Developing a Sentence Repetition Test for the Evaluation of Deaf Children's Use of South African Sign Language

By

Amy Palmer

Thesis presented in partial fulfilment of the requirements for

the degree of Master of Arts (MA)

in the Department of General Linguistics

at

Stellenbosch University

Supervisor: Dr Kate Huddlestone

Co-supervisor: Prof. Anne Baker

March 2020

DECLARATION

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the owner of the copyright thereof (unless to the extent explicitly otherwise stated) and that I have not previously, in its entirety or in part, submitted it for obtaining any qualification.

Amy Palmer

March 2020

Acknowledgements

To my supervisors, Dr Kate Huddlestone and Prof. Anne Baker, whose endless encouragement and advice have led to this finished thesis. Thank you for always finding ways to improve this work, for always checking how I was coping, and for genuinely caring. Your support and cheerleading is immensely appreciated, and I hope this has made you proud.

To Prof. Frenette Southwood, who went above and beyond to make this year possible for me. The financial assistance of the National Research Foundation (NRF) towards this research is hereby acknowledged. The opinions expressed and conclusions arrived at are those of the author, and are not necessarily to be attributed to the NRF. The handshape fonts are created by the Centre for Sign Linguistics and Deaf Studies at the Chinese University of Hong Kong.

To Modiegi Njeyiyana, who helped with the SASL: you were always such an amazing teacher, and you went out of your way to help with my research. To Prof. Martin Kidd, who helped with the statistical analysis: thank you for your patience and enthusiasm. To Lauren Onraët, who copyedited this thesis: thank you for being so enthusiastic about my work, and for handing me back a proper thesis instead of the Word document that I sent you.

To the two schools who allowed me to come and test their learners: I appreciate immensely what you have contributed to this thesis. To the learners who participated: you will never cease to make me smile! And to the two assistants who helped me, June Bothma and Ousus Vermeulen: you were both so great; you genuinely cared and worked so hard. I couldn't have asked for better assistants.

To Taryn Dick, Minali Parshotam, Engela de Villiers, and Alex Zeeman: I would never have made it without all of our venting sessions, progress reports to one another, and advice on how to deal with whatever problems came my way this year, not only concerning this degree.

To Christiaan, who drove through to come and sit in my flat so that I wasn't working alone: thank you for feeding me, supporting me, and cheering me up, even when I didn't know I needed it.

Lastly, to my parents. Dad: thank you for phoning me after meetings to hear how it went. Thank you for reading my work, asking genuine questions about it, and caring so much. Mamma: thank you for all of the airtime spent on me, the sleepless nights spent worrying about me, and for loving my stories about the children as much as I did. Thank you for telling me that I scored them too harshly, and for saying that I should've made space for their imaginations. Thank you for seeing who I am and what I need, and then supporting me to go out and get it when you couldn't give it to me yourself.

Abstract

This study creates the first sentence repetition test (SRT) for South African Sign Language (SASL). The test can be used to measure the proficiency of a participant and track their progress over time. The test is easy to administer and score but needs to be adapted to the context within which it will be used. The aim of the test is to provide deaf schools with a language testing instrument, as there is currently no such instrument readily available. The test provides an opportunity to begin creating an image of what deaf children's SASL language acquisition looks like, of which there is currently very little information.

The main research questions of this study were concerned with establishing the most important features necessary for this test and the relationships between the participants' scores and other variables, such as age and exposure to SASL. An SRT was created with 20 sentences, which were organised into three categories: Simple, Moderate, and Complex. These categories reflected the grammatical complexity of the sentences, as an SRT tests the grammatical knowledge of the participants. This study used data from 40 deaf children between the ages of seven- and nine-years-old. These children had had a minimum of one year of exposure to SASL and were from two schools for the deaf in the Western Cape.

The results showed that lexical variation is vital feature influencing language testing. Appropriate grammatical features needed to be used, keeping the age groups of the participants in mind. It was concluded that the age of the children and their lengths of exposure had significant effects on their test results. The older the child and the longer their length of exposure, the higher they scored on the test. The results also found that participants from different schools scored differently on the test, which is possibly a result of the familiarity of language testing and the participant's familiarity with the administrators of the test. Sentence length had an effect on the results, and the categorisation of the sentences was found to be relatively accurate, with some adjustments necessary for future use of the SRT.

Opsomming

Hierdie studie skep die eerste sinherhalingstoets (SHT) vir Suid-Afrikaanse Gebaretaal (SAGT). Die toets kan gebruik word om die taalvaardigheid van die deelnemer te meet en hul vordering oor tyd te volg. Die toets is maklik om te administreer en te bepunt, maar dit moet aangepas word by die konteks waarin dit gebruik sal word. Die doel van die toets is om ‘n taaltoetsinstrument aan doweskole te verskaf, aangesien daar tans nie so ‘n instrument vrylik beskikbaar is nie. Die toets bied ‘n geleentheid om ‘n beeld te skep van dowe kinders se taalverwerwing van SAGT, waarvan daar tans baie min inligting beskikbaar is.

Die hoof-navorsingsvrae van hierdie studie het gefokus daarop om die belangrikste eienskappe wat nodig is vir die toets en die verhouding tussen die deelnemers se punte and ander veranderlikes, soos ouderdom en blootstelling aan SAGT, vas te stel. ‘n SHT is geskep met 20 sinne, wat in drie kategorieë ingedeel is: eenvoudig, matig en moeilik. Hierdie kategorieë weerspieël die grammatikale kompleksiteit van die sinne, aangesien ‘n SHT die deelnemers se grammatikale kennis toets. Hierdie studie het data van 40 dowe kinders tussen die ouderdomme van sewe en nege jaar gebruik. Hierdie kinders het ‘n minimum van een jaar se blootstelling aan SAGT en is leerders aan twee doweskole in die Wes-Kaap.

Die resultate het getoon dat leksikale variasie ‘n belangrike eienskap van taaltoetsing is. Gepaste grammatikale kenmerke, wat die ouderdomsgroepe van die deelnemers in gedagte hou, moet gebruik word. Die gevolgtrekking was dat die ouderdom van die kinders en die lengte van hul blootstelling beduidende invloede op hul toetsresultate gehad het. Hoe ouer die kind en hoe langer die tydperk van blootstelling, hoe hoër was die punt wat hulle in die toets behaal het. Die resultate het ook bevind dat deelnemers van verskillende skole verskillende punte behaal het in die toets, wat moontlik ‘n gevolg is van die vertroudheid met taaltoetsing en die deelnemer se vertroudheid met die persoon wat die toets geadministreer het. Die lengte van die sin het ‘n effek op die resultate gehad en die kategorisering van die sinne was relatief akkuraat, met ‘n paar aanpassings wat nodig is vir toekomstige gebruik van die SHT.

Table of contents

Declaration i
Acknowledgements ii
Abstract iii
Opsomming iv
Table of contents v
List of figures viii
List of tables viii
Transcription conventions used to gloss SASL x

Chapter 1: Introduction 1

1.1 Background 1
1.2 Methodology 2
1.3 Thesis structure 3

Chapter 2: Literature Review 4

2.1 Acquisition of a sign language as a first language 4
2.2 The situation of deaf children in South Africa 7
2.3 The description of SASL grammar 9
2.3.1 Word order 10
2.3.2 Negation 11
2.3.3 Topicalisation 12
2.3.4 Interrogative sentences 13
2.3.5 Imperatives 14
2.3.6 Lexical variation 14
2.4 Testing of sign language acquisition in deaf children 15
2.5 Sentence repetition tests (SRTs) 18
2.5.1 SRTs for spoken languages 18
2.5.2 SRTs for sign languages 21
2.6. Research questions 25
2.7. Conclusion 26

Chapter 3: Methodology 28

3.1 Participants 28
3.1.1 Selection of participants 28
3.1.2 Background questionnaires 30

3.1.3 Parental/legal guardian consent 31
3.2 Test materials 31
3.2.1 SRT sentences 31
3.3 Procedure 38
3.4 Analysis 40
3.4.1 Quantitative analysis 40
3.4.2 Qualitative analysis 42

Chapter 4: Results 44
4.1 Quantitative results 44
4.1.1 Overall scores 44
4.1.2 Overall scores compared to age 46
4.1.3 Overall scores compared to length of SASL exposure 47
4.1.4 Overall scores compared to schools 49
4.1.5 Overall scores of sentences compared to sentence length 52
4.1.6 Overall scores of sentences compared to categorisation of complexity 53
4.2 Qualitative results 54
4.2.1 Word order 55
4.2.2 Lexical substitution 59
4.2.3 Non-manual features 62
4.2.4 Multilingualism effects 66
4.3 Conclusion 68

Chapter 5: Discussion and Conclusion 69
5.1 Research questions 69
5.1.1 The most important features of an SRT for young, deaf learners of SASL 69
5.1.2 The relationship between the scores on the SRT and chronological age 70
5.1.3 The relationship between the scores on the SRT and length of exposure to SASL 70
5.1.4 The relationship between the scores on the SRT and school 70
5.1.5 The relationship between the scores on the SRT and sentence categorisation 71
5.1.6 The relationship between the scores on the SRT and sentence length 72
5.2 Future use of the SRT 72
5.3 Future research 74
5.4 Conclusion 74

Bibliography **76**

Appendices **80**

Appendix A: Letter to School 1 80

Appendix B: Letter to School 2 82

Appendix C: Letter of permission from the WCED 84

Appendix D(a): Parental background questionnaire (School 1) 85

Appendix D(b): Parental background questionnaire (School 2) 89

Appendix E: Educator background questionnaire 93

Appendix F: Participant biographical information 95

Appendix G: Parental consent form 98

Appendix H: Educator consent form 101

Appendix I: Child assent form 104

Appendix J: English version of the instructions that were given to the participants, signed by a Deaf, native signer of SASL 107

Appendix K: Research assistant confidentiality form 108

Appendix L: Supplementary data – test sentences 110

Appendix M: Supplementary data – video files 111

List of figures

Figure 3.1 Diagram illustrating data collection physical set-up

Figure 4.1 Age groups and combined scores

Figure 4.2 Participant responses across schools

Figure 4.3 Number of Correct responses per sentence with trendline (%)

Figure 4.4 Sentences ordered by distribution of scores

Figure 4.5(a) Model sentence sign BETTER

Figure 4.5(b) P23 sign BETTER

Figure 4.6(a) Model sentence sign CAR

Figure 4.6(b) P9 sign CAR

Figure 4.7(a) Model sentence sign GROW

Figure 4.7(b) P13 sign GROW

Figure 4.8(a) Model sentence sign LEARN

Figure 4.8(b) P8 sign LEARN

List of tables

Table 2.1 Language acquisition stages of hearing children and deaf children (Baker, van den Bogaerde, Pfau and Schermer 2016: 54–62)

Table 3.1 Overview of the total number of participants (N=71)

Table 3.2 Overview of practice and test sentences

Table 4.1 Overall responses in the four categories in real numbers and percentages

Table 4.2 Age groups and average scores

Table 4.3 Number of participants with background information from parents and schools

Table 4.4 Length of exposure means and standard deviation

Table 4.5 Lengths of exposure for participants with the highest number of Unanalysable sentences

Table 4.6 Participant responses across schools

Table 4.7 Participants producing the most Unanalysable sentences

Table 4.8 Sentence lengths per response

Table 4.9 Sentence complexity category and their response scores

Table 4.10 Word order results (N=185)

Table 4.11 Word order changes

Table 4.12 Lexical variant substitutions: participants

Table 4.13 Lexical variant substitutions per specific participant

Table 4.14 Non-manual features' presence in the results

Table 4.15 Non-manual features results

Table 4.16 Number of participants exposed to specific spoken languages

Table 4.17 Number of languages to which the participants are exposed

Table 4.18 Average SRT scores for participants with multiple languages

Transcription conventions used to gloss SASL

HAPPY	Signs are written in capital letters
XXXXX	Unknown signs
re	Raised eyebrows
le	Lowered eyebrows
hs	Headshake
hn	Head nod
bl	Body lean
neg	Negation of any non-manual form
XX++	A reduplicated sign indicating pluralisation (in other instances, it can also indicate habitual inflection, but this is not used in this thesis)
$INDEX_1$	INDEX signs are made with a **B**-handshape and represent pronouns. The finger is pointed at the person, item or abstract concept being referred to, and is signified by the subscript number
$POSS_1$	POSS signs represent possessives. The palm orientation shows who it belongs to, and is signified by the subscript number
$_1GIVE_2$	Verb agreement is shown by the subscript numbers placed before and after the verb. These numbers show the movement of the verb from one person to the other
XXX_3	Subscript numbers directly refer to first person, second person, and third person
CLxx	Classifier handshapes are used to represent items through shape or movement. For example, instead of signing CAR, one might use a classifier: CLcar with a **]**-handshape that represents the car and depicts its movements
$\overline{\text{xx}}$ XXXX	A line on top of signs indicates the scope of the non-manual feature that is produced
R:	Signs produced with the right hand
L:	Signs produced with the left hand
XX^XX	A compound sign

Chapter 1

Introduction

1.1 Background

Only about 5% of deaf[1] children are born to native signing parents (Cormier, Schembri, Vinson and Orfanidou 2012: 51; Haug 2011: 23). The remaining 90–95% of deaf children go through atypical language acquisition, as they are born into hearing families who are typically unable to sign (Marshall, Mason, Rowley, Herman, Atkinson, Woll and Morgan 2014: 239; Cormier et al. 2012: 51; Hermans, Knoors and Verhoeven 2009: 107; Vermeerbergen 2006: 177). The majority of these deaf children will not have full access to a sign language until they have passed the most critical years of the language acquisition period (Haug 2011: 23). Often, deaf children do not have access to sign language until they are placed in schools or special programmes (Mayberry, Lock and Kazmi 2002: 38).

The monitoring and testing of language development in deaf children is necessary and important, and tools have been developed for more widespread and better documented sign languages such as American Sign Language (ASL) and British Sign Language (BSL; Haug 2011: 26–27). There is therefore a current need for reliable, standardised, and valid testing methods to monitor the language acquisition of deaf children for many sign languages (Haug 2011: 27–28). According to Hauser, Paludneviciene, Supalla and Bavelier (2006: 156), in order to properly assess education, we need to be able to evaluate an individual's language skills. There is an urgent need for sign language tests in schools for the deaf around the world (Haug 2011: 25). In many countries, the evaluation of sign language carried out in schools is sub-standard, mostly informally done through observation or video analysis. This is due to a lack of standardised testing methods. As a results of the lack of research done on not only sign language acquisition but sign language overall, even more so for South African Sign Language (SASL), there are no norms available for native signers, nor for educational settings. Thus, it is not feasible to compare a child's results on a language test to any norm to determine his or her success (Marshall et al. 2014: 246).

[1] In this thesis, "**D**eaf" refers to the cultural group, while "deaf" is the term used to refer to the medical diagnosis.

As no such tests exist for SASL, this study aims to develop and pilot a Sentence Repetition Task (SRT) for young, deaf SASL signers, which will go some way in addressing this lack of testing methods. An SRT is a method of assessing linguistic knowledge, and is used in language assessments and for research (Marinis and Armon-Lotem 2015; Polišenská, Chiat and Roy 2015; Fleckstein, Prévost, Tuller, Sizaret and Zebib 2018; Klem, Melby-Lervåg, Hagtvet, Halaas Lyster, Gustafsson and Hulme 2015). The motivation behind choosing an SRT is that it is ideal for language testing in educational settings – particularly in contexts with little to no standardised testing – as these tests are inexpensive to administer, have clear target sentences, can include a large variety of sentence types, can be scored in different ways depending on the focus of the analysis, and are quick and easy to administer (Polišenská et al. 2015: 117; Marinis and Armon-Lotem 2015: 26). An SRT requires a person to immediately repeat a sentence that has been presented to them through auditory or visual channels (Gagiano and Southwood 2015: 39) and, as such, draws on a wide range of linguistic skills (Klem et al. 2015: 146). The SRT can be influenced by a participant's background and language history, in terms of age of acquisition, length of exposure, and quantity and quality of input (Marinis and Armon-Lotem 2015: 28). These factors are exceptionally variable in deaf children (Marshall et al. 2014: 239).

1.2 Methodology

This study considers the construction of a proficiency test in SASL, and will develop an SRT for SASL which will then be piloted on young, deaf children. The test will be created by considering other SRTs used for sign languages. Through this process, the researcher will create 20 sentences that range from simple to complex in terms of grammar, keeping in mind the lexical variation within SASL. These sentences will then be pre-tested with Deaf, native adult signers of SASL to ensure the stability of the test's grammar and lexical items. The test will then be used to test the selected participants: deaf children between the ages of seven and nine years. These participants will come from two schools for the deaf in the Western Cape. Each participant will have had to have received a minimum of one year of exposure to SASL in order to be tested. The participants will be tested at their schools by the researcher, with a Deaf, native signer as an assistant. Explanations and instruction videos, signed by an SASL interpreter and a Deaf, native signer of SASL respectively, will be presented to each participant. With the help of the assistant, the children will be able to ask questions, and the researcher will be able to ascertain whether the children are comfortable and understand the instructions of the SRT. The participants' responses will be recorded with a video camera and then analysed. In total, the data of 40 participants will

be used for the final analysis. The analysis takes on both a quantitative aspect, using statistics and the overall scores, as well as a qualitative aspect, considering specific cases and participants.

