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The use of digit and sentence repetition in the identification of language impairment: The case of child speakers of Afrikaans and South African English

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Abstract
There is a great need for an instrument that can accurately identify children with language problems early, regardless of the language(s) they speak. Certain tasks have been identified as potential markers of language impairment, including sentence repetition and digit repetition (Ziethe, Eysholdt and Doellinger 2013: 1). The purpose of this study was to compare the sensitivity of these two potential markers in order to compile an accurate measuring instrument for language impairment in Afrikaans and South African English (SAE). The participants were 20 typically developing (TD) Afrikaans- and 20 TD SAE-speaking 5-year-olds, as well as five Afrikaans- and five SAE-speaking 5-year-olds with language impairment (LI). Sentence and digit repetition tasks were devised, recorded on CD, and performed by each participant individually. Both groups with LI performed poorly, and significantly more poorly than their corresponding TD group, on both repetition tasks. For both languages, (i) sentence repetition distinguished best between the participants with and without LI, and (ii) some items proved to be more sensitive than others for the difference between the performance of the TD and the LI groups. These items may be appropriate for inclusion in a screening tool for LI in 5-year-olds. The availability of language screening tools in several of South Africa's languages can be of value to child language researchers and speech-language therapists. This study demonstrated that devising such tools could be a feasible endeavour. In contrast to diagnostic language assessment instruments, screening tools that employ repetition tasks can be devised relatively quickly and economically, and can contribute to the early identification of children with language problems in the interim, while diagnostic instruments are developed.

Keywords: sentence repetition, digit repetition, language impairment, Afrikaans, South African English

1. Introduction

It is widely acknowledged that there is a dearth of standardised language assessment instruments available for use with South African children (Demuth, Moloi and Machobane 2010; Pascoe and Norman 2011; Penn 1998; Solarsh and Alant 2006). In the absence of such

standardised instruments to identify language impairment (LI), speech-language therapists and other child language professionals often make use of informal assessment when attempting to differentially diagnose language problems in South African children. They base such assessment on clinical markers of LI,[1] where a clinical marker is a manifestation which is characteristic of a specific condition (Archibald and Joanisse 2009: 900). Two such markers identified for a range of languages in the international literature are low scores on sentence and digit repetition tasks (Ziethe, Eysholdt and Doellinger 2013: 1). The main aim of this study is to ascertain whether sentence repetition and digit repetition are indeed clinical markers of LI in Afrikaans and South African English (SAE), i.e., whether these types of repetition can differentiate between child speakers of these languages with and without LI. Further aims were (i) to ascertain whether different scoring methods affect the sensitivity of sentence and digit repetition tasks towards LI, and (ii) to determine which types of items are most successful at differentiating between children with and without LI in Afrikaans and in SAE. Although Afrikaans and English are the best resourced of all South African languages in terms of language assessment material, they were selected for study here because

(i) the available English materials are almost invariably in a non-South African variety of English (usually British or American English) and are thus lexically and often also syntactically and phonologically inappropriate for use with child speakers of SAE. In a repetition task, these are important considerations because if an unknown word from a different language variety is used, or if a known word is pronounced in an unfamiliar manner, then such a word could in fact be deemed a nonsense word, changing the nature of the task in that instance from digit or sentence repetition to digit or sentence repetition with elements of nonsense word repetition;

(ii) no standardised Afrikaans-medium repetition task yet exists, even though Afrikaans is the language with the third largest home language speaker base in South Africa and the majority language in the province in which the study was conducted (the Western Cape),

[1] The type of language impairment referred to here is so-called "specific language impairment". The term describes a significant impairment in oral language abilities (despite adequate exposure to language) where the cause of the language impairment is not always obvious or where the language impairment appears to be the primary impairment of the person (see Leonard 1998: vi, Stark and Tallal 1981). This impairment can affect more than one language domain, including phonology, syntax, morphology, pragmatics and the lexicon (Gallon, Harris and Van der Lely 2007: 435, Tattersall 2010: 2). It is a "relatively common developmental condition" (Archibald and Alloway 2008: 168), affecting approximately 7% of the total population (Conti-Ramsden and Durkin 2007: 147). Note however that the term "specific language impairment" has become contentious. As stated by Bishop (2014: 389), "if by 'specific' we mean that the child has no problems other than with language, then this is clearly an inappropriate term if ADHD or DCD [developmental coordination disorder, also termed "developmental dyspraxia"] is also present. If, however, we take 'specific' to mean 'idiopathic' or 'functional', i.e. with no known cause, then the term is still applicable, because the co-occurring condition is not an explanation for the language problems". It is in this latter sense that "language impairment" (instead of "specific language impairment") is used here: the presence of other conditions neither predicts nor precludes a diagnosis of language impairment. Whilst "specific language impairment" is widely used in academic or research settings, it is not as familiar a term in clinical or educational settings, and so we opted here for the more neutral yet somewhat non-descript "language impairment" instead of "specific language impairment", following the recommendation of Reilly, Tomblin, Law, McKean, Mensah, Morgan, Goldfeld, Nicholson and Wake (2014) instead of that of Snowling (2014). That said, we acknowledge that the term "language impairment" is not unproblematic either (see Leonard 2014: 437), nor is any of the other proposed replacements for "specific language impairment", such as "primary language impairment", "language delay", "language disorder", "developmental dysphasia", "developmental language disorder/impairment" or "language learning impairment" (Reilly, Bishop and Tomblin 2014: 457-460).

with 49.7% of those residing in this province using it as home language (Statistics South Africa 2012: 11-13).

2. Literature review: Digit repetition and sentence repetition

Conti-Ramsden, Botting and Faragher (2001) investigated the sensitivity and specificity of repetition tasks and tasks assessing grammatical morphology, the latter being another known clinical marker of LI (see Marchman, Wulfeck and Weismer 1999; Rice and Wexler 1996). They found that the repetition tasks were sensitive for LI in 11-year-olds (i.e., they identified children who are indeed impaired) but the grammatical morphology tasks were not. Similarly, Ziethe et al. (2013: 1) found that a group of 5-year-old children with LI performed worse than their typically developing (TD) peers on tasks involving sentence repetition and digit repetition. Furthermore, whereas digit repetition could identify those children with severe impairment, sentence repetition could identify those with less severe impairment as well. This indicates that sentence repetition has a higher sensitivity than digit repetition. Although digit and sentence repetition have also both been identified as clinical markers of LI in adulthood (Poll, Betz and Miller 2010: 414), sentence and digit repetition tasks are generally recognised in the literature as effective in the identification of children with LI (Fletcher, Leonard, Stokes and Wong 2006: 223). Relevant research findings pertaining to these two markers of LI are briefly discussed below.

2.1 Sentence repetition

Sentence repetition is a task in which a person is required to immediately repeat a sentence presented auditorily (Archibald and Joanisse 2009: 901). It provides information on the strengths and weaknesses of a person's language (Marinis 2010). There are indications that sentence repetition, in contrast to many other language assessment methods, is little affected by socio-economic status. It thus provides information on a child's language skills independent of the influence of environmental factors (Marinis 2010).

Sentence repetition provides insight into a range of language and language-related skills in various languages (Seeff-Gabriel, Chiat and Dodd 2010: 692). These skills include morpho-syntactic skills of children (e.g. Verhoeven, Steenge, Van Weerdenburg and Van Balkom 2011: 1801), short term memory of persons with dyslexia (Roach and Hogben 2007: 773), and general expressive language abilities (see Archibald and Alloway 2008: 170). According to Bernstein Ratner (2000: 293), there is

> general agreement by researchers working over the past 30 years that sentences constructed at a level slightly above that observed in the child's spontaneous speech are regularized in ways that reflect both the child's extraction of form and meaning and the child's productive linguistic capacity.

