MEASURING LINGUISTIC AND COGNITIVE ABILITIES BY MEANS OF A SENTENCE REPETITION TASK IN CHILDREN WITH DEVELOPMENTAL DYSLEXIA AND DEVELOPMENTAL LANGUAGE DISORDER

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ABSTRACT

The aim of the present study is twofold: (a) to examine linguistic and cognitive abilities in Greek-speaking children with Developmental Dyslexia (DD) or Developmental Language Disorder (DLD), and (b) to detect whether the performance on Sentence Repetition Task (SRT) is affected by (verbal) working memory (WM) abilities. Previous studies have indicated that children with both DLD and DD have lower linguistic and WM abilities in comparison to their peers. More recent studies focus on the interaction of these two abilities, indicating that the linguistic deficit is driven by the cognitive deficit. Sentence Repetition Task (SRT) is an appropriate and reliable tool for measuring both linguistic and cognitive abilities. For this reason, we tested 30 monolingual children (with DD, DLD and non-impaired controls) by means of an SRT and a verbal working memory task (VWMT). The results have shown that both clinical groups had lower linguistic and cognitive abilities than the control group; however the DLD group show a lower performance on the SRT both in terms of accuracy and grammaticality in comparison to the DD group. Interestingly, we found that the performance on the VWMT predicts the accuracy on the SRT, while lexical knowledge predicts the grammaticality scores in both clinical groups, albeit not in the control group. From our findings we deduce that (a) both clinical groups have impaired linguistic and cognitive abilities; however the DLD group encounters more difficulties with their linguistic abilities and (b) SRT measures both morphosyntactic abilities and WM abilities, as different predictor variables have a different impact on participants' performance.

Keywords: Developmental Dyslexia, Developmental Language Disorder, Sentence Repetition Task, working memory abilities.

INTRODUCTION

Developmental Language Disorder (henceforth DLD; previously known as Specific Language Impairment) is a developmental impairment with normal intelligence; in addition, hearing or motor deficits or emotional problems are absent. Nonetheless, language seems to be impaired (Leonard, 2014), without any obvious reason (Stark & Tallal, 1981). Developmental Dyslexia (henceforth DD) is more related to problems with literacy; however these individuals also face problems with oracy, i.e. the acquisition of morphosyntax (Breznitz & Leikin 2000), albeit not that serious compared to the DLD group (Tallal et al., 1997). In many recent studies, the two disorders (DD and DLD) are compared, since they share similar pathology and brain function (Bishop & Snowling, 2004). More specifically, both clinical groups have a history of delayed speech. Additionally, they face problems with phonological awareness; accordingly, both groups have difficulties with literacy and general learning difficulties. Moreover, they have deviant verbal working memory skills, which is

often the reason, according to previous studies (Pennington & Bishop, 2009), why they also face language problems. Previous studies have indicated that children with DLD and DD have normal intelligence, but lower verbal abilities, which affects their vocabulary acquisition (Leonard, 2014; Vellutino et al., 1995) and their morphosyntactic abilities (Leonard, 2014, Moll et al. 2013, Breznitz & Leikin, 2000); however, children with DLD seem to have more serious problems in morphosyntax (Tallal et al., 1997). Although there are studies that compare the two developmental disorders in terms of their linguistic or/and cognitive skills, to date there are few studies that test the impact of WM abilities on the linguistic abilities.