1.3 Thesis structure

The thesis is structured as follows: the first and current chapter constitutes the introduction. Chapter 2 takes the form of a literature review, which provides an overview of the four key elements of this thesis, namely sign language acquisition as a first language (L1), deaf children in South Africa, SASL, and the ways that SRTs are used. This chapter begins by considering the acquisition of sign language as an L1 and the process that this acquisition typically follows due to the differences in exposure to sign language that deaf children receive. The chapter then goes on to focus on the situation of deaf children in South Africa, specifically considering the education system, as most children receive their first sufficient exposure to SASL at school. The grammar of SASL is then described, followed by a brief overview of ways in which children's acquisition of sign language is tested. The chapter then turns to SRTs, as this is the selected testing method of this thesis. Lastly, based on everything that Chapter 2 has considered, the chapter presents the research questions that this thesis will be answering.

Chapter 3 focuses on the methodology that will be used to answer the research questions posed in Chapter 2, detailing the participants that were tested and the SRT that was created, with a focus on the sentences that were included. The chapter then details the process that was followed for the participant testing and, lastly, the ways in which the results will be analysed.

Chapter 4 consists of the results of the test, looking at the quantitative results first and then the qualitative results. The quantitative results utilise statistics to consider the effects of biographical aspects on the results, as well as the effects that certain aspects of the test might have had on the results. The qualitative results consider the aspects where the participants deviated from the model sentences given in the test, and the frequency of these deviations.

Lastly, Chapter 5 discusses the research questions and concludes the thesis. The chapter also discusses the results of the test, and speculates on some of the possible reasons for these results. The thesis concludes by noting the main findings of the study, and makes recommendations for the future development of SRTs for SASL and for the use of this test in schools.

Chapter 2

Literature Review

This chapter will provide an overview of six key aspects to consider when approaching the topic of sign language assessment as described in Chapter 1. In section 2.1, the acquisition of sign language as an L1 for children will be addressed, as this study will be working with children who are L1 learners of SASL. Section 2.2 will then focus specifically on deaf children in South Africa, contextualising the participants in this study. Section 2.3 briefly provides an overview of the characteristics of SASL grammar, touching on word order, negation, topicalisation, interrogative sentences, imperatives, and lexical variation. Section 2.4 will then look at the testing of sign language acquisition, ending the chapter by considering the testing method chosen for the study, namely SRTs, and focusing on previous SRTs done in sign languages. Finally, the research questions will be presented.

2.1 Acquisition of a sign language as a first language

Only about 5% of deaf children are born to native signing parents (Cormier et al. 2012: 51; Haug 2011: 23; Vermeerbergen 2006: 177). These children are exposed to sign language from birth and will acquire it as their L1, as children have the potential to acquire any language to which they have sufficient exposure. They will thus follow the same type of language acquisition stages and milestones as typically-developing hearing children, as illustrated in Table 2.1 (Cormier et al. 2012: 51; Haug 2011: 61; Hermans et al. 2009: 107; Marshall et al. 2014: 239).

Table 2.1: Language acquisition stages of hearing children and deaf children (Baker, van den Bogaerde, Pfau and Schermer 2016: 54–62)

Year;month	Spoken languages	Sign languages	Stages
0;9	Babbling	Babbling	Pre-linguistic stage
0;9–1;0	Pointing	Pointing	
1;0–1;5	First words	First signs	One-two word stage
1;6–1;11	Two-word combinations	Two-sign combinations	
2;0–2;5	Lexical growth	Lexical growth	Differentiation stage
2;6–2;11	Marking on verbs	Use of classifiers	
3;0–3;5	Multi-word combinations	First marking on verbs; multi-sign combinations	
3;6 onwards	Complex structures	Complex structures	Completion stage
4–10	Narrative structure	Narrative structure	

The remaining 90–95% of deaf children go through atypical language acquisition, as they are born into hearing families who are typically unable to sign (Cormier et al. 2012: 51; Hermans et al. 2009: 107; Marshall et al. 2014: 239; Vermeerbergen 2006: 177). These families tend to focus on teaching their deaf child their spoken language, the acquisition process of which will be difficult and delayed (Cormier et al. 2012: 51). The success of these children in adequately acquiring a spoken language depends on their degree and type of hearing loss, as well as their home and school environments, intelligence, and the amount of time that they spend reading (Cormier et al. 2012: 51). The majority of deaf children will not have access to a sign language, and those who do will not have full access to a sign language until they have already passed the most critical years of the language acquisition period (Haug 2011: 23).

Regardless of these deaf children's success with spoken language, many begin using a sign language. This occurs at different times in different people's lives. Some encounter signing at school (in the case of those who attend schools for the deaf where a sign language is used as medium of instruction and/or the learners use a sign language amongst themselves), whereas some might only come into contact with signing once they leave school (typically those who attended oral, i.e., non-signing schools; see discussion below). This is considered to be the delayed acquisition of a sign language and, for some, even so far as the delayed acquisition of their L1 (Cormier et al. 2012: 51; Haug 2011: 23; Hermans et al. 2009: 107; Marshall et al. 2014:

239). Delayed acquisition of an L1 is unlikely to result in (near-)native proficiency, with effects especially evident at the phonological, morphological, and syntactic levels (Cormier et al. 2012: 51–52).

Mayberry et al. (2002: 38) explored the influence of timing of language acquisition on the capacity to learn language later in life. They investigated the question by studying individuals who were born deaf and were users of American Sign Language (ASL), as they often do not have access to language until they are placed in schools or special programmes, which typically occurs around the age of 3 years (Mayberry et al. 2002: 38). The authors found that this timing of language acquisition had a strong influence on the capacity to learn language later in life. Deaf individuals with little experience of language early in life performed poorly, regardless of whether the language that they first learned was spoken or signed and whether the language they tried to learn later in life was spoken or signed (Mayberry et al. 2002: 38). They also showed low levels of ASL performance, whereas adults who had become deaf later in life and had early exposure to language performed better in ASL than the former. Mayberry et al. (2002: 38) conclude that the language-learning ability is determined by whether or not language was accessible during early brain development.

Similarly, Cormier et al. (2012: 63) state that, for deaf children, relying on the acquisition of a spoken language as their L1 is risky. They explain that if the acquisition of the spoken language fails, the chances of the child then acquiring a signed language to native signer proficiency is unlikely. The effects of this delay do not appear to be corrected, even after many years of exposure to a sign language (Cormier et al. 2012: 63).

Many deaf people can be described as bilinguals, as they use both a sign language and the surrounding spoken language every day. Their competence in the two languages depends on their age of exposure to the languages (Haug 2011: 23). Marshall et al. (2014: 239) state that late acquisition can result in fluent signing but is accompanied by a slower processing speed and more difficulty with the comprehension of complex syntactic structures. When developing or adapting a test for use with deaf children with respect to their language development, Haug (2011: 61) emphasises the importance of considering language acquisition studies: the higher the age of exposure, the lower the participant's language proficiency scores (Haug 2011: 100, 102).

Lenneberg (1967, cited in Cormier et al. 2012: 50) hypothesised that there is a critical period for the acquisition of an L1. This period is linked to neural plasticity in the brain which decreases as a person ages (Cormier et al. 2012: 50). This L1 critical period hypothesis cannot be tested on

the general population, as the evidence would need to come from persons with atypical language development, i.e. persons who were unable to receive exposure to a language during this critical period (Cormier et al. 2012: 50). There are two groups of atypical language development that satisfy this criterion: children deprived of language via social isolation early in life, and profoundly deaf children born into hearing families (Cormier et al. 2012: 50–51). Lenneberg's (1967, cited in Haug 2011: 102) hypothesis proposes that the critical time to acquire an L1 successfully is between the ages of four to six years, as this has long-lasting effects on language performance in the L1 and abilities with later language learning (Haug 2011: 102). The issue of late exposure plays a significant role in the adaptation of a sign language test, as the participant's performance might be affected by age of first exposure in addition to length and quality of exposure.

When considering the acquisition of any language, in particular a sign language as an L1, the educational systems that the child is exposed to are important, as well as any other contextual information about the child's surroundings that might have an effect on their language acquisition. Over time, there have been three main methods of communication at schools with deaf students: auditory-oral methods (focus on speech, listening and/or lip-reading), bimodal methods (artificial sign systems based on the surrounding spoken language), and natural sign languages such as SASL (Cormier et al. 2012: 51). For a comprehensive, globally-orientated introduction to this topic, see Baker et al. (2016: 325–336). Bilingual-bicultural approaches to education, using natural sign languages for communication at school, only recently (the 1980s) became the topic of general public discussion in some countries. These approaches were then implemented in only a few countries in an attempt to change attitudes and raise awareness for the equal capabilities of the Deaf communities (Cormier et al. 2012: 51).

2.2 The situation of deaf children in South Africa

Deaf communities in South Africa consist of approximately 1, 500,000 people who are culturally and linguistically Deaf and hard of hearing (DeafSA 2018). In a country with eleven official languages, SASL is currently under consideration to become the twelfth. The South African Constitution promotes SASL, and encourages its use and development (Constitutional Assembly of the Republic of South Africa 1996: 1245). Reagan (2008: 165) states that language planning and policy have a "long and complex history in South Africa". It is then clarified and confirmed that SASL has been proven to be a distinct language on its own that is rule-governed, grammatical, systematic, and similar in nature to other natural sign languages (Reagan 2008:

172). Not only is sign language acquired as easily as spoken language, it is essential for cognitive development that this language acquisition happens early. Many deaf children have hearing (and generally non-signing) parents, which would result in sign language not technically being the mother tongue of these children (Reagan 2008: 174).

Deaf children are predominantly born into hearing families that do not have the necessary knowledge or resources to provide their children with typical L1 acquisition. These families are unable to offer their natural home language or a signed language to their deaf child (Batchelor 2010: 499). Communication within these families is typically achieved using a gesture system based on the local spoken language. Within these situations, families are also unable to provide their child with an understanding of or perspective on Deaf culture. Most deaf schools admit learners from three years of age, but some come to these schools ranging from the ages of seven to twelve years, with little to no language ability (Batchelor 2010: 499). As a result, many learners are behind in terms of language acquisition when compared to hearing learners of the same age. Batchelor (2010: 499) lists the critical areas in which these learners experience a delay as "linguistic proficiency, general and factual knowledge about the world around them, and basic social adjustment". She states that the priority for deaf schools is to ensure that these learners are enabled with a language as soon as they start attending classes (Batchelor 2010: 499). Unfortunately, this is not always easy, as teachers are not always competent signers, and signing abilities amongst teachers vary greatly (Batchelor 2010: 499).

Increasingly, educators of the deaf support the approach of a bilingual and bicultural education system for deaf students: bilingual to ensure that the child can communicate in sign language and at least one spoken language, and bicultural to ensure that the child can function in both the Deaf and hearing worlds (Reagan 2008: 172), although worldwide the increase in cochlear implants is, in some countries, leading to a debate about whether natural sign language in educational contexts in developed countries is indeed necessary. Sign languages can be used to teach academic content just as spoken languages can, and just as effectively. While the use of a sign language in the deaf classroom makes sense, it is not necessarily common practice. The signing used in classrooms is typically a contact sign language or a manual signing system of the local spoken language (Reagan 2008: 174). Reagan (2008: 176) notes that SASL has been recognised constitutionally and legally in ways that seem to acknowledge the language rights of the South African Deaf community, but she also highlights the fact that these rights are often not practised.

The first school for the deaf in South Africa was established in Cape Town in 1863, and run by Irish Dominican nuns, thus introducing some Irish Sign Language into the country (Van Niekerk, in prep). The history of deaf education was affected by the country's socio-political unrest (Morgan, Glaser and Magongwa 2016: 15). For a long time, many schools for the deaf either did not have educators who were sufficiently fluent in SASL, or the schools had an oralism policy and did not allow any signing (Aarons and Akach 1998: 6; Huddlestone 2019: 7). There are currently 43 schools dedicated solely to education of the deaf across South Africa, some using purely oral systems, but many using SASL in some form (Van Niekerk, in prep).

In 2009, SASL was officially included as a Home Language subject in the curriculum in theory. To aid in the creation of a full curriculum for SASL as a Home Language in schools, a Curriculum Management Task Team was later appointed by the Minister of Basic Education (Morgan et al. 2016: 17). In 2014, a full curriculum for SASL to be taught up until matric (grade twelve) was first introduced into schools for the deaf (Morgan et al. 2016: 17, 20). This achievement came with many challenges in the classroom, as most teachers were not deaf and were rarely native signers of SASL. Teachers typically resorted to a mixture of English and SASL, as they had to provide input for both the deaf and hard-of-hearing learners in their classrooms (Morgan et al. 2016: 21).

To implement the SASL curriculum successfully, teachers are needed who have sufficient education experience and SASL skills. Ideally, qualified Deaf teachers would be presenting this curriculum but, as this is unfortunately not the norm yet, team teaching was suggested by the Curriculum Management Task Team. A hearing teacher paired with a Deaf teaching assistant in the classroom is referred to as "team teaching" (Morgan et al. 2016: 20). There is currently a lack of learning and teaching materials developed in SASL to be used in the classrooms. Teachers are in need of opportunities to receive training in SASL and Deaf culture in South Africa (Morgan et al. 2016: 26). Morgan et al. (2016: 27) conclude that, as the education of deaf children and the status of SASL in schools progress, more resources will be needed along with a larger involvement of Deaf people. Deaf people need to be involved in training, the development of learning and teaching materials, and mentoring teachers to educate them on SASL and Deaf culture. As we come to the end of this section on the situation of deaf children in South Africa, we now turn to a brief description of SASL grammar.

2.3 The description of SASL grammar

In order to construct an instrument to measure grammatical development, it is essential to know about the adult grammar. There is a very limited amount of published research on SASL (De

Barros and Siebörger 2016: 1; Huddlestone 2019: 6). Due to the social factors surrounding the deaf population in South Africa, most research has been orientated around sociolinguistics as well as language policy (including language education policy), as discussed in the previous section. Earlier research focusing on the grammatical aspects of SASL compares this language to other sign languages or identifies grammatical features that are common amongst other sign languages as well, but never provide much detail on SASL's grammatical features (Huddlestone 2019: 7). This section will consider what we do know about SASL grammar, referring to word order and negation, and the contexts where non-manual features play a key role, namely topicalisation, question marking, and imperatives. These aspects are the most relevant for the construction of this SRT instrument. This section then ends with a discussion of lexical variation in SASL.

2.3.1 Word order

There is, as of yet, no established basic word order for SASL. Vermeerbergen, van Herreweghe and Akach (2007: 41) produced the only study on this syntactic feature. Vermeerbergen et al. (2007: 41) compared SASL and Flemish Sign Language, and found that SASL has a typically verb-final sentence structure. They concluded that SASL word order is thus most commonly SOV or OSV. Van Herreweghe and Vermeerbergen (2012) reaffirm this in a later study. Huddlestone (2019: 10) confirms these observations with her own SASL data: see examples (2.1) for SOV and (2.2) for OSV, although she notes that examples of SVO structures can be observed as well, as in example (2.3). Negative constructions seem to function outside of the word order typology of the language, with manual negators being placed in post-predicate or clause-final positions across sign languages (Huddlestone 2019: 3, 10).

(2.1) CHILD INDEX$_{3a}$ TEDDY-BEAR THROW-AWAY$_{3b}$
"The child throws the teddy bear away" (Huddlestone 2019: 10)

(2.2) $\underline{\text{hs}}$
BANANA INDEX$_1$ LIKE
"I don't like bananas" (Huddlestone 2019: 10)

(2.3) $\underline{\text{hs}}$ $\underline{\text{hn}}$
BROTHER POSS$_1$ DRINK WINE BUT DRINK BEER
"My brother doesn't drink wine, he drinks beer" (Huddlestone 2019: 10)

2.3.2 Negation

Sign languages can make use of manual and/or non-manual negation (Quer 2012: 317). Depending on the language and which of the two are considered to be obligatory in negation marking, sign languages are labelled as manual or non-manual dominant languages (Baker et al. 2016: 137; Quer 2012: 316). To negate manually, a manual sign is typically employed that negates the proposition, as seen in example (2.4) for Catalan Sign Language (LSC; Quer 2012: 318). This can be achieved through the use of negative signs, like NOBODY or NOTHING, and negative particles, such as NO and NOT.

