

Measuring working memory in SLI using sentence repetition

Elena Theodorou

Cyprus University of Technology
eleni.theodorou@cut.ac.cy

Maria Kambanaros

Cyprus University of Technology
maria.kambanaros@cut.ac.cy

Kleanthes K. Grohmann

University of Cyprus
kleanthi@ucy.ac.cy

Abstract

Given the significance of sentence repetition as a possible clinical marker across languages for specific language impairment (SLI), this study investigates Cypriot Greek. It reports on the clinical utility of a sentence repetition task (SRT) to distinguish children with SLI from those with typical language development (TLD). The research questions address (i) quantitative differences on SRT abilities between children with SLI ($n=16$) and TLD ($n=22$), (ii) SRT performance influenced by sentence length as related to short-term working memory span, and (iii) possible correlations of SRT scores with a global language test used for the identification of SLI in Cyprus.

Keywords: Cypriot Greek, diagnostic verbal IQ, language tests, Raven's Coloured Progressive Matrices, sentence repetition, specific language impairment

1. Introduction

Sentence repetition tasks tap into the ability of an individual to repeat the exact wording of what was just heard. Sentence repetition has been extensively used to explore language and processing abilities of monolingual children with and without language impairment across languages, such as English (Conti-Ramsden, Botting & Faragher 2001; Redmond, Thompson & Goldstein 2011; Seeff-Gabriel, Chiat & Dodd 2010; see also Riches et al. 2010 for an overview), Cantonese (Stokes et al. 2006; Stokes & Fletcher 2003), Czech (Smolík & Vávru 2014), Dutch (Rispen 2004), Italian (Devescovi & Caselli 2007), and French (Leclercq et al. 2014; Thordardottir et al. 2011).

Researchers have highlighted several advantages of sentence repetition. First, it is easy to administer and analyze (Lust, Flynn & Foley 1996). Second, it can probe specific grammatical structures by targeting well-selected items in a controlled

context not easily accessible by spontaneous language measures. Third, the fact that it is implemented on a one-to-one basis provides the examiner with the opportunity to observe how individual children perform on the task. In addition, it is a natural skill that needs little effort, and even young children recall sentences willingly.

A further issue relates to the type of the sentences included in a sentence repetition task. For the purposes of this study, complex structures were selected, assuming that even the younger participants had already acquired simpler structures. Structures are considered complex when long-distance relations appear between displaced elements and the position in which they receive their thematic role. When sentences are long enough, the participant cannot simply copy. Therefore, participants resort to their grammatical system in order to be able to repeat the sentences by processing, analyzing, and reconstructing the meaning of the sentences. This can only be done successfully if the participant has already acquired the relevant grammatical structure (Marinis & Armon-Lotem 2015).

In other words, in order to repeat a sentence, a child has to know the syntax of the syntactic structure of the sentence, which resides in long-term memory (Woon et al. 2014). This stands in contrast to claims that a repetition task is only a test of short-term memory span, meaning that children recall sentences in a way that reflects their sentence processing abilities rather than language abilities (Karmiloff & Karmiloff-Smith 2001). However, Marinis and Armon-Lotem (2015) discuss the notion of sentence length as related to the child's age, memory capacity, and linguistic abilities.

In another group of studies, a significant correlation of sentence repetition with a number of widely used language assessments for English was found (see Chiat & Roy 2008 and references within), such as the Preschool Language Scale-3 (Boucher & Lewis 1997), the Receptive and Expressive One Word Picture Vocabulary Tests (Brownell 2000), and the Sentence Recall Subtest of the CELF (Wiig, Secord & Semel 1992).

This paper explores sentence repetition as a task for children acquiring Cypriot Greek, both typically developing and language-impaired children.

2. Research questions

The research questions of the present study are threefold:

1. Does a sentence repetition task that elicits complex morphosyntactic structures reveal differences in performance between children with specific language impairment and a group of control children with typical language development?
2. Are children's sentence repetition abilities related to working memory capacity as determined by sentence length?
3. Does performance on the sentence repetition task correlate with global language and non-verbal IQ assessment measures?