Archibald and Joanisse (2009) found that sentence repetition has a high sensitivity for language disorder, as did Conti-Ramsden et al. (2001). The latter group of authors found sentence repetition to have a sensitivity and specificity of 90% and 85%, respectively. Sentence repetition has also been shown to provide an accurate indication of LI in adults (Poll et al. 2010: 424). Sentence repetition differentiates well between English-speaking children of the same age with and without LI and, to a certain extent, between children with a primary LI and those with other diagnoses who also present with language disorder (Botting and Conti-Ramsden 2003;

Marinis 2010; Thordardottir, Kehayia, Mazer, Lessard, Majnemer, Sutton, Trudeau and Chilingaryan 2011: 582 and 591). According to Fletcher et al. (2006: 232), the ability to repeat sentences is, to a great extent, determined by the child's language abilities. This makes sentence repetition a good means of assessing for LI in children.

2.2 Digit repetition

Digit repetition requires a person to repeat in the correct order a series of digits presented auditorily (Rispens and Baker 2012: 687, Thordardottir et al. 2011: 587). Conti-Ramsden and Hesketh (2003) assessed four potential markers of LI, namely past tense production, noun plural production, nonsense word repetition and digit repetition, in English-speaking 5-year-olds with and without LI. They found that children with LI fared worse in word and digit repetition than did their TD peers, but not in past tense and plural production (Fletcher et al. 2006: 220). Ziethe et al. (2013: 9) obtained similar results amongst German-speaking 5-year-olds. As such, digit repetition was shown to be a good predictor of children's language skills.

Both sentence and digit repetition tasks have been performed in languages other than English (see e.g. Archibald and Joanisse (2009: 901) for Cantonese). In this study, the aim was to employ sentence and digit repetition with Afrikaans- and SAE-speaking 5-year-olds to ascertain whether these repetition tasks are sensitive for LI in these under-researched languages.

3. Research questions

In an attempt to determine whether digit and sentence repetition are sensitive to LI in Afrikaans and SAE, answers were sought to the following three questions:

Research Question 1:

For Afrikaans and SAE, which repetition task differentiates best between TD children and those with LI?
The hypothesis was that sentence repetition would differentiate better than digit repetition. This hypothesis was based on research findings in other language varieties, e.g. in French (Thordardottir et al. 2011: 591) and Canadian English (Archibald and Joanisse 2009: 901).

Research Question 2:

Which scoring method – percentage correct digits/words calculated per digit series/sentence, or raw score (item as a whole either correct or incorrect) – is more accurate in differentiating between children with and without LI?
The hypothesis was that raw scores would be more accurate in differentiating between children with LI and their TD peers. This hypothesis was based on the assumption that raw scores do not give children with LI any credit for those digits/words that they do repeat correctly; if one digit/word is repeated incorrectly, the whole response is deemed incorrect.

Research Question 3:

Which items, in the digit and sentence repetition tasks separately, differentiate best between Afrikaans and SAE children with and without LI?
The hypothesis was that the phonologically more complex items would differentiate best between TD children and their peers with LI. This hypothesis was based on findings reported in the

literature that increased phonological complexity negatively influences the performance of children on repetition tasks (Acheson and MacDonald 2011: 193, Archibald and Gathercole 2006: 979, Coady and Evans 2008: 16, Gallon et al. 2007: 450, Munson 2001: 779).

4. Methodology and study design

4.1 Purpose of the study

The aim of the study was to answer the three research questions in order to be able to develop a screening tool for LI for use with Afrikaans-speaking and SAE-speaking children. The steps taken to reach our aim were as follows:

(i) To devise a digit and a sentence repetition task in Afrikaans and in SAE;
(ii) To pilot the digit and sentence repetition tasks with a small group of TD Afrikaans-speaking and SAE-speaking children, and to make adjustments on the basis of the findings;
(iii) To conduct the two repetition tasks with Afrikaans-speaking and SAE-speaking children with and without LI;
(iv) To calculate for Afrikaans and for SAE the raw scores as well as percentage correct digits/words per digit series/sentence for the digit and sentence repetition tasks, respectively;
(v) To compare the scores on the two repetition tasks obtained by the TD children with those obtained by the children with LI, for Afrikaans and for SAE separately, in order to ascertain which repetition task differentiates best between children with and without LI in each language;
(vi) To compare the scores rendered by the two scoring methods (raw scores vs percentage correct) to ascertain which is more sensitive towards differences between the TD and LI groups in each language;
(vii) To determine which task items in Afrikaans and SAE best differentiate between children with and without LI.

4.2 General procedure

In this section, the general protocol followed is briefly presented. Several aspects of the protocol are discussed in more detail in the following sections.

Ethical clearance for conducting the study was obtained from the Research Ethics Committee: Humanities at Stellenbosch University. After obtaining the necessary permission from head teachers and daycare proprietors, parents were sent information letters via the schools and daycare centres inviting their children to participate in the study. With this letter were a short background information form and a consent form to be completed by those parents who wanted their children to participate. The background information form was used to determine whether the child met the selection criteria for participation in the TD group. Children with LI were recruited by contacting various speech-language therapists in private practices in and around Cape Town. Those therapists who had Afrikaans- or SAE-speaking 5-year-olds with LI on their case loads were requested to inform the parent of the study and to invite them to let their children participate. These parents received the same letters and forms as those of the TD participants; one notable difference was that the parents of the children with LI consented to the authors obtaining relevant information about their child's previous language assessments from the speech-language therapists.

After obtaining verbal assent from each potential participant, three TD Afrikaans-speaking and three TD SAE-speaking children were selected for participation in a pilot study. In this study, a digit repetition and a sentence repetition task (devised by the first author on the basis of the recommendations found in the literature) were piloted. After adjustments were made to the tasks, they were voice recorded for use in the main study.

A vocabulary test was administered to each potential TD participant in the main study. Children whose scores were age-appropriate were included as participants. The repetition tasks were then administered to each TD and LI participant individually. The first author (a mother tongue speaker of Afrikaans who is also fluent in SAE) administered the tasks to all of the Afrikaans-speaking participants and to some of the SAE-speaking ones (including all SAE speakers with LI). The remaining English administrations were conducted by a mother tongue speaker of SAE. After these procedures, parents were informed in writing that data collection had been completed. Parents were provided with the first author's contact details so that they could make more detailed enquiries about their child's performance if they so wished.

Responses to each task were transferred from the paper scoresheet to a Microsoft Excel spreadsheet after which data were prepared for statistical analysis. The statistical analysis included comparisons between the two scoring methods and the relevant participant groups. When recording and reporting on the analysed data, participant names were replaced by codes to protect the identities of the participants.

4.3 Participants

There were four participant groups. The first group (TD-A) comprised 20 TD Afrikaans-speaking 5-year-olds of whom nine were male (age range 5(years);3(months) to 5;11 – average age 5;7). Nine of these participants attended an Afrikaans-medium school with a national quintile[2] of 5. The remaining TD-A participants were in preschools (which are not appointed national quintiles) in the same neighbourhood as the school. The parents of two of the TD-A participants reported that their child also spoke a second language fairly well; in both cases, this was English.

The second group (TD-SAE) comprised 20 TD speakers of SAE (six male and 14 female) with ages ranging from 5;4 to 5;11 (average age 5;8). Seven of the participants attended an English-medium private school (which is not appointed a national quintile). The remainder were recruited from preschools in the same neighbourhood as the private school. Three of the TD-SAE participants were reported to speak a second language (Afrikaans) fairly well.