(2.4) SANTI MEAT EAT $\overline{\text{NOT}}^{\text{neg}}$
"Santi doesn't eat meat" (Baker et al. 2016: 136)

Quer (2012: 326) observes that across sign languages, negative manual signs mostly occur in a sentence-final position, as in example (2.4) for LSC, whereas Huddlestone (2017: 96) notes that negative particles can also occur in preverbal positions, seen in example (2.5) for ASL.

(2.5) JOHN $\overline{\text{NOT BUY HOUSE}}^{\text{neg}}$
"John is not buying a house" (Baker et al. 2016: 136)

Non-manual features are often used to negate sentences, typically occurring simultaneously with the signs they are negating. These features are articulated using head movements, facial expressions, and movements of the body (De Barros and Siebörger 2016: 2). These non-manual features can be used independently when negating a sentence but are often found accompanied by manual negation signs, as seen in example (2.5) for ASL (De Barros and Siebörger 2016: 10). The scope of these non-manual features varies across sign languages (Huddlestone 2019: 3). Quer (2012: 324) claims that it seems clear that these markers have their origin in gestures and facial expressions but have evolved to be elements that are fully incorporated into sign language grammar due to the nature of sign languages.

De Barros and Siebörger (2016) considered negative sentences from two native SASL signers in an attempt to contribute to the scarce resources available concerning the formal features of this language. They confirm that SASL uses both manual and non-manual features to indicate negation (De Barros and Siebörger 2016: 1). The most prevalent method of negation in most sign languages is to make use of a head movement (De Barros and Siebörger 2016: 2). This is

confirmed by De Barros and Siebörger (2016: 10) for SASL, where the side-to-side headshake was found to be used for negation the most frequently across their data, and to be the main clausal negator, as seen in example (2.6). Huddlestone (2017: 102) finds that non-manual marking in SASL occurs in an utterance-final position, possibly overlapping with the last-signed element in the clause, shown in example (2.6) as well.

(2.6) NO. SOMETHING ORDER WANT (Huddlestone 2017: 99)
hs
"No. I do not want to order something"

De Barros and Siebörger (2016: 12) conclude that the headshake is an obligatory marker of negation in SASL. It is noted that manual negation signs are optional, and it is concluded that SASL is a non-manual dominant language (De Barros and Siebörger 2016: 8).

2.3.3 Topicalisation

McIntire and Snitzer Reilly (1988) list "topicalisation" and "interrogatives" as contexts in which they expect to see linguistic non-manual markers in sign languages. Baker et al. (2016) describe topicalisation as a grammatical operation, one that is found frequently in SASL as well as in other sign languages. Topicalisation commonly influences the order of signs within a sentence, shifting a constituent to a sentence-initial position so that it is indicated as the topic of that particular stretch of conversation. It is specifically old information that is shared by the conversation partners, often introduced earlier in the conversation, which new information will be added to in the rest of the sentence (Baker et al. 2016: 129). Nominal constituents, locative adjuncts, and temporal adjuncts can all be topicalised, which is signalled by both syntactic positioning and non-manual marking, although non-manual marking is often optional (Baker et al. 2016: 129–130). These non-manual markers are typically raised eyebrows and a slight forward head-tilt; see example (2.7) from the adult signers discussed in subsection 2.3.4 (Baker et al. 2016: 129).

(2.7) MORNING NIGHT EVERY INDEX$_1$ BRUSH-TEETH
re
"I brush my teeth every morning and night"

Topicalisation has not been systematically investigated in SASL, even though it is a common feature of SASL sentences and is worth mentioning when discussing SASL grammar. It was thus not included as a compulsory grammatical element in the SRT developed in the current study.

2.3.4 Interrogative sentences

Interrogatives in SASL are expressed similarly to those of other sign languages, depending mostly on non-manual markers to mark the question (Baker et al. 2016: 131). Of the interrogatives available, yes/no-questions and wh-questions will be considered here. Yes/no-questions are typically only indicated by a non-manual marker with a grammatical function. This marker is commonly the raising of the signer's eyebrows and a head movement, either up or down (Baker et al. 2016: 131). This has been confirmed for SASL by the data of five native, adult SASL signers that the researcher collected to ensure the grammaticality of the test sentences. Four of the five adults[2] produced a yes/no-question, and accompanied their yes/no-questions with raised eyebrows and a head movement forward – see example (2.8). Wh-questions are also marked non-manually in sign languages, typically through furrowed eyebrows and possibly with a forward head movement (Baker et al. 2016: 132). Once again, the adult signers recruited for the SASL data (see subsection 3.2.1) confirm this, with five out of five marking the question with furrowed eyebrows and a head movement forward – see example (2.9).

(2.8)
bl
hs
re
SCHOOL GO WANT
"Do you not want to go to school?"

(2.9)
bl
le
BABY SAD WHY
"Why is the baby sad?"

An interesting construction is found in question-answer clauses (QAC). These constructions consist of a question and an immediate answer, both provided by the same signer. These constructions are equal, in terms of truth conditions, to a declarative sentence (Huddlestone 2019: 14). The question part takes the form of a wh-interrogative or a polar interrogative, and is marked with raised eyebrows (glossed as "re"), whereafter the answer follows (Huddlestone 2019: 12, 14). In negative polar QACs, the answer can even just be a non-manual headshake (glossed as "hs"), with an optional facial expression such as lowered eyebrows (glossed as "le"), with or without a manual marker of negation, as seen in examples (2.10) and (2.11) below (Huddlestone 2017: 100).

[2] The fifth adult interpreted the sentence as a declarative sentence and produced it as such.

(2.10) k-i-t-a INDEX$_3$ EAT SUGAR (Huddlestone 2017: 100)
hs
re le
"Kita does not eat sugar"

(2.11) MAN HOUSE BUY (Huddlestone 2017: 100)
hs
re le
"The man is not buying the house"

2.3.5 Imperatives

The last non-manual marker relevant to the grammatical constructions included in the test is the marking of an imperative sentence. This feature is typically marked by non-manual features but has not been well research across sign languages. In a cross-linguistic comparison between a limited number of sign languages, it has been described as either occurring with furrowed eyebrows or raised eyebrows (Baker et al. 2016: 135). The adult data collected for this study indicates that SASL also has this pattern, raising eyebrows to mark imperatives – see example (2.12).

(2.12) BOTTLE BABY $_2$GIVE$_1$
re
"Give me the baby's bottle"

2.3.6 Lexical variation

In constructing a test for grammar, it is of course essential to use lexical items and thus to be aware of lexical variation. Lexical variation in SASL is mostly affected by school variation, resulting from geographical dispersal but also due to the organisation of education (Baker et al. 2016: 282). Deaf communities in South Africa have been disjointed, with the result that there has been little contact between schools and thus little exposure to different school varieties. Consequently, the SASL varieties used by different Deaf communities show considerable lexical variation[3] (Aarons and Akach 1998: 19). Morgan et al. (2016: 19) state that the variants of lexical items are usually known to native signers and do not cause any communication problems amongst SASL signers; rather, these variants make the language richer. The researcher's experience during data collection and testing for the current study has shown that the situation is not as simple as this statement would lead us to believe. Participants

[3] A school variety is currently being researched (Njeyiyana, in prep).

from two different schools in the same province experienced difficulty with a small number of signs that the researcher used. Even more problematic is the fact that all of the signs were checked and confirmed beforehand with educators involved with the children, in an attempt to avoid such a situation. Lexical selection for the SRT is discussed in Chapter 3, section 3.3.

Van Niekerk, Ebersohn, Huddlestone and Baker (in prep.) state that every sign language examined so far has shown a degree of lexical variation. Lexical variation is the most researched aspect of sign language variation, and can be related to age, education, and/or region (Van Niekerk et al., in prep.). The role of age in lexical variation comes into play as generations add new signs or standardise languages, thus losing less common signs. Education affects lexical variation as schools, even some in the same region, may use different signs depending on the contact between the schools (Van Niekerk et al., in prep.). Van Niekerk (in prep.) considered the lexical variation in South Africa by asking 19 participants, each from a different school for the deaf, to produce 101 lemmas. With a total of 1919 lemmas collected, he was able to determine that 377 of the signs were different but related, and only four were the same across all 19 participants and thus schools: BIRD, RAIN, WORRY, and YEAR (Van Niekerk, in prep.). He concluded that his research supports the claim that school is an influencing factor in lexical variation (Van Niekerk, in prep.).

2.4 Testing of sign language acquisition in deaf children

As mentioned in Chapter 1, language assessments allow researchers to answer questions about the linguistic abilities of various groups, often focusing on children to monitor their development (Haug 2008: 51). According to Haug (2008), there are three groupings of sign language assessments: "(1) instruments to assess and monitor the process of sign language acquisition in deaf children, (2) assessments for educational purposes, and (3) instruments for linguistic research" (Haug 2008: 51). Instruments utilised in educational contexts are typically used to assess acquisition and development, and to determine whether intervention is necessary. These instruments also provide direction for how to plan an intervention for an individual that the instrument has identified as needing assistance (Haug 2008: 52). Instruments used for linguistic research typically focus on the formal features of the languages, for example, morphosyntactic structures or grammatical processing (Haug 2008: 53).

Recently, the European Centre for Modern Languages' ProSign project has reported on sign language assessments that are currently used across Europe (Leeson, Haug, Rathmann, Sheneman and Van den Bogaerde 2018: 12). Some of the most common current assessment

methods include standardised tests, in-class observations, interviews with students, and in-class exams, although a combination of these methods can also be implemented (Leeson et al. 2018: 11). The need for more standardised assessment methods was expressed by 62.5% of the respondents, as observation during class, in-class exams, and interviews with students were all used more often than standardised tests (Leeson et al. 2018: 12). Leeson et al. (2018: 13) note that a recent move towards more standardised assessment methods in sign language programmes has been made in the United States, Australia, and Britain.

Haug (2008: 54) points out that the majority of the instruments surveyed in his research had been based on previous ASL research. This applies to research on the language and its acquisition process. Some of the tests are adapted from tests developed for other sign languages (Haug 2008: 54), which is problematic as the languages differ grammatically and lexically. Other tests have been adapted from spoken language tests, where even more complications arise (Haug 2008: 55). According to Haug (2008: 55), the most important things to consider when developing a test are the linguistic content, target groups, reliability, validity, and standardisation. Standardisation is singled out as particularly important during test development, as standardising the testing format, the tools for coding and analysis, and the compilation of age and/or proficiency norms are all crucial parts of the process (Haug 2008: 55). Test usability depends on the administration and scoring procedures as well as the time costs of the administration and scoring of the test. These factors need to be kept simple and short to allow for tests that are easy to understand, easy to complete successfully, and easy for data retrieval (Haug 2008: 56). Haug (2008: 79) concludes that there is currently a need for instruments that can be used in schools for the deaf, and instruments that can be used for second-language (L2) learners of a sign language. Both instruments that exist for educational purposes and instruments that are designed to assess and monitor language acquisition have limited age ranges that they can test (Haug 2008: 80). This gap in the system of sign language testing is important to note, as it is necessary to be able to assess and keep track of the language acquisition process of younger children across an extended period of time, and thus be able to plan interventions where needed (Haug 2008: 80).

Haug (2011: 25) emphasises the need for sign language tests in schools across the world. In many countries, preschools and primary schools carry out language evaluations that are far from satisfactory (Haug 2011: 26). Standardised tests have been developed for the better known sign languages in the world, for example, ASL and British Sign Language (BSL). Both of these languages have been more broadly documented in terms of their linguistic structures and acquisition in comparison to most other sign languages (Haug 2011: 27).

Testing and monitoring sign language development from an early age is crucial, and to do this a standardised sign language test is necessary (Haug 2011: 26). Due to the lack of research on lesser known sign languages, like SASL, test development relies on the research done on more researched sign languages in addition to using tests developed for other sign languages as source material, as mentioned earlier in this section (Haug 2011: 27).

When evaluating language, there is a choice between two types of language tests: criterion-referenced tests and norm-referenced tests. Criterion-referenced tests have predefined criteria that the participants need to meet in order to score well (Haug 2008: 55; Haug 2011: 33–34). Norm-referenced tests compare participants' performances, sometimes comparing them with very specific aspects in mind, for example, their age group or length of exposure (Haug 2008: 55; Haug 2011: 34). There are three main reasons for doing language testing with children. First, the language testing is done to track a child's language development and to compare it to the expected course. The second reason is to describe the child's language abilities so that their language therapy and/or education can be tailored to suit their needs. The third and final reason for language testing in children is to keep track of individuals' language development, to measure the progress of an educational programme or therapeutic programme (Haug 2011: 35).

There is another way to further categorise language testing methods for children: a categorisation based on the nature of the data sample, i.e. containing elicited or spontaneous responses. Tests with elicited responses can have a fixed response format, whereas spontaneous responses focus more on context and the speaking, writing and signing taking place as a response (Haug 2011: 36). Spontaneous language provides the researcher with an idea of the child's expressive language skills. This would be slightly more natural than elicited data, but there is less control over the situation and thus it is possible that the data the researcher was looking for never occurs. Elicited language is more controlled, but the stimuli need to be carefully considered (Haug 2011: 37). Between these two ways of categorising tests, certain combinations are problematic. For example, norm-referenced tests with elicited behaviour are typically not sensitive enough to pick up language progress due to the way that these tests are designed (Haug 2011: 36). The elicited language from these tests is different from what the child would use in everyday life. Therefore, criterion-referenced measures using spontaneous language samples are becoming more popular as a test for children's language development (Haug 2011: 37). SRTs are elicited, norm-referenced tests and, because of their ease of use, they are the focus of this study. These tests will be discussed in the next section.

2.5 Sentence repetition tests (SRTs)

Typically, language tests that focus on proficiency have lengthy administration times and require advanced skills and knowledge of linguistic constructs to score (Hauser et al. 2006: 156). SRTs are ideal for language testing in educational settings, particularly in contexts with little to no standardised testing, as they are inexpensive, have clear target sentences, can include a large variety of sentence types, can be scored in different manners depending on the focus of the analysis, and are quick and easy to administer (Polišenská et al. 2015: 117; Marinis and Armon-Lotem 2015: 26). This section will first consider research on SRTs for spoken languages (subsection 2.5.1) and then for signed languages (subsection 2.5.2).

2.5.1 SRTs for spoken languages

SRTs are gaining a reputation for their ability to provide insight into a child's sentence level abilities in clinical assessments, and have been used with success in a number of (unrelated) languages (Gagiano and Southwood 2015). These tests are valuable methods of ascertaining language processing and development in the persons being tested (Polišenská et al. 2015: 107; Marshall et al. 2014: 238). They are also increasingly being used as a clinical test to identify specific language impairment (SLI), particularly in children, although this is not specifically relevant to the current study (Polišenská et al. 2015: 106; Klem et al. 2015: 146). Klem et al. (2015: 146) note the suggestion that SRTs may be the best manner of testing children in order to identify SLI. The reason that SRTs are of such interest in the field of SLI is their ability to identify delay and atypical processes in recalling sentences across age (Polišenská et al. 2015: 117). The results of SRTs reflect the integrity of language processing systems on many levels (Klem et al. 2015: 152). These tests give us insight into linguistic knowledge, although it is not always clear which aspects of linguistic knowledge are the most influential in the test results, and few studies have been done on this topic (Polišenská et al. 2015: 106–107).

Polišenská et al. (2015: 106) point out that SRTs identify weak sentence repetition skills which are considered reliable clinical markers of children with language impairments across many languages, but that it is still not clear what the SRTs are actually telling us about the language ability and impairment of the child. There is disagreement about the underlying mechanisms at work in the SRT, resulting in further disagreement regarding their clinical informativeness (Polišenská et al. 2015: 107; Klem et al. 2015: 146). Polišenská et al. (2015: 107) aim to shed some light on the underlying processes of SRTs in order to better understand what the results reveal about the participant's language. Previously, other studies attempting to reveal these

underlying processes focused on the distinction between content words and function words in the test sentences (Polišenská et al. 2015: 107). The younger the child tested with the SRT, the more prone they were to omit function words (Polišenská et al. 2015: 107). Polišenská et al. (2015: 108) manipulated aspects of sentence input to determine which linguistic features are crucial for the participant's immediate recall. Their findings emphasised the importance of morphosyntax, finding that immediate recall is more reliant on morphosyntax than on knowledge of lexical items and semantics (Polišenská et al. 2015: 115).

