowledge According to Whether or not Having Taken a Related Course

Table 3 shows the descriptive statistics of the total knowledge scores of the participants who took a course on dyslexia and of those who did not take a course on dyslexia.

Table 3.
The descriptive statistics on the total knowledge scores of the participants who took a course on dyslexia and of those who did not take a course on dyslexia

Variable	Group	n	\bar{X}	S	Min	Max	Median	\bar{X}_r ank
Total Knowledge Score	Take	42	25.43	3.05	18	29	26.50	55.36
	Did not Take	50	23.22	4.08	13	31	24.00	39.06

The results of Mann Whitney U Test for Independent Samples conducted to examine the significance of the difference between the groups’ scores show that the difference between the groups is statistically significant and that the students who took a course on dyslexia have a significantly higher score than those who did not take any course on dyslexia have ($U= 678.00, z=-2.93, p=.00, r= .31$). The effect size related to the score difference between the groups is seen to be at the medium level.

Discussion

In this study, it was aimed to examine the dyslexia-related knowledge levels of speech language therapist candidates. The participants of the study consisted of 92 fourth-grade students who continue their education in language and speech therapy undergraduate programs. In

collecting the data, “Questionnaire for Determining Dyslexia-Related Knowledge Level” consisting of 30 items was used. The results showed that the percentages of the participants who answered the questionnaire items correctly were generally high, but the participants also had a significant lack of knowledge. In addition, it was observed that the dyslexia-related knowledge levels of the participants who took a course on dyslexia were significantly higher.

The items that the participants answered correctly with the highest rate are: “Individuals with dyslexia have below-average intelligence.”, “Individuals with dyslexia read incorrectly and slowly.”, “Dyslexia is a learning difficulty in reading.”, “Individuals with dyslexia often experience difficulty in writing.”, and “Dyslexia can also be caused by reading less, insufficient reading education, and parents not reading at home.” When these items are examined, it is seen that their content consists of quite general information on dyslexia. Thus, it is not surprising that the speech language therapists answered these items correctly with a high rate.

The items with the lowest correct answer rate are respectively: “Most of the individuals with dyslexia are extremely skilled in art.”, “Individuals with dyslexia may not fully understand what others want to tell during a conversation.”, “Dyslexia is more common in left-handed people.”, “The most important difficulty experienced by individuals with dyslexia is seeing letters and words in reverse”, and “Dyslexia can be eliminated with intensive reading education.” The low percentage of the participants who answered these items correctly indicates that incorrect and incomplete information is common among the speech language therapist candidates. “Most of the individuals with dyslexia are extremely skilled in art.” is a very common misinformation (Seçkin Yılmaz and Erim, 2019). Among individuals with dyslexia, there are those who are extremely talented in various arts (Çorlu, Özcan and Korkmazlar 2009). However, there are no large-scale studies using objective evaluation methods and showing that giftedness is often accompanied by dyslexia. Therefore, the generalisation that individuals with dyslexia are skilled in art is incorrect.

The fact that the item “Individuals with dyslexia may not fully understand what others want to tell during a conversation.” was answered correctly only by 26.1% of the participants suggested that the therapist candidates did not sufficiently have the full knowledge of receptive language problems experienced at dyslexia by individuals with dyslexia. Therefore, the other items regarding the language and speech characteristics of individuals with dyslexia were re-examined. It was seen that only 40.2% of the participants were able to correctly answer the item

“Individuals with dyslexia may also have difficulty in pronouncing words correctly while speaking.” This finding presents that the majority of the speech language therapist candidates are not aware of speech sound disorders that often accompany dyslexia. The fact that the percentage of the participants who correctly answered the item “Individuals with dyslexia may find it difficult to express themselves verbally”, which is about the language and speech characteristics, is 44.6% revealed that the significant number of the therapist candidates did not know the oral language problems frequently experienced by individuals with dyslexia. These findings present that the speech language therapist candidates have a low level of knowledge on language and speech problems frequently encountered by individuals with dyslexia.