LITERATURE REVIEW

The term of DLD is rather debatable; until recently the term Specific Language Impairment (SLI) was used. However, one of the concerns in the SLI term was the first word "Specific". As such, only children with language difficulties that affect language and without other difficulties (i.e. emotional) could get a diagnosis of SLI (Bishop et al., 2017). The word "Specific" has been replaced by the word "Developmental" because the largest group with language disorders are detected in preschool aged children (Laasonen et al., 2018). The word "Impairment" has been replaced by the word "Disorder" for two reasons; first, because the manuals of mental disorders (DSM-V and ICD-11) prefer the term "disorder" over "impairment" and second, the term "disorder" indicates more effectively the seriousness of the pathology (Bishop, 2017). DLD exhibits persistent difficulties in use of language (signed or spoken), in the acquisition and in both comprehension and production in comparison to their peers. The deficits in language do not arise from sensory impairments, neurodevelopmental disorders or any other neurological conditions (infection or brain injury) (World Health Organization, 2018). In relation to DD, the term has not been changed over the years and it refers to deficits in written language and learning (Reid, 2003), albeit without excluding problems in morphosyntax (Breznitz & Leikin, 2000).

Both clinical groups demonstrate linguistic differences in comparison to their non-impaired peers. Even from the first years of life, differences are evident. Typically developing children start to produce their first words at the first year of their lives, despite their cultural background (Gentner, 1982; Gentner & Boroditsky, 2001). However, these clinical groups manifest a language delay in terms of their first words (Vellutino et al. 1995; Trauner et al., 2000), which has an impact on their vocabulary acquisition and vocabulary growth (Katz, 1986; Swan & Goswami, 1997; Wright et al., 2017). Children with DLD are likely to have difficulties with spoken word recognition or learning new words (Nation, 2014). Both groups demonstrate word-finding difficulties (Sheng and McGregor, 2010) and manifest slower semantic and phonological priming compared to their non-impaired peers in oral word recognition (Velez and Schwartz, 2010). The finding is linked to the lower phonological awareness that they have (Bishop & Snowling, 2004).

Similarly, the acquisition of morphosyntax is more deviant, particularly, at early developmental stages (Nation & Snowling, 1998; Leonard, 2014). However, DLD children face more morphosyntactic problems; hence, they face problems with thematic role assignment, 'wh-' questions, 3rd person singular, the use of *-ed* and with the auxiliary verbs. However deficits are not universal across languages and they differ cross-linguistically (Marinis, 2000; Leonard, 2014). For instance, the tense in Greek is not problematic (Tsimpli & Papadopoulou, 2009). Another deviant morphosyntactic phenomenon is clitic pronouns. Preschool DLD children clitic omission errors seem to stem from a developmental delay in

morphosyntactic level with difficulties in semantic interpretability (Tsimpli, 2001; Tsimpli & Mastropavlou, 2007). Therefore, grammatical aspect is particularly problematic in DLD (Konstantzou et al., 2013; Konstantzou, 2015; Dosi, in press). Others suggested that both groups have low sensitivity in ungrammaticality (Chondrogianni et al., 2014). In order to test linguistic abilities, many studies have used the Sentence Repetition Task (SRT) as a diagnostic tool, since it requires the activation of morphosyntactic abilities (Rice & Wexler, 1996; Rice, 2012; Marinis & Armon-Lotem, 2015) and tests both linguistic (i.e. speech perception and production, vocabulary knowledge, and morphosyntactic skills) and working memory skills (Moll et al., 2013; Klem et al. 2015).

The verbal working memory abilities of these two clinical groups are also problematic compared to their typically developing peers (Gathercole & Baddeley, 1990; Smith-Spark & Fisk, 2007; Pennington & Bishop, 2009; Henry & Botting, 2016). DLD and DD children demonstrate significant difficulties in repetition of non-words compare to TD children because of the restricted memory skills (Gathercole & Baddeley, 1990; Wang & Gathercole, 2013). Since, WM and learning are closely related, many studies have investigated the potential impact of WM on language learning and processing abilities of DLD children (Montgomery, 2002). WM problems seem to affect the effective acquisition of vocabulary (Nash & Donaldson, 2005). Limited WM also affects the acquisition of morphosyntax (Archibald & Gathercole, 2006) both in comprehension and in language processing and learning (Das et al., 1994; Montgomery, 2003). Poor verbal STM makes difficult the maintenance the grammatical details in spoken language. This deficit affects the compromising and meaning of the children's receptive grammar and language comprehension (Montgomery et al., 2010). Finally, more recent studies (Dosi, in press) found that WM abilities have an impact on the acquisition of morphosyntax, only in clinical populations and not in non-impaired individuals, since in the former group the deficit in WM hamper the acquisition of morphosyntax; while in the latter group WM and morphosyntactic abilities are independent from each other.