3. Method

3.1 Participants

Thirty-eight Greek Cypriot children aged 5 to 9 years participated in this study. The children were divided into two groups: a clinical group of children with specific language impairment (SLI) and a chronologically age-matched control group of children with typical language development (TLD).

All children came from the Limassol district, and the majority attended public pre-primary or primary schools. Subject selection criteria included: (i) no known history of neurological, emotional, developmental, or behavioural problems; (ii) hearing and vision adequate for test purposes after school screening at the beginning of the school year; (iii) broadly normal non-verbal performance; (iv) no gross motor difficulties; and (v) medium to high socio-economic status. This information was obtained either from the children's speech-language therapists and teachers or from their parents.

A group of 16 children with clinically identified SLI served as the target group. The group included 10 boys and 6 girls ranging in age from 4;11 to 8;1 (years; months). Gender distribution in the SLI group reflected known prevalence of gender (Tomblin et al. 1997). For our initial comparison with the control group, the children with SLI were split into two groups, a group of 9 younger children (SLI-Y, below 6;6) and a group of 7 older children (SLI-O, above 6;6).

Children were identified as SLI by certified speech and language therapists based on case history information, informal testing of comprehension and production abilities, analysis of spontaneous language samples, and clinical observation. Children with SLI included in the study were receiving speech and language therapy services by practitioners in private settings. Only one child was receiving school-based language remediation.

The group of children with typical language development (TLD) comprised 22 children, 12 boys and 10 girls, ranging in age from 4;5 to 8;7. The control group was also divided into two groups according to chronological age. The younger group of TLD children included 6 boys and 4 girls (TLD–Y, below the age of 6;6), while the older group of TLD children included 6 boys and 6 girls (TLD–O, above 6;6).

The mean age of the TLD–Y group was 5;8 (controls for SLI–Y at 5;6), and for the TLD–O group 7;10 (SLI–O at 7;8). Note that in our later analysis, we will collapse both groups again, as discussed below, since no age-discriminant results could be detected for the tasks at hand.

According to the classroom teacher and parent report, each participant was typically developing in all respects. No child was previously referred to or had received treatment by a speech and language therapist. All children came from families with a medium to high socio-economic status as measured by the mother's education level using the database of the European Social Survey (2010)¹. Demographic information on the participating children is reported in Table 1.

Group	Age range	Number of participants	Mean (SD)	Sig. (2-tailed)	Gender	Mo's ed. (SD)	Sig. (2-tailed)
TLD–Y	4;5–6;6	10	5;8 (0;6)	0.38	6M, 4F	4.4 (1.1)	.01
SLI–Y	4;11–5;11	9	5;6 (0;3)		7M, 2F	3.7 (0.5)	
TLD–O	6;7–8;7	12	7;10 (0;6)	0.54	6M, 6F	3.6 (0.8)	.38
SLI–O	6;7–8;1	7	7;8 (0;8)		3M, 4F	3.1 (0.9)	

Key: SD = standard deviation; Sig. = probability (*p*-value); Mo's ed. = mother's education; TLD = children with typical language development; SLI = children with specific language impairment; Y = younger; O = older; M = male; F = female; Mother's education: 0 = did not complete primary education, 1 = completed primary education, 2 = completed high school, 3 = completed lyceum, 4 = diploma, 5 = university degree, 6 = master qualifications, 7 = PhD qualification

Table 1: Participants' details

3.2 Background testing

Prior to the study proper, all children were tested on a global language measure used

¹ It is assumed that sentence repetition does not seem to be influenced by factors such as socio-economic status and gender (Seeff-Gabriel, Chiat & Dodd 2010); however, more recent evidence is contradictory, since there are studies that have contended there is a relation between high SES and better performance on SRT (Balladares, Marshall & Griffiths 2016; Roy, Chiat & Dodd 2014).

for research purposes in Cyprus and on the Raven's Coloured Progressive Matrices. Both assessment measures and results are reported below.