Polišenská et al. (2015: 106, 116) conclude that children's level of familiarity with morphosyntax, function words, and lexical phonology are the most prominent contributors to their scores on the test; semantic understanding does not appear to be the focus of the test (see also Marinis and Armon-Lotem 2015: 6–7). They claim that their results demonstrate that SRTs engage the formal aspects of sentence processing (Polišenská et al. 2015: 116). Klem et al. (2015: 152) are of the view that the process of responding to an SRT requires the listener to hear the sentence, generate a conceptual representation of the sentence, activate the relevant lexical knowledge, grammatically encode the message, and then complete the processes for phonological realisation and speech production. Similarly, Marinis and Armon-Lotem (2015: 6) claim that a successful sentence reproduction during an SRT is accomplished due to the ability to process/analyse the sentence at all levels of representation, extract the meaning of the sentence, and then use the production system to recreate the meaning of the sentence from activated representations in the long-term memory. They confirm what Polišenská et al. (2015) claim by observing the most significant effects in their SRT results to be connected to vocabulary and morphosyntax (Marinis and Armon-Lotem 2015: 6). Children struggle more with constructions that are ungrammatical than their grammatical counterparts (Polišenská et al. 2015: 112). This is particularly relevant to language assessments, as the causes of poor results need to be identified and then addressed (Polišenská et al. 2015: 106–107).

SRTs can be affected by many factors, which is one of the reasons that the test is so sensitive and can be highly accurate in identifying language issues. Due to the fact that the reproduction of sentences involves language processing at components , any deficits in these domains could affect the participant's performance on the SRT (Marinis and Armon-Lotem 2015: 6–7). Subjects completing an SRT have been found to perform poorly when the lexical items in the SRT are not as familiar to them, and perform worse when the sentences are not grammatically well-formed (Polišenská et al. 2015: 115). The SRT can also be influenced by a participant's

background and language history, in terms of age of acquisition, length of exposure, and quantity and quality of input (Marinis and Armon-Lotem 2015: 2, 28). These factors are exceptionally variable in deaf children (Marshall et al. 2014: 239).

Typically, SRTs consist of a number of carefully constructed sentences (Marinis and Armon-Lotem 2015: 27). These sentences increase in complexity to ensure the inclusion of simple sentences and complex sentences (Supalla, Hauser and Bavelier 2014: 2). The number of sentences needs to be controlled for, as long tasks are less engaging and can cause participants to lose focus (Marinis and Armon-Lotem 2015: 26). The length of the sentences also needs to be controlled for, as shorter sentences can be reproduced using passive copy. The sentences need to be long enough to disallow passive copying and rather engage the participant's grammatical system. By controlling for this, participants are unable to repeat sentences for which they have not acquired the structures (Marinis and Armon-Lotem 2015: 4–5). Lexical items in SRTs for children need to be selected and deemed appropriate for the target age group (in this study, ages seven to nine years), specifically in terms of their familiarity (Polišenská et al. 2015: 109).

SRTs are conducted individually with participants, and are audio-recorded or videotaped. For example, when testing sign languages participants face a screen with videos and are asked to repeat sentences that are played to them. These sentences are pre-recorded by native users of the language tested. Participants are asked to repeat the sentences as accurately as possible, as soon as the clip of the model sentence is finished, and their responses are recorded to be scored later (Marinis and Armon-Lotem 2015: 19). In terms of scoring, SRTs are typically scored with absolute scoring, receiving a score of either Correct or Incorrect for the sentence in comparison with the model sentence (Polišenská et al. 2015: 111).

SRTs are preferable above other tests for many reasons, but this does not mean that they do not have their shortcomings. The shortcomings could depend on the nature of the study and also on how the researchers choose to approach the study. This is something that Gagiano and Southwood (2015) have noted, singling out their small sample size specifically, as generalisations could not be made for the language under investigation in their study (Gagiano and Southwood 2015: 56).

The length of the sentences that are included in the SRT could influence the participant, depending on the developmental stage that they are at at the time of test-taking. Should the sentence be too long, then the sentence might exceed the memory capacity of the participant,

which could result in a floor effect and an inaccurate idea of the participant's language abilities (Marinis and Armon-Lotem 2015: 27). The participant may not have the ability to reproduce a specific structure from the sentence, not because of their language ability, but because of the length of the sentence. If the sentences are too short, they will also not reflect the ability of the participant, as the participant could repeat them in a "parroting" fashion (Marinis and Armon-Lotem 2015: 27). The final limitation is that the SRT is not all-encompassing: it does not assess all aspects of language, instead providing clearer insight into the morphosyntactic and syntactic skills of the participant. As such, pragmatics and the difference between comprehension and production are not assessed. To address this limitation, researchers and clinicians should supplement this test with other language assessments to ensure a broad and fair overview (Marinis and Armon-Lotem 2015: 28). It is suggested that researchers and clinicians working with bilingual populations should ensure that a detailed language history is collected so that effects of age of acquisition and length of exposure can be monitored (Marinis and Armon-Lotem 2015: 28). Using an SRT with a participant whose exposure to a language is less than twelve months is not recommended, as the performance is then expected to be very low, and the SRT may be frustrating for a participant with such a limited length of exposure (Marinis and Armon-Lotem 2015: 28).

2.5.2 SRTs for sign languages

As is clear from subsection 2.5.1, SRTs are ideal for language testing in educational settings. This method of testing is particularly well-suited for language communities who do not have traditional language testing methods (Polišenská et al. 2015: 117). SRTs can easily be adapted into the target language, as there are target morphosyntactic characteristics of languages that the participants are being tested on which would then need to be identified in the target language and inserted into the test (Polišenská et al. 2015: 117). This subsection will consider SRTs that have been used with deaf participants.

As mentioned in the previous section, SRTs can be used to determine whether or not children or adults have acquired specific linguistic structures (Marinis and Armon-Lotem 2015: 4). This is ideal for sign language testing due to the previously-mentioned chances of delayed exposure that deaf children face (see section 2.1). The use of SRTs in research into sign language acquisition has many possibilities. The sensitivity of the task means that it can potentially identify delayed acquisition as well as atypical language processing (Polišenská et al. 2015: 117). SRTs have provided accurate indications of L1 proficiency in adults and children alike,

as well as distinguishing between native speakers and late learners, which makes it a handy tool for languages that have such broad variation in terms of proficiency (Gagiano and Southwood 2015: 39–40; Hauser et al. 2006: 157). There is a need for a manner of testing sign language proficiency and fluency, specifically in educational and clinical settings, that is quick and easy to score. These settings require methods of evaluation for both adults' and children's language performance, and yet there is no commonly accepted way of assessing these skills in the sign modality (Hauser et al. 2006: 156–157).

Before the studies discussed below, SRTs had been used for spoken languages, but had never been used to identify SLI in deaf, signing children (Marshall et al. 2014: 237, 246). SLI in deaf children is difficult to diagnose and is often overlooked, even though sign languages have all the same linguistic characteristics as spoken languages and are also processed through short-term memory – both aspects that the SRT assesses (Marshall et al. 2014: 238–239). As mentioned in section 2.1, 90–95% of deaf children are born to hearing parents, which means that these children do not typically receive fluent input until they enter school or are put into a preschool with Deaf staff (Marshall et al. 2014: 239). Due to the reality of their situations, most deaf children have delayed exposure to language. This becomes difficult in language testing, as has been seen with bilingual children, because tests are not always able to distinguish between an individual with SLI and an individual who has had delayed language input. However, when an SRT was used to try to distinguish between SLI and language-input delay for British deaf children, this SRT succeeded in differentiating between the two (Marshall et al. 2014: 239). The majority of deaf, non-native signers become competent in the language over time, which indicates that, although they had delays in their exposure to sign language as children, this was not a result of SLI (Marshall et al. 2014: 239).

The goal of the use of SRTs in sign languages is to distinguish between different proficiency levels, in native and non-native signers, deaf and hearing signers, child and adult signers, and also L2 learners (Hauser et al. 2006: 157, 159). The sentences used in sign language SRTs increase in their complexity as the test progresses. Although the sentences increase in complexity, this does not necessarily imply an increase in length, as longer sentences are not always more difficult, with morphological complexity having the ability to make a short sentence much trickier – see the comparison in the morphologically more complex example (2.7), repeated here as example (2.13), and example (2.14), which is simpler but includes more lexical signs (Hauser et al. 2006: 158). Sentences used in any SRT, including those for sign

languages, should be confirmed, and checked in terms of complexity, by native users of the language (Hauser et al. 2006: 159; Marshall et al. 2014: 242).

(2.13) SCHOOL GO WANT
bl
hs
re
"Do you not want to go to school?"

(2.14) FAMILY POSS$_1$ CAR INDEX$_3$ OLD LIKE
"I like my family's old car"

The participants in Hauser et al.'s (2006) study had varying ages, hearing statuses, and proficiencies in ASL. Participants were tested as is conventional for SRTs, and scoring was strict, with reproductions either being marked as Correct or Incorrect (Hauser et al. 2006: 161). The authors' analysis shows that their SRT was able to distinguish different levels of proficiency between deaf and hearing adults, native and non-native signers, and between children and adults (Hauser et al. 2006: 163). Furthermore, Supalla et al. (2014: 6–7) found that, in comparison with their deaf counterparts, hearing signers tend to make more morphological, lexical, and phonological errors in the SRT. As was briefly mentioned in section 3.2, native signers make the most semantic errors, where they change the structure of the original sentence but keep the meaning of the sentence the same (Supalla et al. 2014: 15). This is interesting when compared with adult hearing signers who tended to spend more time processing the superficial and surface forms of the sentence and signs rather than focusing on the semantics thereof (Marshall et al. 2014: 247). Through their study, Supalla et al. (2014: 12) found that the best predictors for accuracy on an SRT are the participant's hearing status, age, and – most importantly – their sign language fluency.

Schüller (2018) developed and piloted an SRT for Dutch Sign Language (NGT) with promising results. Certain variants were noted as having an influence on the results, such as the age of acquisition of NGT, the type of education that the participant had received, and whether or not the participant grew up with regular exposure to other deaf signers (Schüller 2018: 2). The test was found to be accurate in measuring the proficiency of participants, and was deemed a valid measuring instrument (Schüller 2018: 43). A correlation was also found between the scores on the SRT and the participant's working memory, which was tested using the Digit Span test (Schüller 2018: 2, 44).

Marshall et al. (2014) set out to test an SRT with deaf children with SLI. They compared two groups of deaf, non-native BSL children (Marshall et al. 2014: 240). Their results showed that children with SLI scored significantly lower than deaf children of the same age without SLI and similar levels of exposure. This is consistent with the results we see for children with SLI in spoken languages (Marshall et al. 2014: 237, 247). The fact that the results are so similar across these modalities confirms that sign languages grammaticise visual space, and the grammaticising of visual space is considered a grammatical process by the brain (Marshall et al. 2014: 246). Marshall et al. (2014) considered what the results reveal about the children tested, the key being that the children experienced delayed exposure. This means that the SRT was able to distinguish between children with SLI and children with non-native acquisition (Marshall et al. 2014: 246).

In another study, Palmer (2018) attempted to create an SASL SRT to be used to determine the proficiency of L2 learners of SASL. The long-term goal was to eventually create an SRT that can be used in schools for the deaf, which is what this study is attempting to produce. A test consisting of 19 sentences was piloted on hearing university students, with no prior exposure to SASL, taking modules that included SASL language practical components. The sentences were created in close conjunction with the lecturer of the module, a Deaf, native signer of SASL. These sentences were also categorised into three levels of complexity: Simple (seven sentences – see example (2.15)), Moderate (seven sentences – see example (2.16)), and Complex (five sentences – see example (2.17)).

(2.15) $\underline{\qquad\qquad\qquad\qquad\qquad\qquad\text{re}}$
SISTER BROTHER POSS_1 MANY HAVE
"I have many brothers and sisters"

(2.16) YESTERDAY INDEX_1 HOME GO HOME^WORK PRACTISE
"Yesterday I went home to practise my homework"

(2.17) R: UNIVERSITY STELLENBOSCH INDEX_1 LIVE SIGN LANGUAGE LEARN WHERE INDEX_3

L: CLplace
"I live at Stellenbosch University, where I learn Sign Language"

The participants came from two classes, a first-year SASL language acquisition module (38 hearing students, each with 27 hours of exposure) and a third-year Sign Language Linguistics module with a weekly SASL practical component (11 hearing students, each with 11 hours of

exposure). The ages ranged from 18 to 23 years (mean age 19.04), and there were 48 females and one male participant.

Absolute and qualitative scoring of the data was done. The results were pooled as there was no difference between the results of the two groups with different amounts of exposure. For the absolute score, less than 1% of the response sentences were totally correct (11 out of 931 sentences). Only 16% of the participants produced at least one sentence correctly (8 out of 49 participants). In terms of the qualitative scoring, if the non-manual marking of topicalisation was ignored, then the number of participants that produced at least one sentence correctly rose to 49% (24 out of 49 participants). If all non-manual marking is ignored, then the results rise again: The number of Correct response sentences rises to 10% (97 out of 931 sentences), and 86% of the participants now have at least one sentence correct (42 out of 49 participants). In conclusion, it was observed that the ability to discriminate between Moderate and Complex sentences needed to be carefully examined, and more negation needed to be included in the test. Thus, with the goal of one day having an SRT that schools can use, this thesis now takes the 2018 project further.

2.6 Research questions

As briefly discussed in Chapter 1, in order to assess a child's progress in education, we need to be able to evaluate his/her language skills (Hauser et al. 2006: 156). However, there is no commonly accepted test to measure language performance in a sign modality. Due to the lack of research done on not only sign language acquisition but on sign languages overall, even more so on SASL, there are no norms available for native signers, nor for educational settings. Thus, it is not feasible to compare children's results on a language test to any norm to determine their success (Marshall et al. 2014: 246). For this reason, this study aims to describe and evaluate the results of children's completion of an SRT in SASL in relation to various factors.

This chapter has considered the process of acquiring a sign language as an L1, noting the high risk of delayed exposure to an L1 and, as such, the high possibility of negatively affected language processing. Attention was also given to the unique situation of deaf children in South Africa, the description of which showed how deaf children form a linguistic minority in need of an evaluation method (section 2.2). Section 2.3 described what we know about SASL grammar, which formed a basis on which decisions were made regarding the language used in the SRT, while section 2.4 considered the type of language testing available to deaf populations. The SRT has been widely used and researched with spoken languages (subsection 2.5.1), and some work has been done with sign languages (subsection 2.5.2). This study aims

to construct and implement such a test for deaf children learning SASL and, in so doing, also aims to answer the following research questions:

1. What are the most important features of an SRT for young, deaf learners of SASL?
2. What are the relationships between the scores on the SRT and other variables, as indicated in the following sub-questions?:
   2.1. What is the relationship between the scores on the SRT and the chronological ages?
   2.2. What is the relationship between the scores on the SRT and the lengths of exposure to SASL?
   2.3. What is the relationship between the scores on the SRT and the schools?
   2.4. What is the relationship between the scores on the SRT and the sentence categorisation?
   2.5. What is the relationship between the scores on the SRT and the sentence length of the items?

Regarding the sub-questions of Research Question 2, it is expected that the scores will improve as the ages increase (research sub-question 2.1), the scores will improve as the lengths of exposure increase (research sub-question 2.2), and that the scores will not differ between the two schools (research sub-question 2.3). It is also expected that the scores should decrease as the categories rise from simple to complex (research sub-question 2.4), and that the scores should decrease as the sentence lengths of the items increase (research sub-question 2.5).

2.7 Conclusion

Where the acquisition of sign language as an L1 was discussed, it becomes clear that age and length of exposure are both crucial factors (section 2.1). Deaf children in South Africa have great variations in their lengths of exposure, and the deaf schools in South Africa are currently in need of training for their teachers, the development of materials, and more involvement of Deaf people (as seen in section 2.2). Characteristics of SASL grammar, as far as is known on the basis of relatively little research, include an SOV or OSV word order, a non-manual dominant language with a headshake as an obligatory marker of negation, the presence of topicalisation (which has been excluded from the grammatical aspects considered in this test), and the non-manual marking and changed word order of interrogatives, namely raised eyebrows for yes/no-questions and lowered eyebrows for wh-questions with the question word in a final position (see subsections 2.3.1–2.3.4, respectively). The presence of QACs is also noted. Imperatives are marked with raised eyebrows, and lexical variation has been found to be school-based (see subsections 2.3.5 and 2.3.6, respectively). SRTs have been shown to be

relatively good instruments for language testing, and have also been used successfully for some sign languages (see section 2.5). The research questions have also now been stated, asking what the most important factors in an SASL SRT are and what the relationships between the scores and various biographical and linguistic elements would look like (see section 2.6). The next chapter will now consider how to approach answering these research questions by laying out a plan for the SASL SRT development and testing.

Chapter 3

Methodology

This chapter will outline the approaches taken to creating and administering the SASL SRT, as well as the framework for the analysis of the data. It begins, in section 3.1, by considering the selection of the participants and describing the background questionnaire used to elicit information about the participants. This chapter also outlines the procedures for acquiring parental/legal guardian consent. Section 3.2 looks at the development of the SRT and the decisions made about the sentences that were finally used to test the participants. The chapter then takes a look at the data collection procedure (section 3.3), and ends with an introduction to the way that the results will be analysed (section 3.4).