To ensure that the participants in the TD groups did in fact have age-appropriate language skills, a standardised vocabulary test[3] was administered to each: the *Afrikaanse Reseptiewe Woordeskattoets* ('Afrikaans Receptive Vocabulary Test' (Buitendag 1994)) for Afrikaans and the *Peabody Picture Vocabulary Test – Third Edition* (Dunn and Dunn 1997) for English. By considering the vocabulary test results in conjunction with the written background information

[2] National quintiles (ranging from 1 to 5) constitute a measure employed by the South African Department of Education to describe the socio-economic status of the community in which a school is situated. The higher the quintile, the more affluent the community. This measure of relative socio-economic status determines the funding that the school receives from the government, as well as whether or not the school may charge school fees.

[3] Because of the lack of suitable standardised Afrikaans instruments, a comprehensive test of a range of language skills could not be administered to these participants.

obtained from the parents, it was determined whether these children were indeed TD. As regards the background information, all TD participants were reported to be TD by their parents and class teachers in terms of language, hearing, intellectual functioning, and socio-emotional development.

The third and fourth groups comprised five Afrikaans-speaking and five SAE-speaking 5-year-olds with LI (LI-A and LI-SAE, respectively). In the Afrikaans group, there were two boys and three girls, and their ages ranged from 5;3 to 5;10 (average age 5;6). One of them was reported to speak English fairly well. All participants in the English group were male, and their average age was 5;8 (age range 5;2 to 5;11). The parents of one of the boys reported that he spoke Afrikaans fairly well. These 10 participants were diagnosed with LI by qualified speech-language therapists. Table 1 shows the linguistic basis upon which each child's diagnosis was made. All participants with LI were deemed to be from mid- to high-income groups based on the national quintiles of the schools they attended.

Table 1. Information on diagnosis of LI for Afrikaans- and SAE-speaking participants

Participant	Treated by speech-language therapist at time of study?	Assessed by	Assessment instrument(s) used	Results and other comments
LI-A 1	Yes	His speech-language therapist	*Afrikaanse Reseptiewe Woordeskattoets* (ARW; Buitendag 1994)	Standard score: 86 Informal assessment: delayed syntactic skills
LI-A 2	Yes	Second author[4]	ARW (Buitendag 1994)	Standard score: 82
			Afrikaans version of *Diagnostic Evaluation of Language Variation* (Seymour, Roeper and de Villiers 2005)[5]	Age equivalent scores: (chronological age 5;4) Pragmatics domain: 4;0 Syntax domain: 4;5 Semantics domain: 4;0
LI-A 3	No (referred post-study)	First author[4]	ARW (Buitendag 1994)	Standard score: 88 Informal assessment: deviant expressive syntax and morphology
LI-A 4	No (referred post-study)	First author	ARW (Buitendag 1994)	Standard score: 76 Informal assessment: deviant expressive syntax

[4] Both authors are qualified speech-language therapists with experience in administering speech and language tests to young children.

[5] See Van Dulm and Southwood (2008) for changes made to the original American English version of this instrument.

LI-A 5	No, but started post-study	First author	ARW (Buitendag 1994)	Standard score: 99 Informal assessment: problems with correct use of tense marking; very short, simple sentences Teacher concerned about language skills
LI-SAE 1	Yes	His speech-language therapist	*British Picture Vocabulary Scale – 3rd ed.* (Dunn, Dunn, Whetton and Burley 2009)	Age equivalent score: 5;10 (chronological age 5;9) Informal assessment: problems with regular and irregular plural past tense forms, plural forms, correct use of pronouns, omission of verbs
LI-SAE 2	Yes	His speech-language therapist	The *Test for Auditory Comprehension of Language – 3rd ed.* (TACL-3; Carrow-Woolfolk 1998)	Age equivalent scores: (chronological age 4;9) Receptive vocabulary: 3;3 Comprehension of grammatical structure: 4;6 Comprehension of complex structures: 4;0 Informal assessment: problems with plural forms, correct use of personal and reflexive pronouns, degrees of comparison, past tense forms, prepositions
LI-SAE 3	No (referred post-study)	First author	*Clinical Evaluation of Language Fundamentals – 4th ed.* (CELF-4; Semel, Wiig and Secord 2003)	Standard score: 75 Problems in all evaluated areas, including word structure, recall of sentences, formulating sentences and following instructions
LI-SAE	No (referred post-study)	First author	CELF-4 (Semel et al. 2003)	Standard score: 82 Problems especially in recall of sentences, formulating sentences and following instructions
LI-SAE 5	Yes	His speech-language therapist	TACL-3 (Carrow-Woolfolk 1998)	Age equivalent scores: (chronological age 5;0) Receptive vocabulary: 4;3 Comprehension of grammatical structure: 4;9 Comprehension of complex structures: 4;0

A shortened articulation screening test was administered to each participant in each of the four groups, because the results of the pilot study (discussed briefly below) indicated that articulation skills did influence participants' performance on the repetition tasks. The articulation screening test targeted only liquids and sibilants as these sounds were shown in the pilot study to influence repetition the most. If a participant showed non-target production of one of the sounds included

in the screener and these sounds were systematically substituted by others, such substitutions were not viewed as incorrect during data collection.

4.4 Data collection instrument

Sentence and digit repetition lists were devised by the first author after studying the available literature on sentence and digit repetition as possible markers of LI, specifically studies on the properties that the items of these tasks should have. A pilot study was then conducted in which the original list of items was presented live to three 5-year-old speakers of each of the two languages involved. In devising these lists, several linguistic factors that can influence performance on repetition tasks were borne in mind. These are briefly discussed below.

Regarding the items of the sentence repetition tasks, according to COST Action IS0804 Workgroup 1 (2011, 2012), one should control for length, grammatical properties and lexicality (i.e., lexical vs functional words) of sentence repetition items. A study by Acheson and MacDonald (2011: 193) showed that phonological properties of a sentence (i.e., the sound representation of each word in the sentence) influence the child's ability to recall the sentence. A sentence such as *She sells seashells by the seashore* with frequent sound repetitions might not only be difficult to pronounce but also difficult to understand, even during silent reading (Acheson and MacDonald 2011: 193). It was also found that sentences containing phonological overlap (e.g. *The baker that sought the banker bought the house* and the *She sells seashells by the seashore* example above) were repeated less accurately than sentences without such overlap (Acheson and MacDonald 2011: 202). Lastly, Marinis (2010) proposed that items of a sentence repetition task should include structures which children with LI in that particular language find problematic. In English, long actional and non-actional passive constructions as well as nouns taking complements should thus be included. In devising the items of the sentence repetition task for use in the present study, sentence length, grammatical properties of words and the lexicality of the items were controlled for by adapting the *School-aged Sentence Imitation Test* (Marinis, Chiat, Armon-Lotem, Gibbons and Gipps 2011) for use in SAE. Similar sentences were then devised for Afrikaans. The *School-aged Sentence Imitation Test* is based on three levels of complexity, each including five different sentence types. These are presented in Table 2.