3.2.1 Global language measure (DVIQ)

Children's language abilities were measured using the Diagnostic Verbal IQ Test (DVIQ) (Stavrakaki & Tsimpli 2000). This test is used by language researchers and clinicians to assess language abilities for Greek. It has five sub-parts: expressive vocabulary, comprehension of morphosyntax, production of morphosyntax (e.g., grammatical suffixes, tense inflections, clitics, articles, agreement, relative clauses), comprehension of metalinguistic concepts, and sentence repetition/recall.

Each child was tested individually on all subtests, which involved naming and showing pictures as well as repeating sentences. Children's responses were recorded on answer sheets, and later analyzed and scored. Each correct response received 1 point, with the exception of the sentence repetition subtest which was scored according to the number of errors in each repetition (maximum score of 3 points correct for each sentence).

The DVIQ has been used in published studies for the identification of children with SLI in Cyprus (Kambanaros et al. 2013, 2014; Petinou & Okalidou 2006). There is now also a version of the DVIQ adapted to Cypriot Greek (Theodorou 2013; Theodorou, Kambanaros & Grohmann 2016), which was employed in this study.

The results are shown in Table 2.

	Mean (SD)		Sig. (2-tailed)	Effect size Cohen's <i>d</i>
	TD-Y (<i>n</i> =10)	SLI-Y (<i>n</i> =9)		
Vocabulary	22.9 (2.18)	16.78 (2.82)	.000**	2.761
Production: Morphosyntax	19.8 (2.1)	13.89 (2.71)	.000**	2.456
Comprehension: Metalinguistic Knowledge	19.9 (1.8)	18 (3.87)	.180	0.642
Comprehension: Morphosyntax	25.4 (2.6)	24.56 (3.84)	.578	0.259
Sentence Repetitions	45.50 (2.51)	40.89 (2.47)	.001**	1.850
TOTAL DVIQ	133.50 (7.63)	114.11 (10.45)	.000**	2.139

	TD-O (n=12)	SLI-O (n=7)		
Vocabulary	24.67 (1.61)	20.57 (1.81)	.000**	2.436
Production: Morphosyntax	21.33 (1.37)	14.58 (1.9)	.000**	4.279
Comprehension: Metaling. Knowledge	22.58 (1.88)	19 (1.73)	.001**	1.958
Comprehension: Morphosyntax	28.58 (1.38)	26.43 (2.23)	.047*	1.238
Sentence Repetitions	47.33 (0.985)	42.29 (2.36)	.000**	3.130
TOTAL DVIQ	144.50 (4.17)	122.86 (6.31)	.000**	4.302

Key: SD = standard deviation; Sig. = significance probability (p-value); TLD = children with typical language development; SLI = children with specific language impairment; Y = younger; O = older
 NB: Asterisks indicate the significance level (** $p < 0.01$, * $p < 0.05$).

Table 2: Results

3.2.2 Non-verbal IQ (RCPM)

All participating children were tested on the Raven's Coloured Progressive Matrices (RCPM) (Raven & Court 1998) to confirm that all participants show non-verbal performance within the broad range of normal based on Greek norms (Sideridis et al. 2015). This requirement was satisfied for each child separately, and there were no statistically significant differences in non-verbal IQ between the SLI groups and the TLD control groups. Table 3 provides children's non-verbal performance scores.

Groups	Mean (SD)		Sig. (2-tailed)
	TLD (n=10)	SLI (n=9)	
Younger	95.9 (17.19)	106.66 (7.43)	.09
Older	TLD (n=12)	SLI (n=7)	
	97.0 (16.15)	95.86 (19.47)	.89

Key: SD = standard deviation; Sig. = significance probability (p-value); n = number of participants; TLD = children with typical language development; SLI = children with specific language impairment

Table 3: Performance on the RCPM

3.3 Sentence repetition task

The ability of children to repeat syntactically complex sentences was assessed using a sentence repetition task (SRT). The test consisted of 24 items exploring six morphosyntactic operations for (Cypriot) Greek with four sentences each: subject and object relative clauses (1), embedded 'that'-clauses (2), adjunct 'because'-clauses (3), negative sentences (4), and subjunctive *na*-clauses (5).