To date, since limited studies have investigated the impact of WM abilities on morphosyntactic abilities in both Greek-speaking groups, we leverage the gap in the research literature in order to detect possible similarities and divergences between the two disorders in terms of their linguistic and cognitive abilities. In addition, we aim to investigate whether verbal working memory abilities have an impact on the linguistic abilities.

METHODOLOGY

Participants

In the present study participated thirty (N=30) monolingual Greek-speaking children aged 8-10, forming three groups; (a) ten (N=10) children with Developmental Dyslexia (henceforth, DD group; mean age: 8.3 years; SD: 0.6); (b) ten (N=10) children with Developmental Language Disorder (henceforth, DLD group; mean age: 8.9 years; SD: 0.3) and (c) ten (N=10) typically developing children (henceforth, control group; mean age: 8.9 years; SD: 0.8). Participants were recruited by schools and speech and language therapists in Thessaloniki and Athens. There were also matched in terms of their chronological age and their socioeconomic status.

Material

Four (N=4) tests were administered in all participants; two baseline tasks, a Sentence Repetition Task and a cognitive (i.e. verbal working memory) task. The baseline tasks aim to give participants' profile. More specifically, these tasks test both participants' verbal and

non-verbal abilities. The first task was an expressive vocabulary in Greek (Vogindroukas et al., 2009), where participants should name the picture of an object. The expressive vocabulary task depicts the vocabulary knowledge of the participants.

The second task exhibits participants' non-verbal fluid intelligence (Raven, 2004), in order to exclude from the study any participants with non-typical non-verbal intelligence.

The third task was a Sentence Repetition Task by Stavrakaki & Tsimpli (2000; henceforth SRT); including ten sentences with various structures (negation, subordinate clauses, i.e. relative clauses, complementizers, a.o.). Participants listen to the sentences and they should repeat them afterwards, as accurately, as possible. Their answers were marked both for (a) grammaticality (grammatical vs. ungrammatical sentences) and (b) accuracy (how accurately they repeated the sentences). The total score in grammaticality was 10 points (1 point per sentence), whereas in accuracy the total score was 30 (max. 3 points per sentence; if the sentence matches exactly with the one given by the researcher). The results will be presented in percentages.

The cognitive task was a VWMT (i.e. listening recall task by Chrysochoou et al., 2013; henceforth VWMT). Participants listen to sentences and their have to judge whether they are true or false (e.g. *The lions have hair*) and recall their last word (*hair*). The test had an increasing difficulty (7 blocks), since participants should recall more than one sentences progressively. The task administration stops when the participant recalls inaccurately four sentences within the block.

RESULTS

The results of the baseline tasks suggest that all three groups scored similarly in the non-verbal intelligence task ($F(2,29)= 2.716$, $p=.084$). The result shows that the three groups as comparable, since they have equal performance in terms of their non-verbal, fluid intelligence.

By contrast, differences were observed in the vocabulary task ($F(2,29)= 7.473$, $p=.003$). Post hoc criteria Bonferroni have shown that the control group outperformed, as expected, both DD and DLD groups ($p=.032$ and $p=.003$, respectively), while no differences were found between the two clinical groups ($p=1$).