3.1 Participants

3.1.1 Selection of participants

The participants in this study comprised 40 deaf children. They ranged in age from seven to nine years and were learners in grades R, one, two, and three in the South African education system. This age range was chosen so as to maximize the chances that the deaf children would have received enough exposure to SASL to be able to do the test. As mentioned in section 2.1, deaf children typically experience delayed exposure to sign language (Cormier et al. 2012: 51; Haug 2011: 23; Hermans et al. 2009: 107; Marshall et al. 2014: 239). In South Africa, children generally start school at the age of six (National Department of Basic Education 1998). As such, we can assume that from the age of seven years, these children would have received sufficient exposure to SASL and that they will be able to complete the SRT. Studying children at the older ages of eight and nine years also made it possible to measure development.

Participants were included if they were deaf or hard of hearing (hearing loss ranging from moderate (40 to 70 dB) to profound (> 100 dB)). The participants had to have been in the school and exposed to SASL for a minimum of one year, so as to ensure that they would be able to attempt the test. The results will indicate whether or not this was too little exposure to SASL. The children came from two schools for the deaf and hard of hearing in the Western Cape –

see Appendices A–B for the permission letters to each school, and Appendix C for the permission letter from the Western Cape Education Department (WCED) allowing the study to be conducted in these schools. One of the stipulations issued by the WCED was that the schools were to remain anonymous and unidentifiable, thus their letters granting permission for the study to be conducted in these schools were received but are not included as appendices. Both schools follow the same educational curriculum (CAPS), which as of 2009 theoretically included the subject SASL as a Home Language, but which was only implemented nationally in 2014, and thus covered the same topics in their SASL classes (Morgan et al. 2016: 17; National Department of Basic Education 2014: 5).

The learner information was gathered through the completion of parental and educator background information forms (see Appendices D(a), D(b), and E). Participants were excluded if they were later identified as having visual impairments, attention deficit disorders, and/or physical and cognitive impairments, as these impairments could affect their performance on the test. School 1 specified that the information that would exclude a participant due to additional impairments had to be obtained from the parents, and this information was thus included in their background information forms (see Appendix D(a)). School 2 specified that the information that would exclude a participant due to additional impairment had to be obtained from the school nurse. The researcher then sent the list of additional impairments that would be necessary for her to know about, and the list of participants, to the school nurse. This nurse then listed the participants who would need to be excluded without providing any further details concerning which additional impairments were relevant to which participants. Participants who were unable to return a signed consent form and/or had not attended the school for a minimum of a full year were also excluded from the final data analysis.

In total, the schools had 71 learners who were within the age range, and these children were tested. Subsequently 31 children had to be excluded, leaving 40 who fulfilled all criteria and were thus included in the final data analysis. The 31 children were excluded for the following five reasons: (i) they had additional impairments (18/31); (ii) there was no consent from parents/legal guardian (6/31); (iii) some of the children ended up choosing not to participate (4/31); (iv) one child at the time of testing had received less than a full year of exposure to SASL (1/31); and (v) some learners assured the researcher that they were supposed to be tested but it turned out that they were fabricating the truth because they wanted to be included in the exciting, new activity that was taking place in their dormitory (2/31). Table 3.1 summarises the

biographical information of the 71 participants. A detailed table appears in Appendix F with the biographical information of the 40 participants who were included in the final data.

Table 3.1: Overview of the total number of participants (N=71)

Age group	Total tested	Excl.	Final selection	Male	Female	Average age	Range of age	Average length of exposure to SASL	Range of length of exposure to SASL
7;0–7;11	25	12	13	6	7	7;04	7;00–7;11	3;4	1–7
8;0–8;11	20	7	13	11	2	8;05	8;00–8;11	3;5	1–8
9;0–9;11	26	12	14	6	8	9;07	9;02–9;11	4;3	3–6

3.1.2 Background questionnaires

The parents and educators of the children who participated in the study were asked to complete background questionnaires designed for their specific roles in the children's lives. These background questionnaires requested information on their hearing statuses and the languages that they used (L1 and any other languages; see Appendices D(a), D(b) and E). The parents and educators were then asked about their own exposure to and proficiency in SASL (when exposure started, how they would rate their own proficiency, how often they use SASL in their everyday lives, etc.). Lastly, they were asked about the deaf child (how they would rate the child's proficiency, the language they use to communicate with the deaf child, and whether they have any deaf family members). It was decided not to make use of the parents' and educators' scoring of the child's proficiency in SASL as this scoring varied greatly and there was no clear evidence that the parents and educators scored the children similarly.

Specific questions in the parents' and educators' background questionnaires differed and were more specifically aimed at the parents' and educators' role and position in the child's life. The background questionnaire also asked parents about the languages that the children were exposed to and the lengths of their exposure to these languages. This section briefly asked about the length of exposure to SASL before entering school, the type of exposure they received before entering school, and the other languages to which the children had been exposed. This information was necessary, as participants with multiple spoken languages at home might perform differently on the test. This will be taken into account during the data analysis (see subsection 4.2.4). The children's parents (or legal guardians) and educators were also asked to

sign consent forms (see Appendix G for the parental consent form, and Appendix H for the educator's consent form). The parental consent form will be discussed in the next section.

3.1.3 Parental/legal guardian consent

The parental/legal guardian consent form was split into sections detailing (i) the purpose of the study, which was explained in accessible terms; (ii) details of what their child would be asked to do; (iii) the possible risks or discomforts that their child might experience, and (iv) the possible benefits for the child or society that would arise from the study (see Appendix G). The confidentiality and protection of identity and information was then described, with the following section explaining that the child could decline participation or withdraw at any time, with no negative consequences. The contact details of the researcher and the supervisors were made available for parents/legal guardians who might want more information before giving their consent.

The school assisted with distributing the consent forms and background questionnaires by sending the parental/legal guardian consent forms home with the learners on Fridays, when the hostel learners went home as well. The study was described to the parents/legal guardians in three languages, namely English, Afrikaans, and isiXhosa, which are the three official provincial languages of the Western Cape (Western Cape Government Department of Cultural Affairs and Sport 2019: 3). The children brought the forms back to the school, where they were eventually collected by the researcher. Of the 71 parental/legal guardian consent forms that were distributed, 46 were returned with signed consent. At one school, the director of the school was legally able to provide consent for children to participate, which was the case for 19 of the 25 participants whose parents/legal guardians did not return their consent forms. These 19 children were then tested but had missing data as their background questionnaires were not completed by family members from their homes (see subsection 4.1.3, Table 4.3). The procedure for obtaining child assent will be discussed in section 3.3.

3.2 Test materials

3.2.1 SRT sentences

The test that was developed for this study consists of 20 sentences. These sentences progress from simple to complex grammar, as determined by the structures involved. As discussed in section 2.3, there is little known about SASL in terms of grammar and lexical variation, so this estimate of complexity is not necessarily accurate.

It is assumed that an SRT needs to use lexical items that are known to the participants (see subsection 2.5.1) so that it is the participant's knowledge of grammar that is being tested and not their knowledge of vocabulary. The lexical items included in the test were carefully selected, as the presence of unfamiliar signs could negatively impact the children's performance. This is an important aspect to consider, as lexical variation is considerable across schools and provinces in South Africa (Van Niekerk, in prep.). While adults are typically familiar with several lexical variants of signs, many of the children have only ever been exposed to their school's variant.

In order to describe the lexical variants, phonology is used. Sign language phonology consists of five parameters: location, movement, handshape, palm orientation, and non-manual components. Together, these parameters create signs (Rosen 2004: 33). In Chapter 4, these parameters will be used to describe the signs that the participants produced in their test. Phonologically, there are two instances relevant to this study where lexical items changed to reflect specific meanings or events, namely verb agreement and classifier handshapes. Verb agreement is when a verb's sign undergoes phonological changes that reflect a change in meaning, specifically, a change in orientation and the direction of movement, although the presence of non-manuals has been noticed by some researchers (Mathur and Rathmann 2012: 138). For verbs undergoing verb agreement, these phonological changes aim to portray who is doing the action to whom in the situations where it is applicable, which is glossed in this thesis using subscript numbers indicating the movement of the verb (Mathur and Rathmann 2012: 138) – see page v of this thesis for the list of transcription conventions used. The second phenomenon is the classifier handshape which, unlike verb agreement, has not been found in all sign languages (Baker et al. 2016: 223). Classifier handshapes are handshape changes that are used to portray verbs of motion and location in specific situations. These classifiers reflect the form features of the verb's subject, and are glossed in this thesis using "CL" (see page v of this thesis for the list of transcription conventions used). The relation between the referent and the classifier handshape is typically iconic (Baker et al. 2016: 221).

Three Deaf adults were asked to produce signs for the lemmas that were being considered for the sentences. Each adult signed all of the items. Their productions were then compared to check the variation that might exist between them. Two hearing educators at the two schools participating in the study (see section 3.1) were also asked to sign the same lexical items, one educator per school. Note that no Deaf educators were available, and that educators were included because they are familiar with the signs used at their particular school. On the basis

of the input from these three signers and the two educators, lexical items were chosen that were as similar as possible between the two schools and were familiar to the highest number of Deaf adults. Using these final lexical items, the sentences were constructed.

Table 3.2 presents the sentences used in the test. As previously mentioned, the structures used were graded as Simple (six), Moderate (six), and Complex (eight) on the basis of the structures involved. As discussed in subsection 2.4.2, this categorisation does not have a solid foundation in research; certainly, for SASL it is not clear when the various structures are acquired. The categorisation of the structures will be returned to in Chapter 5. The non-manuals indicated are those considered important for the grammatical structure. The length of the sentences is shown in terms of manual signs. The Simple sentences range from 3–5 signs, mean=3.7; the Moderate from 3–6 signs (mean=4.8), and the Complex from 4–7 (mean=6.4).

Table 3.2: Overview of practice and test sentences

Name	No.	Sentence with translation	No. of manual signs	Clauses/ sentence type
Practice		SHOWER SMELL CLEAN "The shower smells clean"	3	Main: declarative
Practice		TEACHER SCHOOL GO "The teacher goes to school"	3	Main: declarative
Practice		MORNING DOG FLOWER EAT "In the morning the dog eats flowers"	4	Main: declarative
Simple	1	___hs INDEX$_3$ MILK LIKE "She does not like milk"	3	Main: declarative; negative
Simple	2	___hs YESTERDAY DOG POSS$_1$ EAT "Yesterday my dog didn't eat"	4	Main: declarative; negative
Simple	3	_____le BABY SAD WHY "Why is the baby sad?"	3	Main: wh-question
Simple	4	_____Re BOTTLE BABY $_2$GIVE$_1$ "Give me the baby's bottle"	3	Main: imperative

Name	No.	Sentence with translation	No. of manual signs	Clauses/ sentence type
Simple	5	le SUMMER OR WINTER LIKE WHICH "Do you like summer or winter?"	5	Main: alternate question
Simple	6	1-O'CLOCK LUNCH TEACHER EAT "The teachers eat lunch at 1 o'clock"	4	Main: declarative
Moderate	7	re hs SCHOOL GO WANT "Do you not want to go to school?"	3	Main: yes/no-question + Complement clause; negative
Moderate	8	FAMILY POSS$_1$ CAR INDEX$_3$ OLD LIKE "I like my family's old car"	6	Main: declarative
Moderate	9	Re ICE-CREAM YELLOW BETTER WHY PINEAPPLE TASTE "The yellow ice-cream is better because it tastes like pineapple"	6	Main: wh-cleft. Main: declarative
Moderate	10	Re INDEX$_1$ KING SWEETS FREE "If I were king, sweets would be free"	4	Conditional clause + Main: declarative

Name	No.	Sentence with translation	No. of manual signs	Clauses/ sentence type
Moderate	11	Le COMPUTER SEARCH HOW INDEX$_3$ LEARN "She learned how to search on the computer"	5	Complement clause + Main: declarative
Moderate	12	MORNING NIGHT EVERY INDEX$_1$ BRUSH-TEETH "I brush my teeth every morning and night"	5	Main: declarative
Complex	13	DOG CLdog-barking CLwalk-around-dog "The dog barked, so I walked around it"	4	Temporal clause + Main: declarative
Complex	14	le INDEX$_1$ ANGRY WHY BIRTHDAY POSS$_1$ INDEX$_2$ FORGET "I am angry because you forgot my birthday"	7	Wh-cleft. Causal clause + Main: declarative
Complex	15	hs WEEKEND THIS HOUSE PAINT INDEX$_1$ WANT "I don't want to paint the house this weekend"	6	Complement clause + Main: declarative negative
Complex	16	re SISTER POSS$_2$ FRIEND POSS$_3$ NAME Z-A-N-D-I "Is your sister's friend's name Zandi?"	6	Main: yes/no-question
Complex	17	ROAD NEXT-TO FLOWER NEW GROW++ LOOK "I saw new flowers growing next to the road"	6	Complement clause + Main: declarative

Name	No.	Sentence with translation	No. of manual signs	Clauses/ sentence type
Complex	18	CAT INDEX$_{3a}$ DOG INDEX$_{3b}$ INDEX$_{3b}$ FAST CLrun-with-paws "The dog is faster that the cat"	7	Main: declarative
Complex	19	re INDEX$_3$ ASK INDEX$_1$ INDEX$_2$ ANGRY "She asked me if you are angry?"	5	Complement clause + Main: yes/no-question
Complex	20	re hs TOMORROW RAIN INDEX$_1$ SWIM "If it rains tomorrow, I am not going to swim"	5	Conditional clause + Main: declarative; negative QAC (see §2.3.4)

Deaf, native SASL signers (N=2) were pre-tested. These Deaf adults were able to confirm the clarity of the test instructions and the grammaticality of the final sentences chosen for the test. If the adults consistently changed their repetition of a sentence, then it was possible that the sentence would need to be reconsidered and was perhaps not as grammatically sound as had been believed. It was thus possible to avoid any problems of a grammatical nature when working with the children. The sentences were presented to the adults in the same manner that they would be presented to the children. The sentence repetitions produced by the adults indicated that the test was grammatically sound, as they had no problems reproducing the sentences. However, there was a fair amount of lexical substitution, which is addressed in subsection 3.4.1.

3.3 Procedure

Ethical clearance was applied for and granted by the Research Ethics Committee: Social, Behavioural and Education Research of Stellenbosch University. A series of short videos was recorded using L1 signers of SASL whose variety of SASL would be familiar to the children. These videos included the following: an explanation of the data collection and the motivation behind the research (henceforth referred to as "the introduction video"), and an explanation of the test and how it would work (henceforth referred to as "the instructional video"). The instructional video also explained that the first three sentences would be practice sentences and the children could ask questions during this first round. To alleviate any possible pressure, the test was referred to as an "activity", so as not to make the children feel like they could be wrong or that the outcome would affect them in any way. The introduction video, which comprised a translation of the child assent form, was signed by an L1 SASL signer and interpreter from the University of Stellenbosch. After watching the translation of the child assent form with the child, the Deaf assistant helped the participant to sign the physical form should s/he have wished to continue (see Appendix I). The instructional video was signed by a Deaf L1 SASL signer (see a translation of the instructional video in Appendix J). This signer was the same signer who signed the final test sentences. The final test sentences also included three practice sentences, which were used to confirm that the child understood the instructions (see Table 3.2).

As the participants were all deaf and the researcher is not an L1 signer of SASL, certain measures were taken to ensure that the data collection went as smoothly as possible, with no language barriers causing problems. Since the participants were young children and the researcher would be a stranger, it was decided to recruit and train a Deaf assistant at each school who had experience working with children. The first assistant was an L1 signer of SASL who works with special-needs children at a different institution (no staff members from the first school were available to act as research assistant during the data collection period); the second assistant was an L1 signer of SASL and a teaching assistant at the second school. Both assistants signed confidentiality agreements (see Appendix K). The assistants confirmed that the participants had understood what was expected of them and answered any questions that the participants might have had. The use of the Deaf assistants' services ensured that the children were comfortable, and assisted in making the process more fluid, as these children were not as shy in the assistants' presence and did not hesitate to ask questions or admit that they were unsure of what they were required to do.

The setting for the data collection was a classroom on the school premises, and the testing area was set up around a desk near a wall. There were chairs on both sides of the desk, and the child sat with their back to the wall for clearer filming purposes. On the desk was a laptop and monitor, where the laptop was used by the researcher to start and stop the sentences during the SRT, and the child could only see the monitor. The video camera was also set up to the side of the desk so that the researcher could control and monitor the recordings. See Figure 3.1 for a diagram of the physical set-up for the data collection process.