- (1) Vlepo ti ⁿgota pu aⁿgałazi i ȳata.
I am watching the hen that the cat is hanging.
- (2) Ipes oti i jaja emairepse su to fai.
You said that granny cooked your food.
- (3) I daskala tu eȳirokrotise ⁿdon jati itan ȳcevazmenos.
His teacher applauded him because he had done his homework.
- (4) O mixalis eⁿdo to epline to proi.
Michalis didn't wash it in the morning.
- (5) Prepi na mu to ȳocis sto parko.
You must give it to me at the park.

Sentence length ranged from 9 to 23 syllables ($M = 15.54$, $SD = 4.34$), resembling the length of sentences that appear in fairy-tales read by pre-primary schoolteachers as well as the length of sentences appearing in first-grade readers. As for vocabulary, everyday and high-frequency words were used (e.g., 'mum', 'granny', 'baby', 'want', 'say', and 'wash'), minimising the possibility of a vocabulary gap effect on sentence repetition performance through unknown words.

3.4 Procedure

Participants were asked to listen to the 24 pre-recorded sentences from the SRT spoken by the first author, who is a native speaker of Cypriot Greek, to ensure that all participants hear the sentences in the same way. After listening to each sentence, children were asked to repeat the sentence as close to the original as possible. The stimuli were audio-recorded and presented in PowerPoint on a laptop in a fixed order. On the computer screen a green circle would appear in order to keep the attention of the child away from other distractions in the room.

The children were tested individually either by the first author or by a trained research assistant. Children's responses were audio-recorded and then transcribed for later scoring.

3.5 Scoring

Two different methods of scoring were employed due to Redmond's (2005) claim that in order for a task to be included in a battery aiming to detect children with SLI, a finer scoring procedure is required. Therefore, first the responses were scored as

correct when a sentence was repeated exactly (1 point), with all sentence elements included (Scoring Method 1). For the 24 sentences, the possible score range using this method was thus 0 to 24. For the second scoring method (Scoring Method 2), responses were scored according to the number of errors made per sentence (see Conti-Ramsden, Botting & Faragher 2001). In this case, items were scored on a 0–3 scale, with 3 representing an exact repetition of the target sentence, 2 representing one repetition error, 1 representing a sentence repetition with two or three errors, and 0 for more than three errors. The maximum possible score using Scoring Method 2 was thus 72.

For the purposes of the two scoring methods, phonological errors were not taken into consideration, since the vast majority of the SLI participants also exhibited some phonological difficulties. The data were transcribed and scored by the first author (a trained speech-language therapist). Second scoring was carried out on 20% of the data by the second author (also a speech-language therapist); word-by-word inter-rater reliability was excellent, at 98.2%.

4. Results

Overall, all child participants found the task interesting and participated willingly. Complete datasets are available from the authors.

4.1 Group differences

Performance on the SRT by the four groups was compared in terms of the two scoring methods. Table 4 displays the group means and standard deviations obtained by the SLI groups and the TLD groups on each of the two scoring methods used.

	Group	Mean	SD
Scoring Method 1 (out of 24)	TLD–Y	14.6	3.098
	TLD–O	18.2	4.366
	SLI–Y	7.9	3.790
	SLI–O	11.0	5.164
Scoring Method 2 (out of 72)	TLD–Y	57.6	5.777
	TLD–O	63.5	7.379
	SLI–Y	40.2	13.890
	SLI–O	49.9	9.668

Table 4: Group performances on the SRT

To examine whether the task yielded significant differences between the groups, an analysis of variance (ANOVA) was conducted. The test revealed significant differences within the groups on both methods, Scoring Method 1 ($F_{3, 34}=11.92, p = .00$) and Scoring Method 2 ($F_{3, 34} = 11.47, p = .00$).

In order to discover the groups that differ significantly, a post-hoc Scheffé test was conducted. For Scoring Method 1, it yielded a significant difference between the younger children with SLI and the younger TLD children ($p = .012$) as well as between the younger children with SLI and the older TLD children ($p = .000$); the older children with SLI differed significantly from the older TLD children ($p = .009$). No significant difference was detected between the younger and the older children in both cases, neither between the younger and the older TLD children ($p = .266$) nor between the younger and the older children with SLI ($p = .526$).