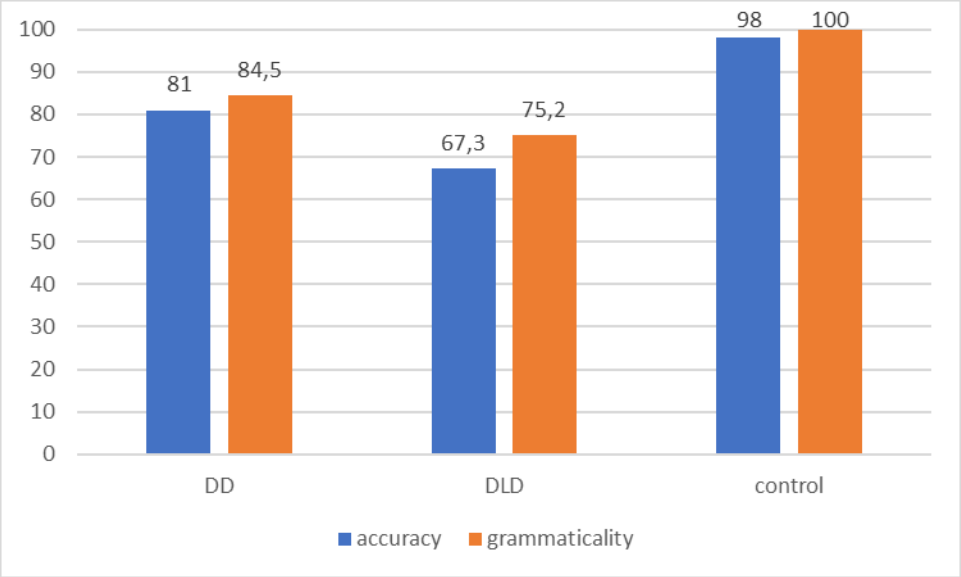
Table 1. Participants' performance on the baseline tasks.

Group	Vocabulary task (%) (SD)	Non-verbal intelligence task (%) (SD)
DD	68.2 (8.6)	76.9 (7.7)
DLD	63 (5.8)	77.5 (5.3)
controls	82.8 (2.4)	79.4 (4.4)

In the SRT, in terms of accuracy scores the results have revealed that the three groups differ significantly ($F(2,29)= 20.332$, $p<.001$), as depicted in Figure 1. Post hoc test Bonferroni have shown that the control group showed a ceiling effect and outperformed both clinical groups (DD group: $p=.005$; DLD group: $p<.001$). Differences were also detected between the two clinical groups, since the DLD group scored significantly lower than the DD group ($p=.026$). At this point, we should notice that the DLD group exhibit quite low performance in comparison to the two other groups.

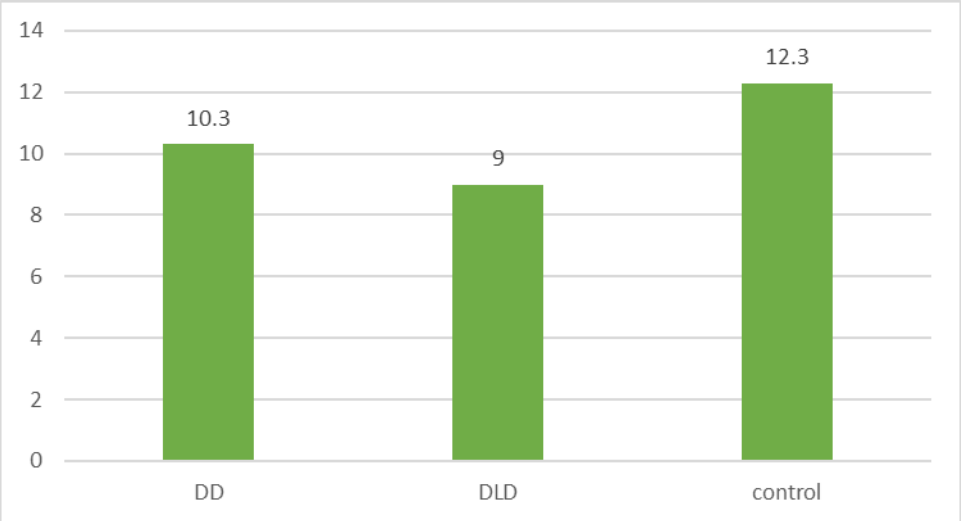
Similarly, in terms of grammaticality scores the three groups differ significantly ($F(2,29)= 21.243$, $p<.001$), as presented in Figure 1. Post hoc test Bonferroni have revealed that the control group performed at ceiling. Both DD and DLD group produced significantly less grammatical sentences than the controls ($p=.003$ and $p<.001$, respectively); while DD group outperformed the DLD group ($p=.005$).