The information that children who apply to speech language therapists during the pre-school period due to receptive and/or expressive language problems and speech sound disorder may be in the risk group for dyslexia is vital for these children to be identified early and receive early intervention. However, for the early identification and intervention, speech language therapists need to know that language and speech problems are among the early signs of dyslexia. Besides, the perception of dyslexia as a reading disorder independent of language and speech skills in school period may cause individuals with dyslexia to receive interventions focusing only on reading skills. However, it is stated in the literature that evidence-based reading interventions should also include language skills (Grigorenko et al., 2020).

The item “Dyslexia is more common in left-handed people” that most of the participants answered incorrectly is also common misinformation about dyslexia (Seçkin Yılmaz and Erim, 2019). Although there are different findings in the studies examining hand dominance in individuals with dyslexia, it is not possible to make a generalization that there is a clear relation between left-hand dominance and dyslexia (Balci, 2017).

Another misinformation that is quite common among the therapist candidates is the item “The most important difficulty experienced by individuals with dyslexia is seeing letters and words in reverse.” In a previous study conducted with the professionals (speech language therapists, occupational therapists, school psychological counsellors, special education teachers, and primary school teachers) working with individuals with dyslexia in Turkey, this misinformation was seen to be common, too (Seçkin Yılmaz, 2019). The mistake of reading letters and words in reverse, which constitutes only a part of the reading mistakes of individuals with dyslexia, creates the perception that dyslexia

is a visual impairment. This perception leads non-evidence-based, ineffective practices such as the use of coloured lenses, eye exercises, and the use of materials written in different fonts called “dyslexia friendly” (American Academy of Pediatrics, 2009). On the other hand, the reversing mistakes made by individuals with dyslexia are developmental mistakes that children with typical development also make during the first time that they learn reading, and are not a distinctive characteristic of dyslexia (Brooks, Berninger, and Abbott, 2011). It was seen that a significant part of the participants could not correctly answer the item “Dyslexia can be eliminated with intensive reading education.” Dyslexia is a lifelong disorder that also affects the adulthood life of the individuals. Individuals with dyslexia show significant improvements with intense and systematic evidence-based interventions, but dyslexia is not a temporary disorder that disappears with the intervention (Grigorenko et al., 2020).

In conclusion, it was observed that the majority of the speech language therapist candidates who participated in this study answered most of the questionnaire items correctly, but the incorrect and incomplete information on dyslexia was also common among the therapist candidates and an important part of them did not know the language and speech problems in individuals with dyslexia. In order to ensure that children at risk of dyslexia in preschool period can be identified and receive early intervention, and that children diagnosed with dyslexia in the school period can receive an effective and evidence-based intervention, theoretical and applied courses related to dyslexia should be included in the undergraduate programs for speech language therapists. The fact that the therapist candidates who took a course on dyslexia had a higher level of dyslexia-related knowledge among those participating in the study also reveals the importance of the related courses in the undergraduate programs.

The most important limitation of this study is that it was conducted with a limited number of participants. However, there are a limited number of universities with undergraduate language and speech therapy programs in our country. Not all of these universities have students in the fourth grade. It is recommended that the study be repeated with larger participant groups and by using different data collection tools in the following years. In the questionnaires and/or scales that will be used in further studies, it is recommended to include and draw attention to the characteristics that individuals with dyslexia show in their oral language skills other than phonology, and to the language and speech disorders accompanying dyslexia in more details, since dyslexia is not a word-reading disorder in which only the

phonology component of language is affected. The fact that individuals with dyslexia also have weak oral language skills further increases the difficulties that these individuals experience in their reading comprehension skills, and in their academic and daily lives. Additionally, graduate therapists' knowledge levels, competencies and practices regarding dyslexia be analysed; and experimental studies aiming to increase the dyslexia-related knowledge and competencies of speech language therapists be conducted. Professionals such as primary school teachers, special education teachers, and speech language therapists working with individuals with dyslexia are recommended to follow up-to-date and scientific information on dyslexia, and to cooperate in the development and implementation of effective and evidence-based intervention programs (including classroom modifications, accommodations, and supports).