Moving on to Scoring Method 2, significant differences were revealed for the same groups as shown by the Scheffé test. Thus, the younger children with SLI differed significantly from the younger TLD children ($p = .04$) and the older TLD children ($p = .00$); the older children with SLI were found to perform significantly different from the older TLD children ($p = .039$). As above, no differences were found between the younger and the older children in each group, neither for TLD nor for SLI ($p = .266$ and $p = .549$, respectively).

Summarising so far, in line with studies on other languages (see above), Cypriot Greek-speaking children with SLI performed significantly below their TLD peers, rendering the task a potential clinical marker. A clinically relevant result was that the performance of children did not differ as a function of age, permitting us to treat the participants as two groups, children with SLI and TLD children, for the remainder of the analysis.

4.2 Correlation results

4.2.1 Short-term working memory span

In order to examine the correlation of the SRT with short-term working memory, the items included in the task were divided according to sentence length. A sentence was classified as *short* when its length was less than 15 syllables and as *long* with a sentence length of 16 syllables and more. The percentage performance of all groups in relation to sentence length is shown in figure 1. Overall, while all groups of children

faced greater difficulty repeating long sentences, the difference between short and long sentence repetition is greater for the children with SLI.

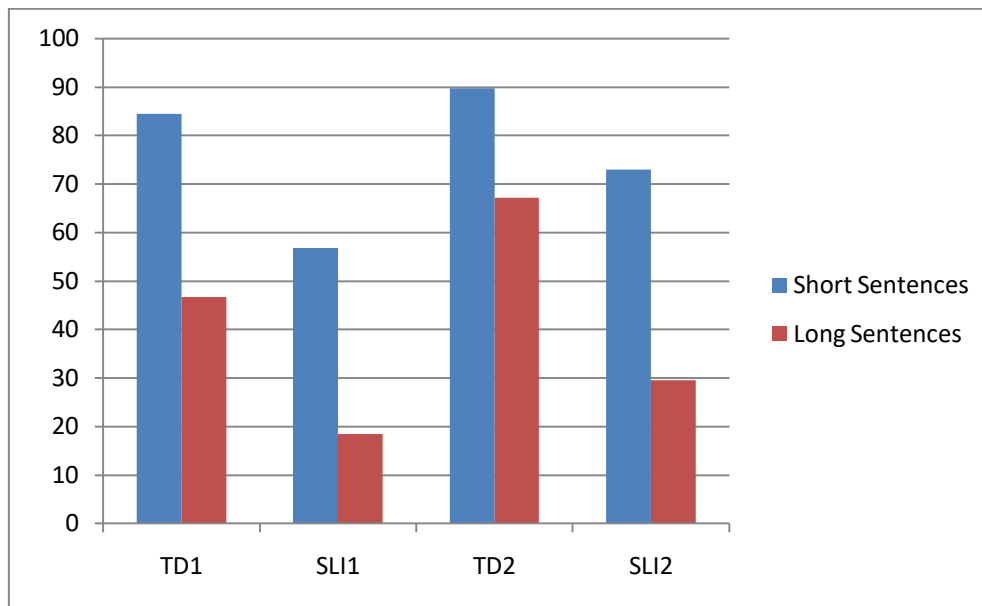


Figure: Performance in relation to sentence length (percentage correct)

4.2.2 Global language measure

Correlations were used to examine the relationship between participants', namely children with TLD and children with SLI², performance on the SRT and their scores on a global language measure, the DVIQ with its five subtests which examine comprehension and production of language in terms of phonology, morphology, syntax, and semantics. The results suggest that the language subtest scores were significantly correlated with both scores of the SRT, yielding very strong ($r > .7$) and strong correlations ($r = .4-.7$). All results are summarised in Table 5.

² For the correlational analysis, due to the small number of participants, the two groups of children were treated as one. Therefore, analysis focused on the relation between performance on the SRT and on a global language measure (DVIQ), and not on how the language status of the participants can affect and differentiate the correlations between the tasks.