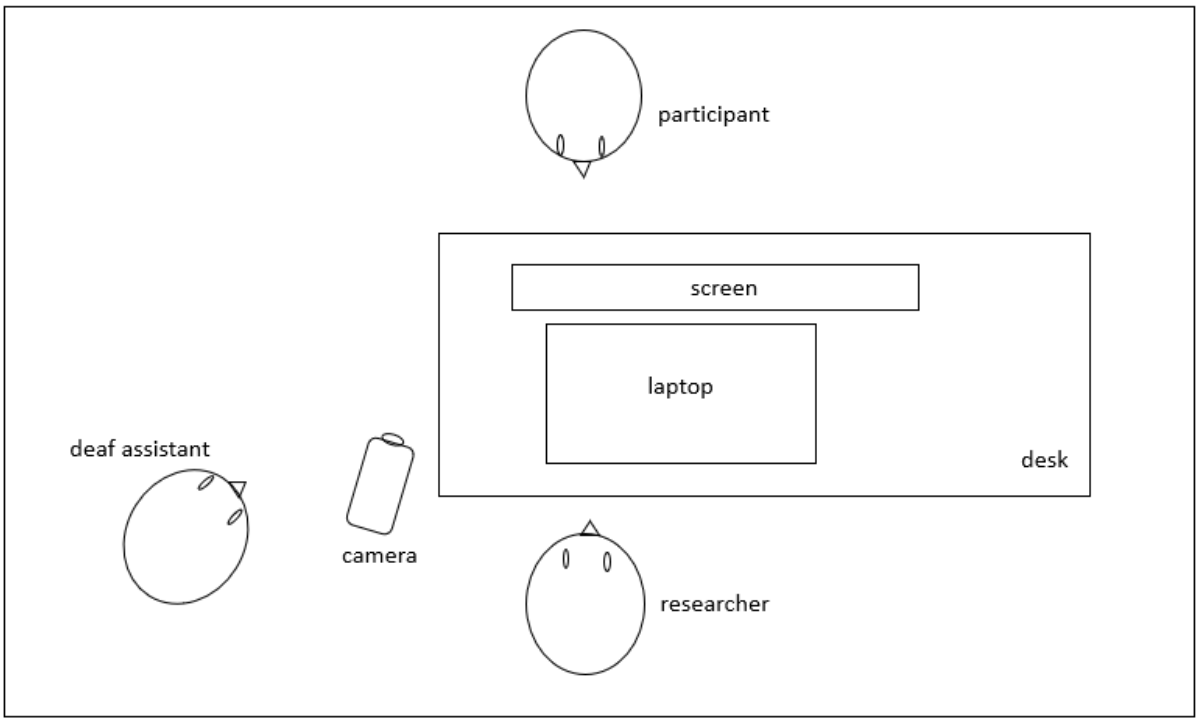


Figure 3.1. Diagram illustrating data collection physical set-up

The children were recorded individually and in no specific order. Each child was welcomed and introduced to the researcher and the Deaf assistant. The child first watched the introduction video, after which s/he was allowed to ask questions, which the Deaf assistant answered. The Deaf assistant was also asked to ensure that the child understood that s/he was allowed to refuse to take part and could end participation at any time, with no negative consequences for him/her. The child then ink signed the physical assent form, which had been signed for them in child-friendly language and included in the introduction video. The Deaf assistant repeated the questions they were asked on the assent form, and assisted those who could not yet read by showing them where the "yes" and "no" options were for them to make their choice.

The child was then shown the instructional video after which the Deaf assistant checked with the child to make sure that s/he felt comfortable with what s/he would be doing. The child then

attempted the practice sentences. First, the video clip of the sentence played, and the participant watched the signer sign the sentence. After the clip had finished, the participant was asked to repeat the sentence as accurately as possible. Each participant's signing was recorded with the video camera. Should any issues have arisen with the child's understanding of the procedure, there was time to clarify the instructions and confirm that the participant understood. This was done by watching the instructions again and/or having the Deaf assistant explain to and show the child how to do the practice sentences.

During the practice sentences, it was discovered that two lexical items, FLOWER and MORNING, were not understood by all of the children. The variation between the schools appeared to be more important than had been assessed before the test. This was dealt with by using visual aids (drawings) and other variations of the signs to introduce the signs and/or confirm that the child would recognise the sign in the test. The Deaf assistant asked the children what the specific sign meant. If they hesitated, then the sign was introduced and explained. This was done as the children attempted the practice sentences and before the actual test started so that the chance of the child being faced with a sign that was not recognised was greatly reduced.

After the practice sentences had been completed, the participant could then discuss and query any parts of the procedure about which they were feeling unsure. The process followed for the elicitation of the practice sentences – watching the video of the sentence and then repeating it back to the video camera – was repeated for all 20 sentences in the main test. The test sentences were presented in a random order for each participant in order to counterbalance any effects that the order of presentation might have. When all of the sentences were completed, the participants were thanked for their time and offered a small treat. The testing took an average of 30 minutes to complete. Each participant's reproduced sentences were then saved to a separate hard drive every afternoon in a folder marked with their unique, allocated code name. This procedure was followed to ensure that the data were safely and securely stored.

3.4 Analysis

3.4.1 Quantitative analysis

The scoring for the quantitative analysis was done as follows: a score of 1 was awarded if the reproduced sentence was a complete match to the model, while a score of 0 was awarded if the sentence was not considered a complete match. The criteria for a complete match was determined for the following elements of the sentences: word order, lexical items, and non-manual features

as specified in Table 3.2. Participants had to match the exact word order of the original sentence, and were required to produce the same lexical signs as the original sentence. The lexical signs could contain one phonological substitution and/or mistake before they were considered a different lexical item and thus marked as Incorrect. Hence, lexical substitutions were not accepted as correct in the scoring of this SRT. Phonological variants were allowed where a single parameter of the original sign was changed. For example, if the participant signed LUNCH with the location over the entire face instead of just over the mouth, while all of the other parameters were correct, then their sign would still be scored as Correct. However, if they signed LUNCH with a change in location and in handshape – for example, a **B**-handshape instead of a **C**-handshape – then they were scored as Incorrect.

The non-manual features considered in the scoring were only those that have a direct role in the grammaticality of the sentence, as previously mentioned in subsection 3.2.1. These features include the marking of questions (yes/no-questions and wh-questions), the marking of negation, and the marking of wh-clefts, imperatives, and conditional phrases of which the non-manual features were discussed in section 2.3. The presence of these non-manual features is important to the grammar of the sentences, and their omission would result in the participant not producing an exact match. Although their presence is necessary, the scope of non-manual features varies widely across signers. Thus, the scope of these features was not considered as a measure. To illustrate, in the model sentence in example (3.1.a) (the clip of which appears in Appendix L), a negation headshake extends only over the sign LIKE, and the others – $INDEX_3$ and MILK – can optionally be negated. Participant 57 extended the scope over the sign MILK as well – see example (3.1.b) (the clip of which appears in Appendix M). The scope of the non-manual feature varies, and thus, did not count against the participant as long as the non-manual feature is present.

(3.1.a) $INDEX_3$ MILK LIKE (hs) [model sentence – S1]
"She does not like milk"

(3.1.b) $INDEX_3$ MILK LIKE (hs) [Participant 57 – S1, scored as Correct]

To provide more information regarding the nature of participant responses, participants' results were then divided into four further categories: Correct, Incorrect, Unanalysable, or Skipped. The sentences were scored as Unanalysable if the participant included elements of the model sentence but gave more information than requested. The sentences that the participants did not

attempt were scored as Skipped, usually indicated to the researcher by the participant shaking his/her head when the time came for him/her to reproduce the sentence.

The participants' scores were compared to their biographical information to determine if there was any correlation between these two factors. In addition, the age groups were compared to each other to see which age group performed better. The total scores were compared to the lengths of exposure that the participants received, so as to determine the effect of the latter. The total scores were also compared between the two schools that the participants were attending to determine if there was any difference between the two groups. Furthermore, the lengths of the sentences were compared to the participants' scores on them in order to consider the influence that the sentence lengths could have had on the result. These quantitative results were determined using statistical analyses, specifically the Fisher Exact test, the Least Significant Difference (LSD) test, and Least-Squares (LS) Means. The Fisher Exact test is used to see if one of two variables changes depending on the value of the other variable, and is typically used with a smaller sample size (McDonald 2014: 77), such as the one in this study. The LSD test is also used as a pairwise comparison technique, and has been noted to be more powerful that other post-hoc comparison methods (Williams and Abdi 2010: 1, 3). LS Means are useful in analysing data from experiments with multiple factors, as they summarise the effects that these factors may have had on the results. Typically, LS Means are also used for pairwise comparisons, which will also be done in this analysis (Lenth 2014: 7). The individual sentences were then ranked in terms of accuracy in order to examine the categorisation of complexity.

3.4.2 Qualitative analysis

An analysis was done of features in the elicited sentences and features from the children's background information. The Incorrect productions were analysed in terms of three specific aspects: the substitution of lexical items, the word order, and the substitution or omission of non-manual features.

In those cases in which the word order was changed, the different word order was noted and compared across all sentences and within participants, where their sentences allowed it. In instances where the participants did not produce enough of the sentence to determine the word order, these were excluded, and only sentences with sufficient information were considered for the analysis. There was a possibility that specific participants may have changed the word order of more sentences than other participants, which was also then considered. As mentioned in

the previous section, the absolute scoring of the lexical items did not allow for lexical substitution. The qualitative analysis considered the type of lexical substitutions made and how often they occurred. These lexical substitutions were described in terms of whether or not they are known[4] variants in SASL, as well as the number of times that each lexical variant appeared. Finally, the last of the three features considered from the elicited sentences, the non-manual features, were addressed. Participants may have omitted the original sentence's non-manual features, which are part of the grammatical structure. This was noted and compared across the data and across the reproduced sentences. The types of non-manual features that were omitted were also noted. Any change in a non-manual feature – for example, raising eyebrows over a wh-question instead of lowering them –was examined. Additionally, the possible effect that being exposed to multiple languages might have had on the results was considered. This was done by conducting a brief inspection of the participants' language backgrounds and comparing these to their scores.

[4] This was operationalised as known to the researcher or any deaf person collaborating in the project.

Chapter 4

Results

This chapter will consider the results of the SRT. The quantitative results (section 4.1) will be considered first, looking at the missing data and overall total scores of the participants. These overall total scores will then be analysed to determine their relationships with specific variables, as indicated in the research questions in Chapter 2. Subsections 4.1.1 to 4.1.4 will examine the relationship between the overall total scores and the participants' specific biographical information. The biographical information that will be used includes the ages of the participants, their lengths of exposure to SASL, their gender, and the school attended. Subsections 4.1.5 and 4.1.6 will attempt to determine the relationship between the overall total scores and specific linguistic information regarding the test, namely sentence length and sentence categorisation in terms of complexity. These subsections (looking at the linguistic information) will tell us about the test and the influence that these aspects might have had on the results, leading to discussions on the improvements necessary for future use. Section 4.2 will provide a qualitative analysis of the results, considering the errors that the participants made in three main sentence components: word order, non-manual features, and lexical items. Subsection 4.2.4 will also briefly investigate the possible effect that multilingualism might have had on the participants' results.

4.1 Quantitative results

4.1.1 Overall scores

In total, data from 40 participants were included in the final data analysis (see subsection 3.1.1). Gender was taken into account but was found to have no effect. As a result, the participants' results were pooled. Each participant was asked to sign the 20 sentences in the main test (see subsection 3.2.1), and this resulted in a total of 800 videos of sentences to be analysed.

Two of the video files became corrupted for unknown reasons, thus parts of these videos could not be included in the final data analysis. This means that there was no video footage of participants P39 and P46's reproductions of sentence C13. The totals for P39 and P46 were therefore calculated with one less sentence than the other participants. In addition, the total

scores for sentence C13 were calculated with two less participants than the other sentences, making the total sentences analysed 798. This is the only instance where data is missing, and the rest of the participants completed the test without any further data corruption.

The responses were split into four categories: Correct, Incorrect, Skipped, and Unanalysable (see Table 4.1 below).

Table 4.1: Overall responses in the four categories in real numbers and percentages

Response type	Correct	Incorrect	Unanalysable	Skipped
No. of sentences (N=798)	86 (10.8%)	644 (80.7%)	50 (6.3%)	18 (2.3%)

Responses were scored as Correct when the participant produced an exact copy of the model sentence – see example (4.1.a) below for the model sentence (the clip of which appears in Appendix L). The scoring of non-manual features was discussed in subsection 3.4.1, where it was decided that the scope of the non-manual features would not influence whether or not the participant produced the non-manual features correctly. This can be seen in example (3.1.b), where the required non-manual feature is present, although its scope varies slightly from that of the model sentence. Responses were scored as Incorrect when the participants produced the model sentence with mistakes in terms of word order, lexical items used, and/or non-manual features – see examples (4.1.b) and (4.1.c) below (both clips appear in Appendix M). Example (4.1.b) was scored as Incorrect due to a missing non-manual feature, whereas example (4.1.c) was scored as Incorrect due to a missing non-manual feature and incorrect word order.

(4.1.a) BABY SAD WHY
le
[model sentence – S3]
"Why is the baby sad?"

(4.1.b) BABY SAD WHY [Participant 33 – S3, scored as Incorrect]

(4.1.c) BABY WHY SAD [Participant 24 – S3, scored as Incorrect]

A response was scored as Skipped when a participant did not attempt the reproduction of the sentence, typically conveyed to the researcher by not producing any signs, signing NEXT, or by shaking his/her head. Lastly, responses were scored as Unanalysable when the response contained other signs in addition to the elements of the model sentence, resulting in the overall

response being too far removed from the model sentence to be scored as Correct or Incorrect. A model sentence is given in example (4.2.a) (the clip of which appears in Appendix L) and an Unanalysable response is given in example (4.2.b) (the clip of which appears in Appendix M). There appears to be a school effect with regards to the Skipped and Unanalysable sentences, which will be discussed later in subsection 4.1.4.

(4.2.a) SUMMER OR WINTER LIKE WHICH
le
[model sentence – S5]
"Do you like summer or winter?

(4.2.b) WINTER LIKE SUMMER HOME SORRY XXXX WINTER LIKE COLD JACKET
hs
[Participant 30 – S5, scored as Unanalysable]

Table 4.1 gives an overview of all 798 sentences divided into their scored categories. This table shows that the majority of the sentences were not correctly reproduced. The possible reasons for this will be discussed in Chapter 5, although the potential influences on the results will be considered in the current chapter.

4.1.2 Overall scores compared to age

As mentioned in subsection 3.1.1, the participants ranged in age from seven to nine years – see Table 3.1 for a detailed breakdown of the number of participants per age group. Table 4.2 below provides the breakdown of the percentage scores for each age group, while Figure 4.1 combines these scores to provide a visual representation of the differences between the participants in terms of age group.

Table 4.2: Age groups and average scores

Age group (years)	Correct (%)	Incorrect (%)	Skipped (%)	Unanalysable (%)
7	3	78	6	13
8	9	85	1	5
9	18	80	1	1

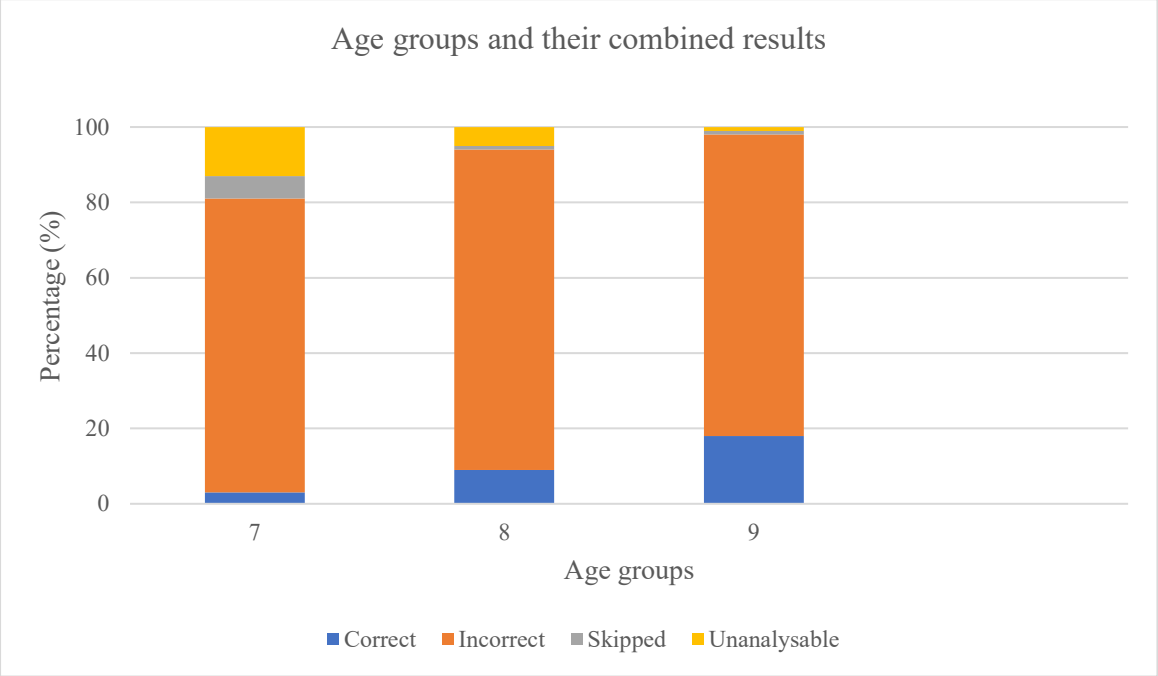


Figure 4.1. Age groups and combined scores

As can be seen in Table 4.2 and Figure 4.1, the younger children had fewer Correct responses and produced more Skipped and Unanalysable sentences. The latter could be an age effect. However, almost all of the participants who produced Skipped or Unanalysable responses came from the same school, meaning that it might also be a school effect; this will be discussed in subsection 4.1.4. The ages of the participants and their scores were run through the Fisher Exact test, resulting in a significant p-value of $p < 0.01$. A p-value of < 0.05 indicates a highly significant correlation, confirming that there is a significant effect of the age of the participant on their results for the test. The number of Correct responses increased with age, and the number of Skipped and Unanalysable responses reduced with age.