Figure 1. Accuracy and grammaticality scores (%) on SRT



In the VWMT, results display that the control group had better verbal working memory abilities ($F(2,29)= 12.111$, $p<.001$) in comparison to both DD and DLD group ($p=.023$ and $p<.001$, respectively); while no differences were found between the two clinical groups ($p=.162$), as depicted in Figure 2.

Figure 2. Performance on the VWMT



As recent previous studies suggest, we tried to find possible predictor variables of the performance on the SRT in the three groups, separately; in order to discover differences in the performance pattern of the three groups. Indeed, we detected differences between the clinical groups and the control group. More specifically, grammaticality is predicted by

vocabulary knowledge in both groups (DD group: R^2 = .844, $F(1,9)$ = 43.401, p< .001; β = .919; DLD group: R^2 = .796, $F(1,9)$ = 31.309, p= .001; β = .892); while accuracy is predicted by VWMT (DD group: R^2 = .140, $F(1,9)$ = 11.916, p= .011; β = .382; DLD group: R^2 = .778, $F(1,9)$ = 27.956, p= .001; β = .882). Interestingly, for the control group none of the aforementioned variables seem to predict their performance.

DISCUSSION

The present study examined linguistic and cognitive abilities in Greek-speaking children DD and DLD by means of an SRT and a VWMT and to detect whether the performance on SRT is affected by verbal WM abilities.

Summarizing the most important findings, in the baseline tasks differences were observed only in terms of participants' lexical knowledge, where the two clinical groups had lower scores compared to the control group (in line with previous studies Leonard, 2014; Vellutino et al., 1995). By contrast, their non-verbal intelligence does not differ, finding that allows the comparison between the groups (Leonard, 2014; APA, 2013). In terms of their verbal working memory abilities, both clinical groups exhibit lower performance than the control group; the finding is also in line with previous studies (Gathercole & Baddeley, 1990; Smith-Spark & Fisk 2007), indicating that even though the non-verbal intelligence is typical, other cognitive abilities are deviant. In regard to the linguistic task, our results suggest that both clinical groups face more difficulties with the SRT; though the DLD group faced more problems in the linguistic task, in terms of both accuracy and grammaticality. The findings agree with the previous studies that both DD and DLD groups show morphosyntactic deficits (Leonard 2014, Moll et al. 2013, Breznitz & Leikin 2000); however, children with DLD seem to have more serious problems in morphosyntax (Tallal et al., 1997; Waltzman & Cairns, 2000; Robertson & Joanisse, 2010).

Looking for possible variables that affect participants' linguistic performance, we found that verbal working memory abilities predict the accuracy on the SRT (Andreou et al. in press). The finding is plausible, if we consider that in order for the participant to accurately recall a sentence, they should rely on their verbal working memory skills (Alloway et al., 2004; Alloway & Gathercole, 2005). The fact that no predictor variables were found for the control group may suggest that, since the language is mastered and fully acquired and the sentences are not too long, typically developing children do not rely, that much, on their WM abilities. Similar finding is observed in a study of Dosi (in press), where correlations between linguistic and verbal working memory tasks were found only in the group with language impairment and not in the control group. In terms of grammaticality, lexical knowledge predicts the grammaticality scores in both clinical groups. The finding also agrees with previous studies (Dosi et al., 2016; Dosi & Koutsipetsidou, 2017; Andreou et al., in press), indicating that in order to produce grammatical sentences working memory is not enough (Ellis, 2005; Erlam, 2006) and other factors, such as lexical/vocabulary knowledge, affect the performance on the task (Chaudron & Russell, 1990; Munnich et al., 1994; Klem et al., 2015). For the control group, no predictor variables were found, denoting that, since the language is fully acquired lexical knowledge does not affect anymore the grammaticality.