<i>Diagnostic Verbal IQ Test (DVIQ)</i>		SRT Scoring Method 1	SRT Scoring Method 2
Vocabulary	Pearson Correlation	.742**	.727**
	Significance (2-tailed)	.000	.000
Production: Morphosyntax	Pearson Correlation	.720**	.688**
	Significance (2-tailed)	.000	.000
Comprehension: Metalinguistic Knowledge	Pearson Correlation	.475**	.396*
	Significance (2-tailed)	.003	.014
Comprehension: Morphosyntax	Pearson Correlation	.484**	.404*
	Significance (2-tailed)	.002	.012
Sentence Repetitions	Pearson Correlation	.766**	.754**
	Significance (2-tailed)	.000	.000
TOTAL DVIQ	Pearson Correlation	.786**	.736**
	Significance (2-tailed)	.000	.00

NB: Asterisks indicate the significance level (** $p < 0.01$, * $p < 0.05$).

Table 5: Correlations between DVIQ and SRT performance (n = 38)

Overall, the correlation analyses suggest that sentence repetition is highly related to measures that examine language grammar. This will be discussed in section 5 below.

4.2.3 Non-verbal IQ

A Pearson correlation coefficient was computed to assess the relationship between RCPM and the SRT scores. Overall, there was no correlation between scoring method 2 and participants' scores on the non-verbal IQ task (RCPM). A marginal negative correlation was found between the scores and scoring method 1, meaning that a change in one measurement affects the other in an opposite way.

	SRT Scoring Method 1	SRT Scoring Method 2
RCPM	-.330* ($p = .043$)	.300 ($p = .067$)

NB: Asterisks indicate the significance level ($p < .05$).

Table 6: Relationship between RCPM and SRT scores

5. Discussion

The primary interest of this study was to compare sentence repetition performance of Cypriot Greek-speaking children with SLI to that of TLD peers to determine whether there are significant differences between and within the groups. The second goal was to identify the relationship between sentence repetition abilities and short-term working memory as related to sentence length. Third, we investigated whether

sentence repetition performance correlated with global language abilities and with non-verbal IQ.

With regards to our first research question, the SRT yielded overall significant differences in the performance of children with SLI compared to that of the children with TLD. The outcome confirms previous research findings for other languages, such as English, Cantonese, Czech, Dutch, Italian, and French (see section 1 above for references). Besides conducting an analysis for both groups of typically developing and language-impaired children, a further analysis between younger and older groups did not reveal any significant difference. This outcome suggests that, at least for the set of structures included, age did not play a role.

In relation to our second research question, sentence length was found to be a significant predictor of language-impaired children's abilities to successfully repeat a sentence. This suggests that working memory is a factor that warrants further investigation using, in addition to an SRT, specific non-verbal tools that tap into this domain (e.g., digit recall).

Our third research question based on the correlation analyses conducted to examine the relationship between sentence repetition and global language abilities. This proved to be significant, given the strong correlations found. Specifically, sentence repetition was found to be related with measures that examine grammatical skills—phonology, morphosyntax, and semantics. This lends support to the assumption in the relevant literature that sentence repetition can be used as a clinical marker for the identification of SLI—and in the present case, for Cypriot Greek. Our findings allow us to adopt the claim put forward in the past by Lust, Flynn and Foley (1996), namely that the performance on a sentence repetition task could be considered an indicator of a child's grammatical ability. Indeed, it is not suggested that sentence repetition can provide a detailed description of the language profile of the child, but in order to get a detailed description, further assessment is required. Moreover, sentence repetition abilities did not correlate with fluid intelligence as measured by the RCPM.

It is important to point out some of the limitations of this investigation. First, the sample size is small and the age range quite large. However, this seems acceptable in the relevant published literature; thus Stokes et al. (2006) and Seeff-Gabriel, Chiat and Dodd (2010) investigated 16 and 13 children with SLI, respectively. Second, no filler items eliciting declarative sentences were used.

Another issue that has come to light concerns task construction. A future study should take into consideration known issues about language development and impairment in the language (Cypriot Greek and Standard Modern Greek)—structures which are expected to develop at the ages under examination rather than only the structural complexity aspect. In this way, the task will become even more specific to complex structures that are well documented as problematic, such as relative clauses (Theodorou & Grohmann 2013) and *wh*-questions (Varnava & Grohmann 2014).