4.1.3 Overall scores compared to length of SASL exposure

Given the variable access of deaf children to sign language (see section 2.2), it is necessary to consider the relationship between age and length of exposure. Due to the fact that the principal of the second school provided consent, as legal guardian, for many of the children to participate, the background information obtained on those children is only the information that the school could provide, not information from the parents themselves. Table 4.3 below provides a breakdown of the number of participants whose parents returned background forms and those who did not. This table serves to remind the reader that the accuracy of the information may

vary but, for the purposes of this analysis, the information given by the parents and the information provided by the educators was considered equivalent and reliable.

Table 4.3: Number of participants with background information from parents and schools

School (no. of participants)	Background information provided by parents	Background information provided by schools
School 1 (21)	21	0
School 2 (19)	3	16

The participants with deaf parents had been exposed to sign language their entire lives (n=2). Other participants were only exposed to SASL when they started at a deaf school between the ages of three and five years. Some of these participants had been diagnosed as deaf later in their lives, while others were diagnosed at birth but only exposed to SASL at, for example, eight years of age. This results in highly varying degrees of lengths of exposure to SASL – see Table 3.1 for the average length of exposure and the ranges between age groups. The overall results were compared to the participants' lengths of exposure through LS Means and the LSD test. Table 4.4 below provides the mean lengths of exposure per response category, as well as the standard deviations. This table was used to determine the significance of the effect of the participants' length of exposure to SASL on their SRT scores.

Table 4.4: Length of exposure means and standard deviations

Response	N=798	Length of exposure Mean (overall = 3.75)	Length of exposure Standard deviation (overall = 1.79)
Correct	86	4.56	2.29
Incorrect	644	3.56	1.68
Skipped	18	3.72	0.75
Unanalysable	50	4.94	1.54

Pairwise comparisons indicated that there was a significant difference between the mean length of exposure to SASL and Correct versus Incorrect responses (mean difference = -1, standard error = 0.2, p-value = 0). In addition, these comparisons indicated a marginal difference between mean length of exposure to SASL and Correct versus Skipped responses (mean difference = 0.84, standard error = 0.45, p-value = 0.06). Thus, it is evident that the

Incorrect and Skipped responses were produced by participants with less exposure than those who produced Correct responses. Those who produced Correct responses had received more exposure to SASL.

Furthermore, pairwise comparisons indicated that there was a significant difference between the mean length of exposure to SASL and Unanalysable versus Incorrect responses (mean difference = -1.38, standard error = 0.25, p-value = 0) or Skipped responses (mean difference = -1.22, standard error = 0.48, p-value = 0.01). Thus, the Skipped and Incorrect responses associated with less exposure than the Unanalysable responses. A possible reason for the association of Unanalysable sentences with a high mean length of exposure could be the fact that the five participants who produced the highest number of Unanalysable sentences had longer-than-average lengths of exposure to SASL. This was an unexpected result, but could be due to these participants having a higher level of fluency in SASL, and thus they would be more comfortable with their signing and more able and eager to converse and tell stories. These participants were all from the same school, so one cannot rule out a school effect (to be discussed in subsection 4.1.4). Table 4.5 below details these five participants' lengths of exposures and numbers of Unanalysable sentences that were produced. Looking at Table 3.2 in Chapter 3, we can deduce that the average length of exposure across all participants was 3;9 years.

Table 4.5: Lengths of exposure for participants with the highest number of Unanalysable sentences

Participant	Length of exposure to SASL in years	Sentences produced that were Unanalysable (n=50)
P2	4	8
P5	5	4
P19	4	10
P22	7	14
P26	5	6

The length of exposure to SASL was confirmed to have a highly significant effect on the overall results (p = 0.00000).

4.1.4 Overall scores compared to schools

The participants came from two different schools in the Western Cape (see Table 4.3 in subsection 4.1.3 for the distribution of participants per school). School 1 had a lower number of Incorrect responses, which might lead one to assume that these participants performed better.

However, the number of Skipped and Unanalysable responses from School 1 was much higher than those from School 2. School 2 had a higher number of Correct responses, and almost no instances of Unanalysable or Skipped responses, as shown in Table 4.6 and Figure 4.2 below.

Table 4.6: Participant responses across schools

School	Correct	Incorrect	Skipped	Unanalysable
1 (21)	5% (n=20)	80% (n=336)	3% (n=15)	12% (n=49)
2 (19)	17% (n=66)	82% (n=308)	1% (n=3)	0% (n=1)

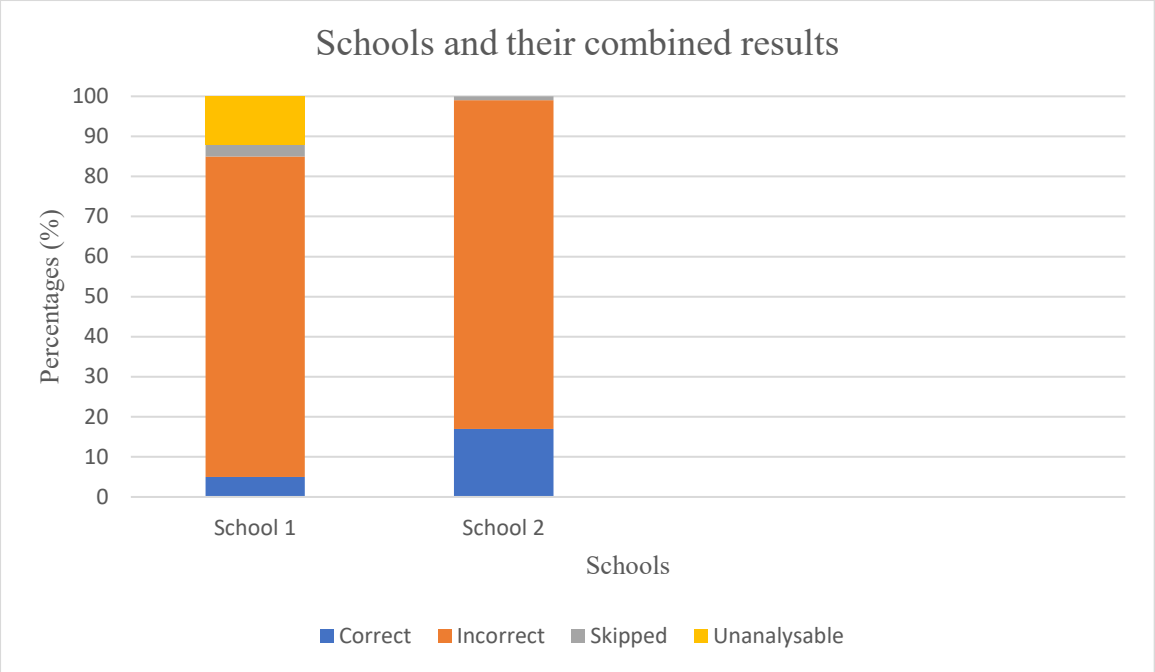


Figure 4.2. Participant responses across schools

The results between these two groups of participants differed significantly. It was assumed that there would be no differences between the schools (see section 2.6) but, since there were, these differences are analysed here. These results were run through the Fisher Exact test, which confirmed that the effect of the school on the participants' performance on the test was highly significant (where $p < 0.01$).

The number of Unanalysable and Skipped sentences was higher than expected (see Table 4.1), and it is interesting to consider why these responses occurred. Although the number of Skipped and Unanalysable sentences is higher at School 1, these results were clustered in specific participants. For example, only seven participants chose to skip sentences and, of these seven, only four were from School 1. Yet School 1's total of Skipped sentences is much higher due to

one participant who skipped 12 of the 20 sentences shown to her in the test, whereas the other participants all skipped only one sentence. There were no problems during the practice sentences with this specific participant, as the researcher and Deaf assistant worked one-on-one with her. However, as soon as the test started, this participant shook her head for many of the sentences. Thus, for the Skipped sentences, a participant effect is found.

Unanalysable sentences resulted when the participants included elements of the model sentence but gave more information than requested – see example (4.2.b) in subsection 4.1.1. These results could also be attributed to a participant effect, although it is possible that there could also be a pedagogical effect. In total, only ten participants produced Unanalysable sentences, and only five produced more than two Unanalysable sentences. These five participants are presented in Table 4.7 below.

Table 4.7: Participants producing the most Unanalysable sentences

Participant	**Unanalysable sentences produced (n=50)**
P2	8
P5	4
P19	10
P22	14
P26	6

Although the Unanalysable sentences are attributed to five participants (aged between seven and eight years), it is still necessary to consider the fact that they all attended School 1. Of the 21 participants, this makes up 24% of their group. It is possible that School 1 does not expose the children to tests similar to the SRT used here, so the participants were unfamiliar with taking tests in this manner as well as with the specific memory processing that is required of them in the SRT. The participants might not have realised how important it was to adhere to the instructions of the test, so they produced stories using exaggerated signs, and acted out their sentences. As mentioned in the previous section, it is also possible that the participants' levels of fluency could have influenced this result, and thus their familiarity with the testing method might not be the only problem. One participant told the researcher about her home in 12 out of her 20 sentences. She did so by replacing information in the model sentences with information about her house and life at home. Other participants added random signs and/or pieces of previous

sentences that they had seen in the practice or test sentences. It is possible that they struggled to reproduce the relevant model sentence and thus filled the gaps with what they remembered from previous sentences. This was perhaps due to them being afraid of repercussions for an incorrect response (despite the researcher's assurances to the contrary at the beginning of the session with each child). It is possible that the participants felt as though they were still producing information relevant to the test, if not the sentence requiring repetition at that point in the test.

4.1.5 Overall scores of sentences compared to sentence length

The SRT sentences ranged from being three to seven signs long – see the range for each sentence in Table 3.2 of subsection 3.2.1. The significance of the effect of sentence length on the participants' scores was determined using LS Means and the LSD test. Table 4.8 below provides the mean sentence length of the sentences (overall and per response), as well as the standard deviations of the sentence lengths (overall and per response). This table will be used to determine the significance of the effect of the SRT sentence lengths on the participants' results.

Table 4.8: Sentence lengths per response

Response	**N = 798**	**Sentence length Mean (overall = 4.85)**	**Sentence length Standard deviation (overall = 1.28)**
Correct	86	3.56	0.78
Incorrect	644	5	1.25
Skipped	18	5.28	0.89
Unanalysable	50	4.98	1.13

Pairwise comparisons indicated that there was a significant difference between the mean length of the Correct sentences and the mean length of the Incorrect sentences (mean difference = 1.44, standard error = 0.14, p-value = 0), Skipped sentences (mean difference = -1.72, standard error = 0.31, p-value = 0), and Unanalysable sentences (mean difference = -1.42, standard error = 0.21, p-value = 0). The LS Means provides a p-value = 0.00000, proving a highly significant effect on the results. The longer the sentence became, the more likely it was to be produced incorrectly, in an unanalysable manner, or even skipped completely.

4.1.6 Overall scores of sentences compared to categorisation of complexity

Lastly, the overall scores will be compared to the categorisation of the SRT sentences in terms of complexity. This will indicate whether complexity was correctly evaluated. As mentioned in subsection 3.2.1, the categorisation of sentences in this SRT was estimated and therefore not necessarily accurate. Thus, it is necessary to evaluate this categorisation in order to learn more about the structures and their perceived complexity for future use. Should any sentence prove to be incorrectly categorised, then the sentence will need to be re-examined for the test and for future testing – this will be discussed further in Chapter 5. Table 4.9 below presents the total responses for the three complexity categories that were used in the test. Figure 4.3 provides a visual representation of the SRT sentences and their total percentage of Correct scores (%).

Table 4.9: Sentence complexity category and their response scores

Complexity	Correct response	Incorrect response	Skipped response	Unanalysable response
Simple	53 (22.08%)	172 (71.67%)	4 (1.67%)	11 (4.58%)
Moderate	16 (6.67%)	203 (84.58%)	4 (1.67%)	17 (7.08%)
Complex	17 (5.35%)	269 (84.59%)	10 (3.14%)	22 (6.92%)

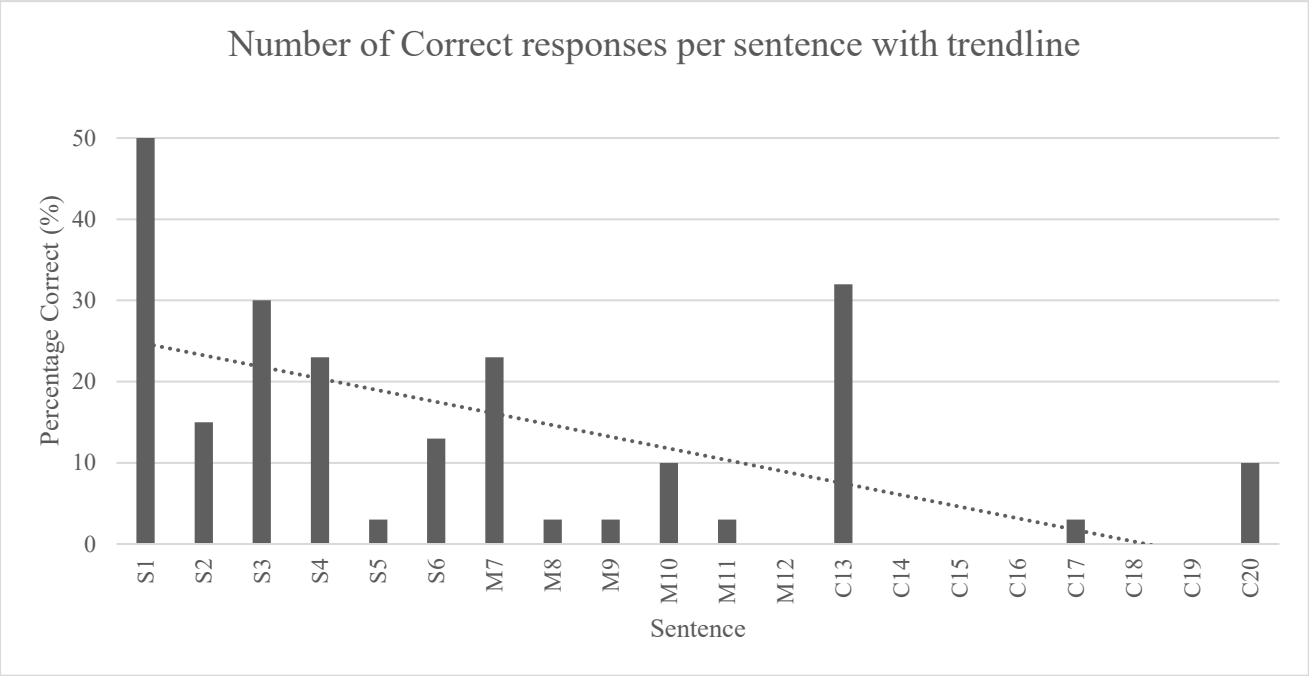


Figure 4.3. Number of Correct responses per sentence with trendline (%)

Figure 4.3 clearly shows that there are outlying sentences where participants either scored lower than initially expected for a sentence in the Simple category, or scored higher than

expected for a sentence in the Complex category. Not only did these sentences receive different scores than expected, but they also differ from other sentences within their categorisation. For example, C13 scored more than 20% higher than the second-highest-scoring Complex sentence, 10% higher than the highest-scoring Moderate sentence, and coming second overall after a Simple sentence, thus putting its actual complexity in question. Figure 4.4 below rearranges the sentences into the order of their participant scores.