From our findings we may deduce that SRT measures both morphosyntactic abilities and working memory abilities, as also recent studies suggest (Riches, 2012; Klem et al., 2015). Additionally, it is more likely that the linguistic deficit is led by the cognitive deficit in clinical groups (Robertson & Joanisse, 2010; Dosi & Koutsipetsidou, 2017; Dosi, in press).

CONCLUSIONS

Our study tested linguistic and verbal WM abilities in Greek-speaking children with DD and DLD. This investigation was made by means of an SRT and a WM task. The results have shown that both clinical groups faced problems in terms of both accuracy and grammaticality (as in Tallal et al., 1997). In regards to the WM task, both clinical groups scored lower (similar to previous studies Alloway et al., 2004; Alloway & Gathercole, 2005). An interesting finding accuracy on the task is predicted by verbal WM, while grammaticality is predicted by vocabulary knowledge (similar to Dosi & Koutsipetsidou, 2017; Andreou et al., in press). The present study enlightens more our knowledge of the interaction of language and cognition in language disorders and may lead to more targeted methods of intervention in these clinical groups.

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REFERENCES

American Psychiatric Association (2013) *Diagnostic and Statistical Manual of Mental Disorders: DSM-5* (5th ed.). Washington: APA.

Archibald, L.M.D & Gathercole, S.E. (2006) Prevalence of SLI in language resource units. *Journal of Research in Special Educational Needs, 6,* 3-10.

Bishop, D.V.M. (2017) Why is it so hard to reach agreement on terminology? The case of developmental language disorder (DLD). *International Journal of Language & Communication Disorders* [Accessed 17th July 2017] Available from World Wide Web: https://doi.org/10.1111/1460-6984.12335

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

Bishop, D.V.M. et al. (2017) Phase 2 of CATALISE: a multinational and multidisciplinary Delphi consensus study of problems with language development: Terminology. *Journal of Child Psychology & Psychiatry* [Accessed 30th March 2017] Available from World Wide Web: doi:10.1371/journal.pone.0158753

Breznitz, Z., & Leikin, M. (2000) Syntactic processing of Hebrew sentences in normal and dyslexic readers: electrophysiological evidence. *The Journal of genetic psychology*, 161(3), 359-380. doi:https://doi.org/10.1080/00221320009596718

Chondrogianni, V. et al. (2014) Production and online comprehension of define articles and clitic pronouns by Greek sequential bilingual children and monolingual children with specific language impairment. *Phycholinguistics, 36,* 1-37.

Chrysochoou, E. et al. (2013) Working memory and vocabulary development in Greek preschool and primary school children. *European Journal of Developmental Psychology, 10(4),* 417-432.

Dosi, I. (in press) Aspectual and cognitive asymmetries in Greek-speaking children with SLI. In the *Proceedings of 23rd International Symposium on Theoretical and Applied Linguistics*. Aristotle University of Thessaloniki.

Dosi, I. & Koutsipetsidou E. (2017) Language Impairment in Specific Language Impairment. Is it a matter of memory? [in Greek]. *Oral presentation in 1st Scientific Conference on Speech Therapy*, Ioannina, 10-12 November 2017.

Gathercole, S. & Baddeley, A. (1990) Phonological memory deficits in language disordered children: In there a causal connection?. *Journal of Memory and Language, 29*, 336-360.

Gentner, D. (1982) Why nouns are learned before verbs: Linguistic relative versus natural partitioning. In S. Kuczaj (Eds.), *Language development: Language, cognition, and culture*. Hillsdale, NJ: Erlbaum.