In addition, in order for the task to be administered for diagnostic purposes, cut-off scores should be established (Stokes et al. 2006), similar to what has been done for measures in English (Conti-Ramsden, Botting & Faragher 2001). But this is the bigger issue that concerns all language- or variety-specific adaptations of diagnostic tools and the work that comes with it: after successful piloting, large databases need to be created for all tools on the basis of large-scale testing (numbers of children, inclusive age groups, and other variables). We admit that for (Cypriot) Greek, there is much room for fine-tuning existing tools to make the step from clinically relevant research tool to bona fide diagnostic battery (see for detailed discussion, Theodorou, Kambanaros & Grohmann 2016).

6. Conclusion

Research has shown that sentence repetition is a useful task for identifying children's language abilities alongside other language-specific testing tools. The results of the present study indicate that a sentence repetition task appears to differentiate children with SLI from their TLD peers. The outcome of the study can be considered a starting point for more research on the topic particularly in relation to working memory and sentence repetition success.

References

- Balladares, J., C. Marshall & Y. Griffiths (2016). Socio-economic status affects sentence repetition, but not non-word repetition, in Chilean preschoolers. *First Language* 36(3): 338-351.
- Boucher, J. & V. Lewis (1997). *Preschool language scale-3* (UK edn., adapted for the UK). Sidcup: The Psychological Corporation.
- Brownell, R. (2000). *Receptive and expressive one word picture vocabulary tests* (2nd edn.). Novato, CA: Academic Therapy Publications.
- Chiat, S. & P. Roy (2008). Early phonological and sociocognitive skills as predictors of later language and social communication outcomes. *Journal of Child Psychology and Psychiatry* 49: 635-645.
- Conti-Ramsden, G., N. Botting & B. Faragher (2001). Psycholinguistic markers for SLI. *Journal of Child Psychology and Psychiatry* 42: 741-748.
- Devescovi, A. & C. Caselli (2007). Sentence repetition as a measure of early grammatical development in Italian. *International Journal of Language & Communication Disorders* 42(2): 187-208.