References

- American Academy of Pediatrics (2009). Learning disabilities, dyslexia, and vision. *Pediatrics* 124(2), 837–844. <https://doi.org/10.1542/peds.2009-1445>.
- American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: Author.
- American Speech-Language-Hearing Association. (2001). *Roles and responsibilities of speech-language pathologists with respect to reading and writing in children and adolescents* www.asha.org/policy
- BALCI, E. (2017). The Facts About Dyslexia: What Is Dyslexia And What Is It? *Trakya University Journal of Social Sciences*, 19(1), 1-17.
- Blood, G.W., Mamett, C., Gordon, R., & Blood, I.M. (2010). *Written language disorders: Speech-language pathologists' training, knowledge, and confidence*. *Language Speech and Hearing Services in Schools*, 41(4), 416. [https://doi.org/10.1044/0161-1461\(2009/09-0032\)](https://doi.org/10.1044/0161-1461(2009/09-0032))
- Brooks, A.D., Berninger, V.W., & Abbott, R.D. (2011). Letter naming and letter writing reversals in children with dyslexia: Momentary inefficiency in the phonological and orthographic loops of working memory. *Developmental Neuropsychology*, 36(7), 847-868. <https://doi.org/10.1080/87565641.2011.606401>
- Cabbage, K.L., Farquharson, K., Iuzzini-Seigel, J., Zuk, J., & Hogan, T.P. (2018). Exploring the overlap between dyslexia and speech sound production deficits. *Language Speech and Hearing Services in Schools*, 49(4), 774. https://doi.org/10.1044/2018_Ishss-dyslc-18-0008
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.
- Corlu, M., Ozcan, O., & Korkmazlar, U. (2009). The meaning of dyslexics' drawings in communication design. *Dyslexia*, 15(2), 148-154. <https://doi.org/10.1002/dys.362>
- D'Mello, A.M., & Gabrieli, J.D.E. (2018). Cognitive neuroscience of dyslexia. *Language Speech and Hearing Services in Schools*, 49(4), 798-809. https://doi.org/10.1044/2018_Ishss-dyslc-18-0020
- Dil Ve Konuşma Terapisi Ulusal Çekirdek Eğitim Programı (2016). Erişim adresi: https://www.yok.gov.tr/Documents/Kurumsal/egitim_ogretim_dairesi/Ulusal-cekirdek-egitimi-programlari/dil_konusma.pdf
- Döhla, D., & Heim, S. (2016). Developmental dyslexia and dysgraphia: What can we learn from the one about the other? *Frontiers in Psychology*, 6, 2045. <https://doi.org/10.3389/fpsyg.2015.02045>
- Eden, G.F., Olulade, O.A., Evans, T.M., Krafnick, A.J., & Alkire, D.R. (2016). Developmental dyslexia. In G. Hickok & S.L. Small (Eds.), *Neurobiology of language*, Oxford, UK: Elsevier, 815-826.
- Elliott, J., & Grigorenko, E. L. (2014). *The dyslexia debate*. Cambridge: Cambridge University Press.
- Flax, J.F., Realpe-Bonilla, T., Roesler, C., Choudhury, N., & Benasich, A. (2008). Using early standardized language measures to predict later language and early reading outcomes in children at high risk for language-learning impairments. *Journal of Learning Disabilities*, 42(1), 61–75. <https://doi.org/10.1177/0022219408326215>
- Göbel, S.M. (2015). *Number processing and arithmetic in children and adults with reading difficulties*. In R. Cohen Kadosh, A. Dowker (Eds.), *The Oxford handbook of numerical cognition*, Oxford University Press, 1-21..
- Grigorenko, E.L. (2006). Learning disabilities in juvenile offenders. *Child Adolesc Psychiatr Clinics of North America*, 15, 353–371.
- Grigorenko, E.L., Compton, D.L., Fuchs, L.S., Wagner, R.K., Willcutt, E.G., & Fletcher, J.M. (2020). Understanding, educating, and supporting children with specific learning disabilities: 50 years of science and practice. *American Psychologist*, 75(1), 37–51.
- Hamilton, L.G. (2017). Dyslexia. In B. Hopkins, E. Geangu, & S. Linkenauer (Eds.), *The Cambridge encyclopedia of child development*, Cambridge University Press, 670–675.