Gentner, D. & Boroditsky, L. (2001) Individuation, relative and early word learning. In M. Bowerman & S. Levinson (Eds.), *Language acquisition and conceptual development.* New York: Cambridge University Press.

Katz, R. B. (1986) Phonological deficiencies in children with reading disability: Evidence from an object-naming task. *Cognition*, 22(3), 225-257. doi:https://doi.org/10.1016/0010-0277(86)90016-8

Klem M., et al. (2015) Sentence repetition is a measure of children's language skills rather than working memory limitations. *Developmental Science*, *18(1)*, 146-154.

Konstantzou, K. (2015) Development of Grammatical Aspect in Specific Language Impairment Evidence from an Experimental Design with Video Stimuli. *Procedia Computer Science*, *65*, 510-518.

Konstantzou, K. et al. (2013) Perfective–imperfective: Development of aspectual distinctions in Greek specific language impairment. *Linguistic Variation*, *13(2)*, 187–216. https://doi.org/10.1075/lv.13.2.03kon

Laasonen, M. et al. (2018) Understanding developmental language disorder-the Helsinki longitudinal SLI study (HelSLI): a study protocol. *BMC Psychol.* [Accessed 21 May 2018] Available from World Wide Web: ncbi.nlm.nih.gov

Leonard, L.B. (2014) *Children with specific language impairment.* Cambridge, MA: MIT Press.

Marinis, T. (2000) The acquisition of clitic objects in modern Greek: single clitics, clitic doubling, clitic left dislocation. *ZAS Papers in Linguistics*, *15*, 260-283.

Marinis, T. & Armon-Lotem, S. (2015) Sentence Repetition. In S. Armon-Lotem, J. Jong & N. Meir (Eds.), *Methods for assessing multilingual children: disentangling bilingualism from Language Impairment*. UK: Multilingual Matters.

Moll K. et al. (2013) Sentence repetition as a marker of language skills in children with dyslexia. *Applied Psycholinguistics, First View*.:1–19.

Montgomery, J.W. (2002) Understanding the language difficulties of children with specific language impairments: Does verbal working memory matter? *American Journal of Speech-Language Pathology*, *11*, 77-91.

Montgomery, J.W. (2003) Working memory and comprehension in children with specific language impairments: what we know so far. *Journal of Communication Disorders* [Accessed 16th May 2016] Available from World Wide Web: www.sciencedirect.com

Montgomery, J.W., Magimairaj, B.M., & Finney, M.C. (2010) Working memory and specific language impairments: an update on the relation and perspectives on assessment and treatment. *American Journal of Speech and Language Pathology*, *19*, 78-94.

Nash, M., & Donaldson, M.L. (2005) Word learning in children with vocabulary deficits. *Journal of Speech, Language, and Hearing Research, 48*, 439-458.

Nation, K. (2014) Lexical learning and lexical processing in children with developmental language impairments. *Phil. Trans. R. Soc. B* [Accessed 19th January 2014] Available from World Wide Web: https://doi.org/10.1098/rstb.2012.0387

Nation, K. & Snowling, M. J. (1998) Individual Differences in Contextual Facilitation: Evidence from Dyslexia and Poor Reading Comprehension. *Child Development*, *69*, 996-1011. http://dx.doi.org/10.1111/j.1467-8624.1998.tb06157

Pennington, B.F. & Bishop, D. (2009) Relations among speech, language, and reading disorders. *Annual Review of Psychology*, *60*, 283–306.

Raven, J.C., (2004) *Coloured Progressive Matrices Sets A, AB, B*. London: Pearson.

Rice, N.G. (2012) Sentence repetition in children with specific language impairment: an investigation of underlying mechanisms. *International Journal of Language & Communication Disorders* [Accessed 15th May 2016] Available from World Wide Web: http://www.researchgate.net/publication/230780341

Rice, M.L. & Wexler, K. (1996) Toward tense as a clinical marker of specific language impairment in Eglish-speaking children. *Journal of Speech and Hearing Research, 39*, 1239-1257.