Table 2. Sentence types and their levels of complexity in the *School-aged Sentence Imitation Test*

Level 1	1. Subject Verb Object (SVO) with one auxiliary verb or one modal verb 2. SVO with one auxiliary or one modal verb as well as negation 3. Short action passive constructions 4. *Who*- and *What*-subject questions 5. Biclausal sentences with coordination and infinitival clauses
Level 2	6. SVO with two auxiliary verbs or one auxiliary verb and one modal verb 7. SVO with two auxiliary verbs or one auxiliary verb and one modal verb as well as negation 8. Long actional and non-actional passive constructions 9. *Which* object questions and *Who(m)* indirect object questions 10. Biclausal sentences with subordination (subordinate conjunction): complement and adjunct sentences

Level 3	11. Object-object right-branching relative clauses 12. Centre-embedded subject-object relative clauses 13. Coordinating clauses with conditional elements 14. Object-split sentence with active construction and subject-split sentence with passive construction 15. Sentences with nouns that contain complements

For each sentence type, four repetition items were included in the pilot lists. These items varied with regard to the total number of syllables and the total number of words in each sentence. Both the Afrikaans and SAE sentence repetition items included sentences with eight to 14 syllables and seven to 12 words. For example, in Afrikaans, items were included with only eight syllables (*Hy is hard gedruk teen die grond* 'He was shoved hard against the ground'), items with nine syllables (*Die boek is na die kantoor geneem* 'The book was taken to the office'), but there were also items with ten or more syllables (*Sy vryf haar been, want sy het dit teen die muur gestamp* 'She is rubbing her leg, because she bumped it against the wall'). As stated above, sentences with different numbers of words were also included. In English, for instance, there was a sentence of seven words (*What did the princess buy last month?*), one of eight words (*Who did she give the beautiful rose to?*) and also sentences with nine or more words (*It was his son that the fireman saved from the house*).

Furthermore, the sentence repetition items of both languages each included one to five functional words and three to seven lexical words. An example of an English sentence with three lexical and seven functional words is *He will feed the cow before he waters the plants*, where the functional words have been underlined.

The items in the Afrikaans list were similar to those in the English list as regards sentence type and number of words, syllables and functional vs lexical words. The final number of items for sentence repetition in the pilot study was 60 per language, i.e., more than one example of each sentence type.

No published discussion could be traced on factors to be borne in mind when devising digit repetition tasks. We thus worked on the assumption that factors shown to influence performance on other repetition tasks (such as utterance length in terms of number of words) would also affect the accuracy of digit repetition. The *Test of Auditory Processing Skills* (TAPS; Martin and Brownell 2005), which was developed for use with speakers of English, was consulted during the creation of the digit repetition items for this study. This test uses a maximum of nine digits in no specific order. We thus decided to also use items with one to nine digits per item. However, the TAPS does not control for the total number of syllables per item. Because we predicted that number of syllables would influence performance on digit repetition, as had been shown to be the case for nonsense word, real word and sentence repetition, items with one to 14 syllables were included in a controlled manner. By doing so, both number of syllables and number of digits per item were controlled for. Digits with lengths of one to four syllables were included, e.g. *two*, *nineteen*, *seventeen* and *twenty seven*. The Afrikaans and SAE digit repetition tasks each originally comprised 59 digit series.

The preliminary sentence and digit repetition tasks were performed with three TD Afrikaans-speaking and three TD SAE-speaking 5-year-olds. All items were read to the children in a clear manner. After each item, the child was expected to repeat the sentence or digit series verbatim.

Responses were recorded on self-devised scoresheets and were scored by the first author together with a consulting speech-language therapist in order to increase accuracy of scoring.

The results of the pilot study were used to determine how long the repetition tasks took to administer and to decide whether (i) the instructions to the participants were clear enough and (ii) any problem items needed replacement. Instructions and item clarity proved to be unproblematic, but the tasks were found to be too long to perform comfortably with 5-year-olds. The sentence repetition task was reduced to 30 items, with two examples of each sentence type (one with more and one with fewer syllables). The digit repetition task was reduced to 35 items, five examples for each of the series lengths (one to seven digits per series). In the final instrument, the number of syllables in digit repetition items was not considered as the pilot study indicated that it was number of digits rather than number of syllables that influenced performance. Tables 6 to 9 contain the final versions of the two tasks per language used as the data collection instrument in the main study.

The final sentence and digit item lists were recorded on CD in a recording studio, using the voice of the first author. Recordings rather than live voice were used during data collection in the main study because Schöler and Brunner (2008: 39) found that children with LI fared significantly better on repetition tasks when items are presented to them with live voice than via a recording. The use of a recording thus potentially increases the difference in performance of groups with and without LI, thereby increasing the sensitivity of the task.

4.5 Data transcription

The responses of each participant on each of the two repetition tasks were scored online paper-and-pencil style by the first author. All responses were also recorded with a digital voice recorder so that the accuracy of the online transcriptions could be verified. The second author independently transcribed and scored the responses of a number of participants: two TD Afrikaans-speaking and two TD English-speaking participants and all participants with LI (a total of 14 of the 50 participants). Where there were differences between the two transcriptions or scores, these involved at most one word per sentence. Interrater reliability was greater than 99% for percentage scores and 100% for raw scores.

4.6 Scoring methods

Several scoring methods have been proposed for sentence repetition tasks (see Fletcher et al. 2006: 225). For the purposes of both the pilot and the main study, two methods were used here. Firstly, each item repeated correctly was awarded one point and each not repeated correctly in all respects was awarded no points. The total number of correctly repeated items then served as a raw score. Secondly, the number of words produced correctly was counted so that the percentage words correct could be calculated. For instance, if the sentence *The cat sits on the mat* (comprising six words) was produced as *The cat sits on bat*, the percentage correct words would be 67%: one word (*mat*) was mispronounced/replaced and another (the second *the*) was omitted, so 4/6 words were correct. Where a participant added a word (as in *The cat sits on the big mat*), one point was deducted (which would render 83% (5/6) in this case). The average percentage words repeated correctly was then calculated for each participant individually.

In the available literature, no specific scoring method for digit repetition is proposed; therefore, that of the TAPS (Martin and Brownell 2005) was used. Participants were awarded two points if they repeated all digits and did so in the correct order. Where the participant repeated all digits but in the incorrect order, one point was awarded. No points were awarded to repetitions in which one or more digits were omitted, replaced or added. Both a raw score and a percentage score were calculated for each participant.

4.7 Statistical analyses

The data in the main study constituted 20 sets of responses for each of the two potential markers of LI for the TD Afrikaans- and SAE-speaking participants (thus 40 TD sets in total) and five sets of responses for each of the two potential markers for Afrikaans- and SAE-speaking participants with LI (thus 10 LI sets in total). The raw scores and percentages were analysed by a statistician (using the Mann-Whitney U test) in order to ascertain whether there were any significant differences between the groups and between the scoring methods.

5. Results and discussion

In the following subsections, the results of the four participant groups are discussed for each potential marker of LI, after which the research questions are addressed.

5.1 Sentence repetition

Table 3 contains a summary of the raw scores and percentages obtained by each of the four groups on the sentence repetition task. The performance of each group is discussed below the table.

Table 3. A descriptive comparison of the results of the four participant groups for the sentence repetition task

	Group			
	TD-A (n = 20)	**TD-SAE** (n = 20)	**LI-A** (n = 5)	**LI-SAE** (n = 5)
Minimum raw score (/30)	5	4	0	0
Maximum raw score (/30)	23	26	4	2
Average raw score (/30)	13.5	12.9	1.6	0.8
Minimum % words repeated correctly	73.23%	67.42%	24.21%	49.83%
Maximum % words repeated correctly	95.09%	98.21%	66.38%	67.02%
Average % words repeated correctly	86.69%	84.72%	49.63%	59.39%

Participants in the **TD-A group** had raw scores from 5/30 to 23/30, with a group average raw score of 13.5. Eleven of the 20 participants had percentage correct scores ranging from 88.1% to 95.1%; the remainder had scores of 73.2% to 86.5%. Sixteen of the participants had an average percentage correct score of more than 80%. The average percentage words repeated correctly was 86.7% for this group. Sentence constructions that the TD-A group found difficult to repeat included:

(i) object-split sentences with active constructions and subject-split sentences with passive constructions. For example, *Dit is haar blonde dogter wat deur die brandweerman*

gered is ('It is her blonde daughter that was saved by the fireman') was repeated as **Dit is die blonde dokter wat hy by die brandweerman gered is* ('It is the blonde doctor that he was saved at the fireman');

(ii) biclausal sentences with subordination: complement and adjunct sentences. For instance, *Die seun glo dat die kind fluit speel* ('The boy believes that the child plays the flute') was repeated as *Die kind wat by die skool fluit speel* ('The child that plays the flute at school');

(iii) long actional and non-actional passive constructions. For example, *Sy is vanoggend in die winkel gesien* ('She was seen in the shop this morning') was repeated as *Sy het vanoggend in die winkel gesien* ('She saw in the shop this morning');

(iv) SVO with two auxiliaries or one auxiliary and one modal. For instance, *Die kat sou nie die rooi lekker geëet het nie* ('The cat would not have eaten the red sweet') was repeated as *Die kat het nie die rooi lekker geëet nie* ('The cat did not eat the red sweet').