- Hulme, C., & Snowling, M.J. (2016). Reading disorders and dyslexia. *Current opinion in pediatrics*, 28(6), 731–735. <https://doi.org/10.1097/MOP.0000000000000411>
- Langer, N., Benjamin, C., Becker, B.L.C., & Gaab, N. (2019). Comorbidity of reading disabilities and ADHD: Structural and functional brain characteristics. *Human Brain Mapping*. <https://doi.org/10.1002/hbm.24552>
- McGrath, L.M., & Stoodley, C.J. (2019). Are there shared neural correlates between dyslexia and ADHD? A meta-analysis of voxel-based morphometry studies. *Journal of Neurodevelopmental Disorders*, 11, 31. <https://doi.org/10.1186/s11689-019-9287-8>
- Moats, L.C. (2009). Knowledge foundations for teaching reading and spelling. *Reading and Writing*, 22, 379–399.
- Mortimore, T., & Crozier, R. (2006). Dyslexia and difficulties with study skills in higher education. *Studies in Higher Education*, 31(2), 235–251. <https://doi.org/10.1080/03075070600572173>
- Ozernov-Palchik, O., & Gaab, N. (2016). Tackling the 'dyslexia paradox': reading brain and behavior for early markers of developmental dyslexia. *Wiley Interdisciplinary Reviews: Cognitive Science*, 7(2), 156–176. <https://doi.org/10.1002/wcs.1383>
- Puolakanaho, A., Ahonen, T., Aro, M., Eklund, K., Leppänen, P.H., Poikkeus, A.M., Tolvanen, A., Torppa, M., & Lyytinen, H. (2007). Very early phonological and language skills: estimating individual risk of reading disability. *Journal of child psychology and psychiatry, and allied disciplines*, 48(9), 923–931. <https://doi.org/10.1111/j.1469-7610.2007.01763.x>
- Seçkin Yılmaz, Ş. (2019). *Disleksili bireylerle çalışan meslek elemanlarının disleksiye ilişkin bilgi düzeylerinin incelenmesi*. 1. Uluslararası Katılımlı Özgül Öğrenme Güçlüğü Kongresi'nde sunulan bildiri. İstanbul Ticaret Üniversitesi, İstanbul. Erişim adresi: http://oogkongresi.com/toplu_kongre_bildiril_eri.pdf
- Yılmaz, Ş.S., & Ahsen, E.R.İ. Adults Living in Turkey for Dyslexia of m. Investigation of Knowledge Level. *Abant İzzet Baysal University Journal of Education Faculty*, 19(3), 1102-1114. <https://doi.org/10.17240/aibuefd.2019.19.49440-583895>
- Snowling, M.J., & Hulme, C. (2012). Interventions for children's language and literacy difficulties. *International Journal of Language & Communication Disorders*, 47(1), 27–34. <https://doi.org/10.1111/j.1460-6984.2011.00081.x>
- Snowling, M.J., & Melby-Lervåg, M. (2016). Oral language deficits in familial dyslexia: A meta-analysis and review. *Psychological Bulletin*, 142(5), 498-545. <http://dx.doi.org/10.1037/bul0000037>
- Snowling, M.J., Nash, H.M., Gooch, D.C., Hayiou-Thomas, M.E., Hulme, C., & Wellcome Language and Reading Project Team (2019). Developmental outcomes for children at high risk of dyslexia and children with developmental language disorder. *Child Development*, 90(5), e548– e564. <https://doi.org/10.1111/cdev.13216>
- Van Viersen, S., De Bree, E.H., Verdam, M., Krikhaar, E., Maassen, B., Van Der Leij, A., & De Jong, P.F. (2017). Delayed early vocabulary development in children at family risk of dyslexia. *Journal of Speech, Language, and Hearing Research*, 60(4), 937–949. https://doi.org/10.1044/2016_JSLHR-L-16-0031