Sheng, L. & McGregor, K.K. (2010) Lexical-semantic organization in children with specific language impairment. *Journal of Speech, Language and Hearing Research* [Accessed 1st February 2010] Available from World Wide Web: https://doi.org/10.1044/1092-4388(2009/08-0160)

Stark, R. E. & Tallal, P. (1981) Selection of children with specific language deficits. *Journal of speech and hearing disorders*, 46(2), 114-122. doi:10.1044/jshd.4602.114

Swan, D. & Goswami, U. (1997) Picture naming deficits in developmental dyslexia: The phonological representations hypothesis. *Brain and Language*, 56(3), 334-353. doi:https://doi.org/10.1006/brln.1997.1855

Tallal, P. et al. (1997) Academic outcomes of language impaired children. In C. Hulme & M. Snowling (Eds.), *Dyslexia: Biology, cognition, and intervention*, 167–181. London: Whurr.

Trauner, D. et al. (2000) Neurological and MRI profiles of children with developmental language impairment. *Dev. Med. Child Neurol., 42*, 470-475.

Tsimpli, I.M. (2001) LF-interpretability and language development: a study of verbal and nominal features in Greek normally developing and SLI children. *Brain and Language, 77*, 432-448.

Tsimpli, I.M. & Mastropavlou, M. (2007) Feature interpretability in L2 and SLI: Greek clitics and determiners. In J. Liceras, H. Zobl & H. Goodluck (Eds.), *Feature, Minimalism and Language Acquisition*. Mahwah, NJ: Lawrence Erlbaum Associates.

Tsimpli, I.M. & Papadopoulou, D. (2009) Aspect and the interpretation of motion verbs in L2 Greek. In N. Snape, Y. Leung & M. Sharwood-Smith (Eds.), *Representational Deficits in SLA*. Amsterdam: John Benjamins.

Stavrakaki, S. & Tsimpli, I.M. (2000) Diagnostic Verbal IQ Test for Greek preschool and school age children: Standardization, statistical analysis, psychometric properties [in Greek]. In M. Glykas & G. Kalomiris (Eds.), *Proceedings of the 8th Symposium of the Panhellenic Association of Logopedists* [in Greek]. Athens: Ellinika Grammata, 95-106

Velez, M. & Schwartz, R.G. (2010) Spoken word recognition in school-age children with SLI: semantic, phonological and repetition priming. *Journal of Speech, Language and Hearing Research* [Accessed 1st December 2010] Available from World Wide Web: https://doi.org/10.1044/1092-4388(2010/09-0042)

Vellutino, F.R., Scanlon, D.M., & Chen, R. (1995) The increasingly inextricable relationship between orthographic and phonological coding in learning to read: Some reservations about current methods of operationalizing orthographic coding. In V. Berninger (Ed.), *The varieties of orthographic knowledge II: Relationships to phonology reading, and writing* (pp. 47–111). Dordrecht: The Netherlands.

Vogindroukas, I., Protopapas, A., & Sideridis, G. (2009) *Expressive vocabulary assessment* [in Greek] (Greek version of Renfrew Word Finding Vocabulary Test). Chania, Crete: Glafki.

Wang, S., & Gathercole, S.E. (2013) Working memory deficits in children with reading difficulties: memory span and dual task coordination. *Journal of experimental child psychology, 115 (1),* 188-97.

World Health Organization (2018) *International statistical classification of diseases and related health problems* [Accessed 3th May 2019] Available from World Wide Web: https://icd.who.int/browse11/I-m/en

Wright, L., Pring, T., & Ebbels, S. (2017) Effectiveness of vocabulary intervention for older children with (developmental) language disorder. *Interventional Journal of Language & Communication Disorders* [Accessed 7th December 2017] Available from World Wide Web: https://doi.org/10.1111/1460-6984.12361