The **TD-SAE group** obtained raw scores of 4/30 to 26/30. The average raw score for this group was 12.9 and the average percentage words repeated correctly was 84.7%. As was the case for the TD-A group, only four participants had an average percentage words repeated correctly of less than 80%. Like the TD-A group, the TD-SAE group found the following constructions difficult to repeat accurately:

(i) object-split sentences with active constructions and subject-split sentences with passive constructions. For example, *It was the boy that the man splashed in the sea* was repeated as *It was the boy he had splashed in the sea*;

(ii) biclausal sentences with subordination: complement and adjunct sentences. For instance, *The man said that he combed his hair* was repeated as *The man said he cont* (sic) *his hair*;

(iii) SVO with two auxiliaries or one auxiliary and one modal. For instance, *John won't have talked about it with his father* was repeated as *John talked about it with his father*.

In contrast to the TD-A group, the TD-SAE group found object-object right-branching relative clauses difficult to repeat rather than long actional and non-actional passive constructions. For instance, *The monkey stroked the horse that the worm frightened* was repeated as *The monkey did strake* (sic) *the horse that the worm strightened* (sic).

The **LI-A group** had an average raw score of 1.6/30: two participants obtained 0/30, and one each obtained 1/30, 3/30 and 4/30. The group's average percentage words repeated correctly was 49.6%, with individual scores of 24.2%, 49.6%, 53.3%, 54.7% and 66.4%. The sentence type on which this group fared the best (three of the five repeated it correctly) was the *Who*- and *What*-subject questions, e.g. *Wie het die man in die water gegooi?* ('Who threw the man in the water?'). The participants found the repetition of the other sentence types challenging. Examples of repetition errors include **Die meisie het gesien wat die seun dit steel* ('The girl saw what the boy stole it') instead of *Die meisie het gesien hoe die seun dit steel* ('The girl saw how the boy stole it') and **Die groot man sal hele sap opdrink* ('The big man will drink up whole juice') instead of *Die groot man sou die hele bottel sap kon drink* ('The big man would have been able to drink up the whole bottle of juice').

Turning to the **LI-SAE group**: Two participants had a raw score of 0/30, two of 1/30 and one of 2/30. The average raw score for the group was 0.8 and the average percentage words repeated

correctly was 59.4%, with individual averages of 49.8%, 56.9%, 58.8%, 64.4% and 67.0%. All sentence types were difficult to repeat; there was no sentence type on which the LI-SAE group fared better than on the rest. Examples of incorrect repetition include **The books couldn't take from the office* instead of *The books were taken to the office* and **The cat is hit the rat down the stairs* instead of *The kitten could have hit the rattle down the stairs.*

To summarise, the two TD groups obtained similar raw scores and similar percentage scores for sentence repetition. Both groups found the repetition of the following challenging: (i) object-split sentences with active constructions and subject-split sentences with passive constructions, (ii) biclausal sentences with subordination, and (iii) SVO with two auxiliaries or one auxiliary and one modal. Participants in these two groups most often replaced rather than omitted words. By contrast, the groups with LI fared notably more poorly on the sentence repetition task than did their TD peers, and found all sentence types difficult to repeat. This concurs with the findings of Thordardottir et al. (2011: 592), who worked with French-speaking 5-year-olds and concluded that sentence repetition is an accurate marker of language impairment.

5.2 Digit repetition

The results for the digit repetition task are presented in Table 4. A discussion of these results follows the table.

Table 4. A descriptive comparison of the results of the four participant groups for the digit repetition task

	Group			
	TD-A (n = 20)	**TD-SAE** (n = 20)	**LI-A** (n = 20)	**LI-SAE** (n = 20)
Minimum raw score (/70)	28	30	16	26
Maximum raw score (/70)	45	51	30	34
Average raw score (/70)	36.55	38.6	25.6	31.2
Minimum % digits repeated correctly	40%	42.86%	22.86%	37.14%
Maximum % digits repeated correctly	64.28%	72.86%	42.86%	48.57%
Average % digits repeated correctly	52.21%	55.14%	36.57%	44.57%

In the **TD-A group**, 13 participants had raw scores of more than 34/70 and seven of 28/70 to 34/70. Similarly, 14 of the **TD-SAE** participants had scores of more than 34/70 and six of 30/70 to 34/70. The average raw scores of these two groups were 36.6/70 and 38.6/70, respectively, and the average percentage scores 52.2% and 55.1%, respectively. Both TD groups made the highest number of errors from 5-digit series onwards. For example, *ses – een – drie – agt – twee* ('six – one – three – eight – two') was repeated as *drie – sewe – agt – twee* ('three – seven – eight – two').

The **LI-A group** had notably lower scores that the two TD groups: individual raw scores were 16, 26, 28, 28 and 30/70, and the group's average raw score was 25.5/70. The average percentage series repeated correct was 36.6%. Although the **LI-SAE group** also had lower scores than the two TD groups, their scores were somewhat higher than those of the LI-A groups: individual raw scores were 26, 31, 32, 33 and 34/70 (group average 31.2/70), and the

average percentage series repeated correct was 44.6%. The two LI groups could repeat most items correctly up to and including 3-digit series.

In summary, the two TD groups fared similarly on digit repetition and fared better than the two LI groups who in turn fared similarly to each other. The TD groups most often began to repeat incorrectly when there were five digits in a series, whereas this threshold was four digits in a series for the two LI groups. When repeating the longer, more difficult series, most participants in all four groups omitted digits and offered only one to three digits per repetition attempt. It was clear that the number of digits rather than the syllable length of the item influenced participant performance. Digit series consisting of five digits and five syllables (e.g. *six – one – three – eight – two*) were more likely to be repeated incorrectly than were series consisting of six syllables but only three digits (*twenty one – seven – nine*).

5.3 Answers to the research questions

Research Question 1: For Afrikaans and SAE, which repetition task differentiates best between TD children and those with LI?

The first hypothesis was that sentence repetition would differentiate better than digit repetition. When considering the raw scores obtained by the TD-A and LI-A groups, sentence repetition differentiates best between 5-year-olds with and those without LI ($p = 0.000771$; see Table 5). Although results show that digit repetition can also be employed to differentiate between these two groups, it appeared that digit repetition was less sensitive than sentence repetition ($p = 0.001583$). Similar results were obtained when the percentage words repeated correctly was considered: the sentence repetition task differentiated better between the Afrikaans-speaking groups with and without LI ($p = 0.000771$) than did the digit repetition task ($p = 0.001583$). Similar results were obtained for the SAE groups: whether considering raw scores or percentages, sentence repetition differentiates better between 5-year-old SAE speakers with and without LI ($p = 0.000771$ in both cases) than does digit repetition ($p = 0.019088$ in both cases). The first hypothesis was thus proven for both Afrikaans and SAE. These results concur with those of Fletcher et al. (2006: 222) and Thordardottir et al. (2011: 591).