- European Social Survey (2010). *Round 5 source showcards*. London: City University London, Centre for Comparative Social Surveys.
- Kambanaros, M., K.K. Grohmann, M. Michaelides & E. Theodorou (2013). Comparing multilingual children with SLI to their bilingual peers: Evidence from object and action picture naming. *International Journal of Multilingualism* 10(1): 60-81.
- Kambanaros, M., K.K. Grohmann, M. Michaelides & E. Theodorou (2014). On the nature of verb-noun dissociations in bilingual SLI: A psycholinguistic perspective from Greek. *Bilingualism: Language and Cognition* 17(1): 169-188.
- Karmiloff, K. & A. Karmiloff-Smith (2001). *Pathways to language: From foetus to adolescent*. Cambridge, MA: Harvard University Press.
- Leclercq, A., P. Quémar, D. Magis & C. Maillart (2014). The sentence repetition task: A powerful diagnostic tool for French children with Specific Language Impairment. *Research in Developmental Disabilities* 35(12): 3423-3430.
- Lust, B., S. Flynn & C. Foley (1996). What children know about what they say: Elicited imitation as a research method for assessing children's syntax. In D. McDaniel, C. McKee & H. Smith Cairns (eds), *Methods for assessing children's syntax*. Cambridge, MA: MIT Press, 55-76.
- Marinis, T. & S. Armon-Lotem (2015). Sentence repetition. In S. Armon-Lotem, J. de Jong & N. Meir (ed.), *Methods for assessing multilingual children: Disentangling bilingualism from language impairment*. Bristol: Multilingual Matters, 95-124.
- Petinou, K. & A. Okalidou (2006). Speech patterns in Cypriot-Greek late talkers. *Applied Psycholinguistics* 27: 335-353.
- Raven, J. & J. Court (1998). *Raven's progressive matrices*. San Antonio, TX: Harcourt Assessment.
- Redmond, S.M. (2005). Differentiating SLI from ADHD using children's sentence recall and production of past tense morphology. *Clinical Linguistics and Phonetics* 19: 109-127.
- Redmond, S.M., H.L. Thompson & S. Goldstein (2011). Psycholinguistic profiling differentiates Specific Language Impairment from typical development and from Attention-deficit/hyperactivity disorder. *Journal of Speech, Language, and Hearing Research* 54(1): 99-117.
- Riches, N.G., T. Loukas, G. Baird, T. Charman & E. Simonoff (2010). Sentence repetition in adolescents with specific language impairments and autism: An investigation of complex syntax. *International Journal of Language and Communication Disorders* 45: 47-60.
- Rispens, J.E. (2004). *Syntactic and phonological processing in developmental dyslexia*. PhD dissertation, Rijksuniversiteit Groningen.
- Roy, P., S. Chiat & B. Dodd (2014). *Language and socioeconomic disadvantage: From research to practice*. London, UK: City University London.
- Seeff-Gabriel, B., S. Chiat & B. Dodd (2010). Sentence imitation as a tool in identifying expressive morphosyntactic difficulties in children with severe speech difficulties. *International Journal of Language and Communication Disorders* 45(6): 691-702.
- Sideridis, G., F. Antoniou, A. Mouzaki & P. Simos (2015). *Raven's coloured progressive matrices and vocabulary* [in Greek]. Athina: Motivo.
- Smolík, F. & P. Vávru (2014). Sentence imitation as a marker of SLI in Czech: Disproportionate impairment of verbs and clitics. *Journal of Speech, Language, and Hearing Research* 57(3): 837-849.
- Stavarakaki, S. & I.M. Tsimpli (2000). Diagnostic verbal IQ test for Greek preschool and school age children: Standardization, statistical analysis, psychometric properties [in Greek]. In *Proceedings of the 8th Symposium of the Panhellenic Association of Logopedists*. Athens: Ellinika Grammata, 95-106.
- Stokes, S. & P. Fletcher (2003). Aspectual forms in Cantonese children with Specific Language Impairment. *Linguistics* 41: 381-405.
- Stokes, S., A. Wong, P. Fletcher & L. Leonard (2006). Nonword repetition and sentence repetition as clinical markers of Specific Language Impairment The case of Cantonese. *Journal of Speech, Language, and Hearing Research* 49: 219-236.
- Theodorou, E. (2013). *Specific language impairment in Cypriot Greek: Diagnostic and experimental investigations*. PhD dissertation, University of Cyprus, Nicosia.
- Theodorou, E. & K.K. Grohmann (2013). The acquisition of relative clauses in Cypriot Greek: Production and comprehension. *Diacrítica* 26: 271-300.
- Theodorou, E., M. Kambanaros & K.K. Grohmann (2016). Diagnosing bilingual children with (S)LI: Determination of identification accuracy. *Clinical Linguistics and Phonetics* 30(12): 925-931.
- Thordardottir, E., E. Kehayia, B. Mazer, N. Lessard, A. Majnemer, A. Sutton, N. Trudeau & G. Chilingaryan (2011). Sensitivity and specificity of French language and processing measures for the

- identification of primary language impairment at age 5. *Journal of Speech, Language, and Hearing Research* 54: 580-597.
- Tomblin, B.J., N.L. Records, P. Buckwalter, X. Zhang, E. Smith & M. O'Brien (1997). Prevalence of Specific Language Impairment in kindergarten children. *Journal of Speech, Language, and Hearing Research* 40: 1245-1260.
- Varnava, M. & K.K. Grohmann (2014). The development of the comprehension of *wh*-questions and the notion of exhaustivity in Cypriot Greek. *Linguistic Variation* 14(1): 69-108.
- Wiig, E.H., W.A. Secord & E.M. Semel (1992). *Clinical evaluation of language fundamentals – Preschool*. San Antonio, TX: The Psychological Corporation.
- Woon, C.P., N.T. Yap, H.W. Lim & B.E. Wong (2014). Measuring grammatical development in bilingual Mandarin–English speaking children with a sentence repetition task. *Journal of Education and Learning* 3(3): 144-157.