Table 5. P values for the groups with and without LI for the sentence and digit repetition tasks (per language)

Task	**Comparison**			
	TD-A vs LI-A		**TD-SAE vs LI-SAE**	
	Raw score p value	**Percentage score p value**	**Raw score p value**	**Percentage score p value**
Sentence repetition	0.000771	0.000771	0.000771	0.000771
Digit repetition	0.001583	0.001583	0.019088	0.019088

Research Question 2: Which scoring method – percentage correct digits/words calculated per digit series/sentence, or raw score (item as a whole either correct or incorrect) – more accurately differentiates between children with and those without LI?

The hypothesis was that raw scores would be more accurate in differentiating between children with LI and their TD peers because raw scores presumably do not give children with LI any

credit for those parts of the item that they do repeat correctly. In order to test this hypothesis, the p values for the raw scores as well as the p values for the percentage correct scores were compared among groups (see Table 5), where the lower of the two p values indicates the more sensitive scoring method. For both digit and sentence repetition in both Afrikaans and SAE, there was no difference between the accuracy of the raw scores and that of the percentage correct scores. Based on this finding, any one of these two scoring methods can thus be used. The second hypothesis was therefore refuted.

Research Question 3: Which items, in the digit and sentence repetition tasks separately, differentiate best in Afrikaans and SAE between children with and without LI?

As stated earlier, the hypothesis was that the phonologically more complex items would differentiate best between children with and without LI. In the digit repetition task, the number of digits within a series did influence the accuracy of the series to differentiate between TD children and their peers with LI. No significant differences in results between the two groups were found for 1-digit and 2-digit items, but items with three or more digits could indeed differentiate between the two groups. For sentence repetition, there was no single factor – e.g. phonological complexity or number of syllables – that influenced the ability of the items to differentiate between the two groups of children.

For items 1, 2, 3, 4, 5, 6, 8 and 24 (eight in total; see Table 7 for the Afrikaans items and Table 9 for the SAE items) of the digit repetition task, there was no difference between the groups with and without LI. All sentence repetition items in both languages, however, revealed a difference between the TD and LI groups. In terms of digit repetition, but not sentence repetition, the hypothesis was proven.

Those items from each task that differentiated best between the groups with and without LI were identified, i.e., those with the smallest p values (< 0.05). These items appear in bold with p values in grey cells in Tables 6 to 9, and are the items that could be considered for inclusion in a screening test for use with Afrikaans-speaking and with SAE-speaking 5-year-olds.

Table 6. Afrikaans sentence repetition items that best differentiate between children with and without LI

Item	**p value**
1. Die meisie het gesien hoe die seun dit steel.	0.1225
2. Sy het die pan op die stoof gesit.	**0.0403***
3. Die meisie wil nie die pynappel eet nie.	**0.0024**
4. Die seun het nie in die karavaan geklim nie.	**0.0391**
5. Die boek is na die kantoor geneem.	**0.0464**
6. Die kat word in die groot huis gejaag.	**0.0123**
7. Wie het die man in die water gegooi?	1
8. Wie het hy by die skool gesien?	**0.0011**
9. Dirk eet brood en Susan speel klavier.	0.2887
10. Sy vryf haar been, want sy het dit teen die muur gestamp.	0.1215
11. Die meisie sal die brode kan bak.	**0.0464**
12. Die groot man sou die hele bottel sap kon drink.	1
13. Ons moes nie die vrugte gepluk het nie.	0.1225

14. Die kat sou nie die rooi lekker geëet het nie.	1
15. Die katte word deur die honde gejaag.	**0.0149**
16. Sy is vanoggend in die winkel gesien.	1
17. Watter boek lees die vrou met die lang rok?	0.6146
18. Watter storie het sy by die skool gelees?	0.3217
19. Die seun glo dat die kind fluit speel.	1
20. Hy sal die hond kos gee voordat hy die kar was.	0.5494
21. Die meisie ken ’n seun wat van rugby hou.	0.2743
22. Die aap eet die piesang wat die kind gegooi het.	0.1602
23. Die waentjie wat die seun trek, ry oor sy een voet.	0.2743
24. Die kat wat die meisie vryf, lek haar hand.	0.0613
25. Die kind sal ’n roomys kry as hy die speelgoed wegpak.	**0.0464**
26. As die seun ophou kla, sal hy ’n geskenk kry.	0.544
27. Dit was die seun wat gister deur die hond gebyt is.	0.2887
28. Dit is haar blonde dogter wat deur die brandweerman gered is.	No value
29. Hy het planne gemaak om die huis te verf.	**0.0047**
30. Die belofte om lekkers te kry maak hulle bly.	0.2887

Table 7. Afrikaans digit repetition items that best differentiate between children with and without LI

Item	**p value**
1. een	No difference between the two groups
2. nege	No difference between the two groups
3. sewentien	No difference between the two groups
4. een-en-twintig	No difference between the two groups
5. drie	No difference between the two groups
6. een – drie	No value
7. een – nege	No difference between the two groups
8. nege – sewe	No difference between the two groups
9. sewentien – nege	0.2
10. een-en-twintig – sewe	0.2
11. twee – vyf – drie	0.0698
12. drie – nege – een	**0.0333***
13. twee – nege – sewe	0.2
14. agt – sewentien – nege	**0.0333**
15. een-en-twintig – drie – nege	0.1664
16. agt – drie – vyf – twee	**0.000395**
17. nege – sewe – twee – vyf	**0.0403**
18. sewentien – drie – nege – twee	**0.0159**
19. vyf – sewe – een-en-twintig – agt	0.2887
20. drie – nege – een-en-twintig – sewe	0.1462
21. ses – een – drie – agt – twee	1
22. een – ses – vyf – nege – sewe	0.6352
23. nege – drie – een-en-twintig – tien – ses	1
24. tien – twee – sewentien – nege – een-en-twintig	No difference between the two groups
25. een – ses – vyf – nege – sewe	1

26. tien – drie – twee – vyf – een – vier	No value
27. een – nege – twee – sewe – vyf – drie	No value
28. nege – sewentien – vier – ses – agt – tien	No value
29. drie – sewentien – ses – een-en-twintig – vyf – een	No value
30. sewentien – ses – een-en-twintig – sewe – vyf – nege	No value
31. ses – agt – drie – tien – een – vier – twee	No value
32. drie – een – vyf – sewentien – vier – ses – twee	No value
33. een – sewentien – twee – agt – drie – nege – sewe	No value
34. agt – een – nege – een-en-twintig – sewentien – vier – ses	No value
35. tien – vyf – sewe – twee – vier – ses – agt	No value

Table 8. SAE sentence repetition items that best differentiate between children with and without LI

Item	**p value**
1. The kitten is chasing the rat up and down.	**0.0391***
2. She can bring the glass to the table.	**0.0011**
3. The man wasn't driving the lorry to town.	0.1225
4. The farmer couldn't ride the horse in the river.	0.2887
5. The books were taken to the office.	**0.0055**
6. The child was helped in the sweet shop.	0.2887
7. Who did the monkey splash near the water?	**0.0464**
8. Who have they seen near the steps?	0.1399
9. His sister ran and his father walked.	0.3123
10. He went to the coast, but he didn't swim in the sea.	0.1333
11. The policeman has been looking at us.	**0.0149**
12. The kitten could have hit the rattle down the stairs.	0.1399
13. John wouldn't have talked about it with his father.	No value
14. We shouldn't have been picking the flowers.	**0.0391**
15. The sandwich was eaten by the postman.	0.1225
16. She was seen by the doctor in the morning.	**0.0391**
17. Which drink did the milkman spill in the house?	0.544
18. Which picture did he paint at home yesterday?	0.0613
19. The man said that he combed his hair.	0.5494
20. He will feed the cow before he waters the plants.	**0.0464**
21. The monkey stroked the horse that the worm frightened.	1
22. The mum baked the meal that the children are eating.	1
23. The horse that the farmer pushed kicked him in the back.	0.544
24. The bee that the man swallowed had hurt him.	0.1399
25. The people will get a present if they clean the house.	0.544
26. If the kids behave, we will go in the garden.	0.1225
27. It was the boy that the man splashed in the sea.	0.1399
28. It was his son that the fireman saved from the house.	0.2887
29. The builder had the idea to dig the hole.	0.1225
30. The promise of going to Paris made them happy.	0.2887

Table 9. SAE digit repetition items that best differentiate between children with and without LI

Item	**p value**
1. one	No difference between the two groups
2. thirteen	No difference between the two groups
3. seventeen	No difference between the two groups
4. twenty seven	No difference between the two groups
5. three	No difference between the two groups
6. one – three	0.2
7. one – thirteen	No difference between the two groups
8. thirteen – seven	No difference between the two groups
9. seventeen – thirteen	No value
10. twenty seven – seven	No value
11. two – five – three	No value
12. three – thirteen – one	No value
13. two – thirteen – seven	No value
14. eight – seventeen – thirteen	0.2
15. twenty seven – three – thirteen	**0.0192***
16. eight – three – five – two	0.2
17. thirteen – seven – two – five	0.6544
18. seventeen – three – thirteen – two	**0.0464**
19. five – seven – twenty seven – eight	0.3217
20. three – thirteen – twenty seven – seven	0.0682
21. six – one – three – eight – two	0.149
22. one – six – five – thirteen – seven	0.2887
23. thirteen – three – twenty seven – ten – six	No value
24. ten – two – seventeen – thirteen – twenty seven	No difference between the two groups
25. one – six – five – thirteen – seven	0.3857
26. ten – three – two – five – one – four	1
27. one – thirteen – two – seven – five – three	1
28. thirteen – seventeen – four – six – eight – ten	1
29. three – seventeen – six – twenty seven – five – one	No value
30. seventeen – six – twenty seven – seven – five – thirteen	No value
31. six – eight – three – ten – one – four – two	No value
32. three – one – five – seventeen – four – six – two	No value
33. one – seventeen – two – eight – three – thirteen – seven	No value
34. eight – one – thirteen – twenty seven – seventeen – four – six	No value
35. ten – five – seven – two – four – six – eight	No value

6. Summary, conclusion and recommendations

The main aim of the study was to compare the sensitivity of sentence repetition and digit repetition in the identification of children with LI. This was done to obtain information that could be used to develop an accurate screening tool for LI for use with Afrikaans-speaking and

SAE-speaking children. To this end, repetition tasks were devised and administered to five Afrikaans-speaking children with LI and 20 without as well as to five SAE-speaking children with LI and 20 without.

On sentence repetition, the children with LI fared significantly worse than did their TD peers. Whereas the former group experienced difficulties with repeating all sentence types included in the test, the latter struggled mainly with (i) object-split sentences with active constructions and subject-split sentences with passive constructions, (ii) biclausal sentences with a subordinate conjunction, and (iii) long actional and non-actional passive constructions.

On digit repetition, the children without LI also performed better than those with LI, although the difference in performance between the children with LI and their TD peers was larger for sentence than for digit repetition. The TD children made most errors on items containing five or more digits, whereas the children with LI made most errors on items containing four or more digits. When required to repeat longer, more difficult digit series, most children (regardless of language or LI status) omitted digits, repeating only two or three digits per series. In an attempt to repeat the correct number of digits in long series, some children gave three digits and then counted on from the last digit, seemingly until they felt they had repeated a sufficient number of digits to render their version and the target equally long. The results also indicated that the number of digits and not the number of syllables in the item influences children's performance on this task.

The general conclusion of the study is that sentence repetition is the more sensitive of the two repetition tasks for identifying Afrikaans- and SAE-speaking 5-year-olds with LI. On the basis of the results per item, it was possible to indicate which items could be included in a screening instrument making use of repetition tasks for the identification of LI in Afrikaans-speaking and SAE-speaking 5-year-olds.

The study had several methodological limitations, including small sample sizes in only one age band, using parental and teacher reports rather than audiological screening to determine hearing status, relying on parental reports to determine which children were TD rather than employing IQ and other testing, and including only two of the languages spoken in South Africa. These limitations should be addressed in future studies on repetition tasks. In addition, carefully devised real and nonsense word repetition tasks should be included in such further research. Finally, future studies should investigate the sensitivity and specificity of repetition tasks among children with language impairments associated with other conditions, such as autism spectrum disorder.

In South Africa, there is an underprovision of speech-language therapists and other child language professionals (Pascoe and Norman 2011: 2). There are not enough child language specialists to do language screening as part of the school readiness assessment battery. There is also little or no culturally and linguistically appropriate diagnostic or screening instruments with which child language professionals can identify language problems in children (see Van Dulm and Southwood 2013). This study examined the sensitivity of two repetition tasks in order to determine which of their items could be included in a screening test that is both quick and easy to administer. The results of the study indicate that such a screening test is indeed feasible. Whereas such a test would be welcomed by child language practitioners (especially if there were to be African language versions that could be administered without the assistance of an

interpreter), it would not reduce the need for diagnostic instruments that can provide intervention guidelines. That said, it is hoped that screening instruments involving repetition, such as those proposed in this study, would also be developed for African languages, so that they can be used as interim measures until appropriate diagnostic instruments (that are typically developed at a slower rate and at higher cost) become available.

References

Acheson, D.J. and M.C. MacDonald. 2011. The rhymes that the reader perused confused the meaning: Phonological effects during on-line sentence comprehension. *Journal of Memory and Language* 65(2): 193-207.

Archibald, L.M.D. and T.P. Alloway. 2008. Comparing language profiles: Children with specific language impairment and developmental coordination disorder. *International Journal of Language & Communication Disorders* 43(2): 165-180.

Archibald, L.M.D. and S.E. Gathercole. 2006. Nonword repetition: A comparison of tests. *Journal of Speech, Language, and Hearing Research* 49(5): 970-983.

Archibald, L.M.D. and M.F. Joanisse. 2009. On the sensitivity and specificity of nonword repetition and sentence recall to language and memory impairments in children. *Journal of Speech, Language, and Hearing Research* 52(4): 899-914.

Bernstein Ratner, N. 2000. Elicited imitation and other methods for the analysis of trade-offs between speech and language skills in children. In L. Menn and N. Bernstein Ratner (Eds.) *Methods for studying language production.* Mahwah, NJ: Lawrence Erlbaum Associates. pp. 291-311.

Bishop, D.V.M. 2014. Ten questions about terminology for children with unexplained language problems. *International Journal of Language and Communication Disorders* 49(4): 381-397.

Botting, N. and G. Conti-Ramsden. 2003. Autism, primary pragmatic difficulties, and specific language impairment: Can we distinguish them using psycholinguistic markers? *Developmental Medicine & Child Neurology* 45(8): 515-524.

Buitendag, M. 1994. *Afrikaanse reseptiewe woordeskattoets* [Afrikaans receptive vocabulary test]. Pretoria: Human Research Council.

Carrow-Woolfolk, E. 1998. *Test for auditory comprehension of language, third edition.* San Antonio: Pearson.

Coady, J.A. and J.L. Evans. 2008. Uses and interpretations of non-word repetition tasks in children with and without specific language impairments (SLI). *International Journal of Language & Communication Disorders* 43(1): 1-40.

Conti-Ramsden, G. and K. Durkin. 2007. Phonological short-term memory, language and literacy: Developmental relationships in early adolescence in young people with SLI. *Journal of Child Psychology and Psychiatry* 48(2): 147-156.

Conti-Ramsden, G. and A. Hesketh. 2003. Risk markers for SLI: A study of young language-learning children. *International Journal of Language and Communication Disorders* 38(3): 251-263.

Conti-Ramsden, G., N. Botting and B. Faragher. 2001. Psycholinguistic markers for specific language impairment (SLI). *Journal of Child Psychology and Psychiatry* 42(6): 741-748.

COST Action IS0804 Working Group 1 (Syntax and Interfaces with Morphology and Semantics). 2011. Working Groups Report on Sentence Repetition – English Sentence Repetition Task: Results. Report presented at the Fifth Meeting of COST Action IS0804, 21-23 November, St Paul's Bay, Malta.

COST Action IS0804 Working Group 1 (Syntax and Interfaces with Morphology and Semantics). 2012. COST Sentence Repetition Tasks across languages – notes from the meetings in Malta. Unpublished report.

Demuth, K., F. Moloi and M. Machobane. 2010. Three-year-olds' comprehension, production, and generalization of Sesotho passives. *Cognition* 115(2): 238-251.

Dunn, L.M. and L.M. Dunn. 1997. *Peabody picture vocabulary test, third edition*. Circle Pines, MN: American Guidance Service.

Dunn, L.M., L.M. Dunn, C. Whetton and J. Burley. 2009. *British picture vocabulary scale, third edition*. London: Granada.

Fletcher, P., L.B. Leonard, S.F. Stokes and A.M.-Y. Wong. 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(2): 219-236.

Gallon, N., J. Harris and H. Van der Lely. 2007. Non-word repetition: An investigation of phonological complexity in children with Grammatical SLI. *Clinical Linguistics & Phonetics* 21(6): 435-455.

Leonard, L.B. 1998. *Children with specific language impairment*. Cambridge, MA and London: MIT Press.

Leonard, L.B. 2014. Replacing one imperfect term with another. *International Journal of Language and Communication Disorders* 49: 436-437.

Marchman, V.A., B. Wulfeck and S.E. Weismer. 1999. Morphological productivity in children with normal language and SLI: A study of the English past tense. *Journal of Speech, Language, and Hearing Research* 42: 206-219.

Marinis, T. 2010. Sentence repetition. Paper presented at the Third Meeting of COST Action IS0804, 27-29 October, Larnaca, Cyprus.

Marinis, T., S. Chiat, S. Armon-Lotem, D. Gibbons and E. Gipps. 2011. *School-age sentence imitation test (SASIT) E60*. Reading: University of Reading.

Martin, N.A. and R. Brownell. 2005. *Test of auditory processing skills (TAPS)*. Novato, CA: Academic Therapy Publications.

Munson, B. 2001. Phonological pattern frequency and speech production in adults and children. *Journal of Speech, Language, and Hearing Research* 44(4): 778-792.

Pascoe, M. and V. Norman. 2011. Contextually relevant resources in speech-language therapy and audiology in South Africa – are there any? *South African Journal of Communication Disorders* 58: 1-5.

Penn, C. 1998. The study of child language in South Africa. *Folia Phoniatrica et Logopaedica* 50(5): 256-270.

Poll, G.H., S.K. Betz and C.A. Miller. 2010. Identification of clinical markers of specific language impairment in adults. *Journal of Speech, Language, and Hearing Research* 53(2): 414-429.

Reilly, S., D.V.M. Bishop and B. Tomblin. 2014. Terminological debate over language impairment in children: Forward movement and sticking points. *International Journal of Language and Communication Disorders* 49(4): 453-462.

Reilly, S., B. Tomblin, J. Law, C. McKean, F.K. Mensah, A. Morgan, S. Goldfeld, J.M. Nicholson and M. Wake. 2014. Specific language impairment: A convenient label for whom? *International Journal of Language and Communication Disorders* 49(4): 416-434.

Rice, M. and K. Wexler. 1996. Towards tense as a clinical marker of specific language impairment in English-speaking children. *Journal of Speech and Hearing Research* 39: 1239-1257.

Rispens, J. and A. Baker. 2012. Non-word repetition: The relative contributions of phonological short-term memory and phonological representations in children with language and reading impairment. *Journal of Speech, Language, and Hearing Research* 55(3): 683-694.

Roach, N.W. and J.H. Hogben. 2007. Impaired filtering of behaviourally irrelevant visual information in dyslexia. *Brain: A Journal of Neurology* 130: 771-785.

Schöler, H. and M. Brunner. 2008. *Heidelberger Auditives Screening in der Einschulungsuntersuchung* [Heidelberg auditory screening in the preschool examination]. Binswangen, Germany: Westra.

Seeff-Gabriel, B., S. Chiat and B. Dodd. 2010. Sentence imitation as a tool in identifying expressive morphosyntactic difficulties in children with severe speech difficulties. *International Journal of Language & Communication Disorders* 45(6): 691-702.

Semel, E., E.H. Wiig and W.A. Secord. 2003. *Clinical evaluation of language fundamentals, fourth edition*. San Antonio: Pearson.

Seymour, H.N., T.W. Roeper and J. de Villiers. 2005. *Diagnostic evaluation of language variation. Norm referenced*. San Antonio, TX: Pearson.

Snowling, M.J. 2014. SLI – not just a semantic issue. Commentary on Reilly, S., Tomblin, B., Law, J., McKean, C., Mensah, F.K., Morgan, A., Goldfeld, S., Nicholson, J.M. and Wake, M., 2014, Specific language impairment: a convenient label for whom? *International Journal of Language and Communication Disorders* 49: 438-439.

Solarsh, B. and E. Alant. 2006. The challenge of cross-cultural assessment – The test of ability to explain for Zulu-speaking children. *Journal of Communication Disorders* 39(2): 109-138.

Stark, R.E. and P. Tallal. 1981. Selection of children with specific language deficits. *Journal of Speech and Hearing Disorders* 46(2): 114-122.

Statistics South Africa. 2012. *Stats in brief 2012*. Pretoria: Statistics South Africa.

Tattersall, P.J. 2010. Reading, Writing, and Repetition: Performance on Nonword Measures by Students with and without Language-Learning Disabilities. Unpublished doctoral dissertation, Western Michigan University.

Thordardottir, E., E. Kehayia, B. Mazer, N. Lessard, A. Majnemer, A. Sutton, N. Trudeau and G. Chilingaryan. 2011. Sensitivity and specificity of French language and processing measures for identification of primary language impairment at age 5. *Journal of Speech, Language, and Hearing Research* 54(2): 580-597.

Van Dulm, O. and F. Southwood. 2008. Toward a dialect-neutral Afrikaans-medium child language assessment instrument: Test item development. *Language Matters* 39(2): 300-315.

Van Dulm, O. and F. Southwood. 2013. Child language assessment and intervention in multilingual and multicultural South Africa: Findings of a national survey. *Stellenbosch Papers in Linguistics* 42: 55-76.

Verhoeven, L., J. Steenge, M. Van Weerdenburg and H. Van Balkom. 2011. Assessment of second language proficiency in bilingual children with specific language impairment: A clinical perspective. *Research in Developmental Disabilities* 32(5): 1798-1807.

Ziethe, A., U. Eysholdt and M. Doellinger. 2013. Sentence repetition and digit span: Potential markers of bilingual children with suspected SLI? *Logopedics Phoniatrics Vocology* 38(1): 1-10.