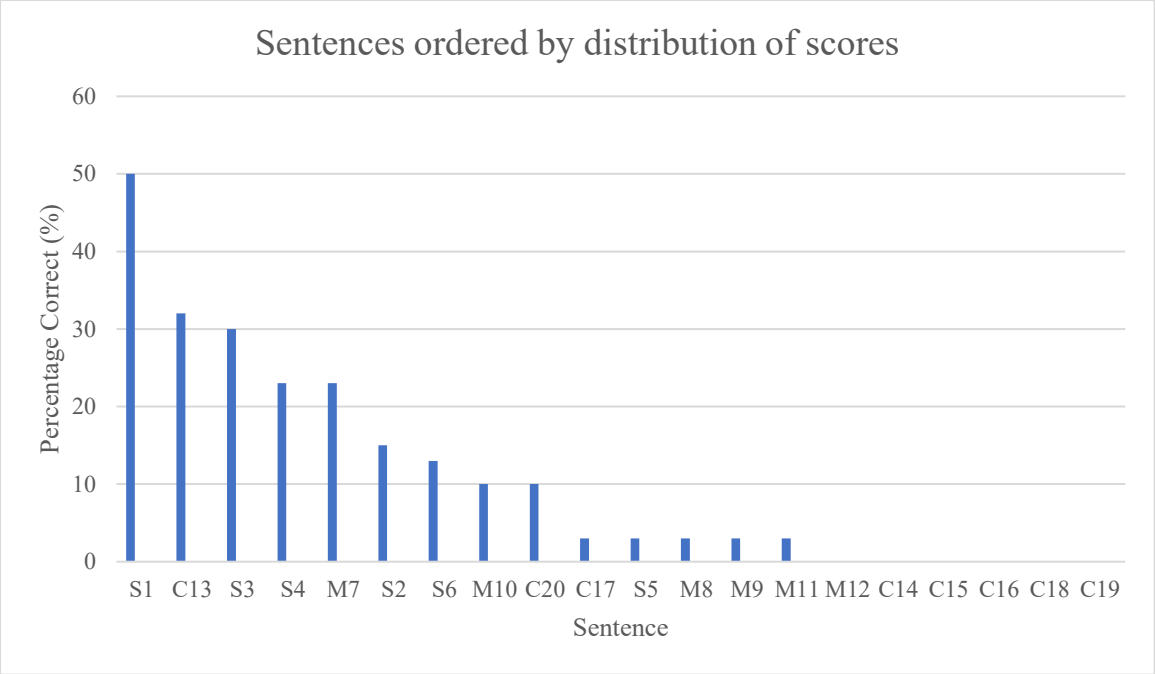


Figure 4.4. Sentences ordered by distribution of scores

Therefore, it is clear that, although the categorisation was estimated, many sentences do appear to have been categorised correctly. Certain sentences, however, will need to be re-evaluated, as will be discussed in subsection 5.1.5.

4.2 Qualitative results

This section will consider the responses that the participants gave on the SRT in a more in-depth manner. As discussed in subsection 4.1.1, the responses were scored as Correct, Incorrect, Unanalysable (when responses were produced that were unable to be analysed), or Skipped (when participants skipped a sentence and moved on to the next one). The Incorrect responses (n=644) are of the most interest to this qualitative analysis, as the aim of the SRT is to indicate the participants' level of SASL knowledge (see section 2.3). This analysis will identify the types of errors made in the three main components of the model sentences: word order, lexical items, and non-manual features. As mentioned in the introduction to this chapter,

this section will look at error types in the sentence reproductions, and what went wrong. This section will also consider multilingualism as a factor that could possibly have had an effect on the participants' results. This will be done by performing a brief inspection of the participants' scores and the languages to which they are exposed. When considering the results through a qualitative approach, it is important to note that a number of sentences will not be able to be included. This is as a result of the way in which some participants responded to the model sentence (see subsection 4.1.1 and Table 4.1 for more details). Of the 798 sentences, 68 (8.5%) have to be excluded from this section of the results.

4.2.1 Word order

To analyse the word order that the participants used, the sentences that they produced needed to include enough of the model sentence's signs to have a recognisable word order. Some reproduced sentences had to be excluded from this analysis due to their having too few signs to determine a word order (n=545). These criteria resulted in the exclusion of many sentences from this part of the qualitative analysis, which is detailed in Table 4.10 below.

Table 4.10: Word order results (N=185)

	Correct word order	**Reversed subject-object word order**	**Question word not in final position**	**Negation not clause-final (pre-verbal)**	**Time adverbials not in sentence-initial position**
No. of sentences (N=185)	131	20	17	2	15

As discussed in section 2.3, there is very little research on the grammar of SASL, including its word order. The sentences that were used to create the test were tested on five adult, native signers of SASL, and the most common of their word orders were used to form the final sentences. In line with what we currently know about SASL, these sentences had a verb-final structure, with question words also being produced at the end of the constructions. This analysis will consider the deviations that participants made from the model sentences' word orders, specifically considering verbs, subjects, question words, negation, and time adverbials.

Most of the sentences used in the SRT had an OSV structure. Interestingly, the sentences were not always reproduced in the same word order. There were 20 instances of sentence word orders being changed out of the 798 responses, detailed in Table 4.11 below.

Table 4.11: Word order changes

New word order	**SOV**	**SVO**	**VSO**	**OVS**	**VS**
Number of sentences changed	14	1	2	2	1

Most commonly amongst the changed sentences, sentences kept their verb-final structure but shifted their subjects and objects. See examples (4.3.b) and (4.3.d) below (both clips appear in Appendix M) for illustrations of this change from an OSV to an SOV structure, with the model sentences presented in (4.3.a) and (4.3.c), respectively (both of these clips appear in Appendix L). Both sentences in (4.3.b) and (4.3.d) were scored here as Incorrect due to their changes in word order.

(4.3.a) $\underline{\text{hs}}$
INDEX$_3$ MILK LIKE [model sentence – S1]
"She does not like milk"

(4.3.b) $\underline{\text{hs}}$
MILK INDEX$_3$ LIKE [Participant 58 – S1, scored as Incorrect]

(4.3.c) $\underline{\text{re}}$
BOTTLE BABY $_2$GIVE$_1$ [model sentence – S4]
"Give me the baby's bottle"

(4.3.d) $\underline{\text{re}}$
BABY BOTTLE $_2$GIVE$_1$ [Participant 38 – S4, scored as Incorrect]

Some word order changes resulted in the verb moving from a sentence-final position to another position in the sentence, for example, changing OSV structures to SVO, VSO, or OVS – see examples (4.4.b), (4.4.c) and (4.4.d) below (the clips of which appear in Appendix M), with the model sentence presented again in (4.4.a) (the clip of which appears in Appendix L). All of these sentences were scored as Incorrect due to their word order changes. Example (4.4.b) was also scored as Incorrect due to the lack of non-manual features, whereas example (4.4.c) had a lexical substitution.

(4.4.a) BOTTLE BABY $_2$GIVE$_1$ [model sentence – S4]
re
"Give me the baby's bottle"

(4.4.b) BABY $_2$GIVE$_1$ BOTTLE [Participant 29 – S4, scored as Incorrect (SVO)]

(4.4.c) $_2$GIVE$_1$ BABY BOTTLE [Participant 20 – S4, scored as Incorrect (VSO)]
re

(4.4.d) BOTTLE $_2$GIVE$_1$ BABY [Participant 8 – S4, scored as Incorrect (OVS)]
re

Manual negation typically occurs in sentence-final positions, although this SRT had no sentence containing a manual negation sign. Interestingly, participants added manual negation signs into four of the five negated sentences (see subsection 4.2.3 where the non-manual negation results are addressed). Most occurred in a sentence-final position, typically also where the main non-manual negation would extend, but two participants placed their manual negation signs in pre-verbal positions – see (4.5.a) for the model sentence (the clip of which appears in Appendix L), and examples (4.5.b) and (4.5.c) (the clips of which appear in Appendix M) for these manual negated sentences (the NEG sign of which is described in subsection 4.2.3). Both sentences were scored as Incorrect due to their insertion of a manual sign and for not having all of the correct signs or word order.

(4.5.a) TOMORROW RAIN INDEX$_1$ SWIM [model sentence – C20]
re hs
"If it rains tomorrow, I am not going to swim"

(4.5.b) NO TOMORROW SWIM NO [Participant 2 – C20, scored as Incorrect]
hs hs

(4.5.c) TOMORROW RAIN NEG SWIM [Participant 9 – C20, scored as Incorrect]
hs

Time adverbials were also moved into different positions in the sentences, where they typically occur sentence-initially and were presented as such in the model sentences. There were four sentences with time adverbials, all in the sentence-initial position, and they were moved in 15 instances – see examples (4.6.b) and (4.6.c) (the clips of which appear in Appendix M), and the model sentence in (4.6.a) (the clip of which appears in Appendix L). Both of these sentences were scored as Incorrect due to their word order changes. Example (4.6.b) also had an incorrect non-manual feature.

(4.6.a) YESTERDAY DOG POSS$_1$ EAT (hs) [model sentence – S2]

"Yesterday my dog didn't eat"

(4.6.b) DOG EAT YESTERDAY (re) [Participant 20 – S2, scored as Incorrect]

(4.6.c) DOG YESTERDAY EAT (hs) [Participant 10 – S2, scored as Incorrect]

Lastly, we will observe the position of the question word in sentences where the word order changed, as the question word is typically – and in all of the model sentences – in a sentence-final position. Overall, there were two wh-questions in the test, and thus two sentences with question words in the final position. The question words were moved in 17 instances, as shown in examples (4.7.b) and (4.7.c) below (the clips of which appear in Appendix M), with the model sentence in (4.7.a) (the clip of which appears in Appendix L). Both of these sentences were scored as Incorrect due to their word order changes. Example (4.7.b) also contained no non-manual feature, while example (4.7.c) included a lexical substitution.

(4.7.a) BABY SAD WHY (le) [model sentence – S3]

"Why is the baby sad?"

(4.7.b) BABY WHY SAD [Participant 13 – S3, scored as Incorrect]

(4.7.c) WHY SAD XXXXX (le) [Participant 19 – S3, scored as Incorrect]

Another interesting observation was the omission of the INDEX$_1$ sign. A number of participants chose to not sign an INDEX$_1$ in their sentences, even though the model sentence contained one. This suggests that the optional INDEX$_1$ feature of other sign languages may be applicable to SASL as well.

Overall, sentences were mostly produced with too few signs to identify their word orders, or with enough signs to suggest their order but not enough to constitute a Correct score (n=545). Participants preferred to produce their verbs in a sentence-final position, although there were some exceptions, and time adverbials and question words were sometimes moved within the sentence structure.

4.2.2 Lexical substitution

This subsection of the qualitative analysis will constitute an explorative look at the lexical items that the participants used, specifically when they substituted the signs in the model sentences with different signs. The frequency of these lexical substitutions will be looked at, in addition to whether the signs were substituted for variants or different signs, and whether or not there was a possible link between various substitutions, be it by one participant specifically, one specific sign used by multiple signers, or links between participants from a specific school. This latter factor is highly likely, as schools have been found to play a large part in lexical variation (as was discussed in subsection 2.3.6).

As mentioned in subsection 3.2.1, adult signers were approached to sign the sentences and lexical items; educators of the age groups from the two schools were also asked to sign the lexical items for the researcher. The variant that was found to occur the most often was then used in the final test, with a final check with the educators that the learners would in fact be familiar with the chosen signs. Unfortunately, this was not always the case, as two signs – FLOWER and MORNING – were not always recognised by all of the children participating in the research (see subsection 3.2.1). This was counterbalanced and rectified as much as possible at the time by the researcher, but it was still found that participants used a different phonological variant for FLOWER, with a **n**-handshape instead of a **/**-handshape, and that some left out the sign for MORNING or signed it incorrectly in their reproduction of the sentence that contained this sign (sentence M12).

Due to the limited knowledge that we have on lexical variation in SASL (see subsection 2.3.6), it is entirely possible that the participants signed variants of signs that the researcher could not recognise. It is also notable that the participants were young, and the distinction between variants, neologisms and nonsense signs that children might be producing is very difficult to make in a language that has so little documentation. The accepted lexical items that were signed in the model sentences and then substituted by the participant, as well as the substituted signs, will be described using their parameters. As mentioned in subsection 3.4.1, phonological variants are not included in this analysis. Across all of the participants' sentences, only twelve signs were deemed as unknown signs to the researcher. Of these twelve signs, eight were produced by participants from School 1, and four were produced by participants from School 2.

Participants substituted four signs with lexical variants, namely BETTER, CAR, GROW, and LEARN. These signs and their lexical variants produced in the test will be described using parameters and images will be provided to aid the descriptions. None of these signs required non-manual features, nor were any non-manual features produced when the lexical variants were produced.

The sign for BETTER that was used in the model sentence is articulated with two hands, both in the **2**-handshape. The non-dominant hand is located in front of the torso, with its palm orientation facing the opposite side of the body. The dominant hand is located just above the non-dominant hand, with its palm orientation facing away from the body. The movement that occurs is the dominant hand's thumb sliding up over the non-dominant hand's thumb in a repetitive, circular motion (see Figure 4.5(a)). The lexical variant that was produced for BETTER was also a two-handed sign, both in the **B**-handshape. The sign was located in front of the chest and the palms faced each other, while the movement was a repetitive tapping of the extended fingertips against one another (see Figure 4.5(b)).

Figure 4.5(a). Model sentence sign BETTER

Figure 4.5(b). P23 sign BETTER

The sign for CAR in the model sentence is produced with both hands in the **1**-handshape, palms facing each other in front of the chest while moving up and down repetitively within a space of roughly 10cm (see Figure 4.6(a)). The variant that was produced had the non-dominant forearm horizontal across the chest, with the hand in a **1**-handshape. The dominant forearm was held vertically, with the wrist resting against the non-dominant forearm. The dominant hand was in a **[**-handshape, with the wrist moving from side to side (see Figure 4.6(b)).

Figure 4.6(a). Model sentence sign CAR

Figure 4.6(b). P9 sign CAR

The sign used in the model sentence for GROW starts with the dominant hand in a **6**-handshape and the non-dominant hand wrapped around it, located in front of the chest. The dominant hand moves up and out of the non-dominant hand while changing its handshape to a **5**-handshape. The non-dominant hand remains wrapped around the forearm during this movement (see Figure 4.7(a)). The lexical variant that was produced for GROW was also located in front of the chest, with both palms facing upward and initially in a **A**-handshape. Both hands then moved slightly upwards at alternating times and changed into a **?**-handshape. They then moved back down again at alternating times and returned to the **A**-handshape. This was repeated multiple times (see Figure 4.7(b)).

Figure 4.7(a). Model sentence sign GROW

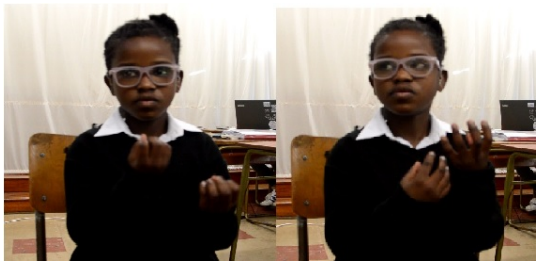


Figure 4.7(b). P13 sign GROW

Lastly, the sign for LEARN is signed in the model sentence with the non-dominant hand resting in front of the chest with a **>**-handshape and palm orientated upward. The dominant hand begins in a **5**-handshape, resting the fingertips against the non-dominant hand. It moves up to the temple, changing its handshape to a **I**-handshape. The dominant hand then returns to its original position and handshape, and begins the movement and handshape change again in a repetitive motion (see Figure 4.8(a)). The lexical variant for LEARN was produced with both hands up and roughly 10cm in front of the forehead. The palms faced each other in a **5**-handshape. Both hands then

moved near to the forehead and changed their handshape to a **I**-handshape, then reverted to the original position and repeated the movement (see Figure 4.8(b)).

Figure 4.8(a). Model sentence sign LEARN

Figure 4.8(b). P8 sign LEARN

Table 4.12 below gives a breakdown of the number of times the signs were substituted by the participants, and the schools to which they belong. Then, Table 4.13 details the participants who made use of lexical variant substitutions, and the specific lexical variant substitutions that these participants made.

Table 4.12: Lexical variant substitutions: Participants

Sign substituted with known variant	**BETTER**	**CAR**	**GROW**	**LEARN**
No. of participants	2	1	1	1
School	School 1	School 1	School 1	School 1

Table 4.13: Lexical variant substitutions per specific participant

	BETTER	**CAR**	**GROW**	**LEARN**
P8	0	0	0	1
P9	1	1	0	0
P13	0	0	1	0
P23	1	0	0	0

Overall, lexical substitution was not that common in the results, with only lexical variant substitution occurring. Lexical variants were only produced by participants from School 1, strongly suggesting a school effect.

4.2.3 Non-manual features

In this final subsection of the qualitative analysis, the non-manual features will be examined. These features all had a grammatical function within the sentences that were tested. They

carried information regarding question-marking, imperatives, and negation. Fourteen of the 20 test sentences contained non-manual features. These non-manual features, described in section 2.3, include raised eyebrows to indicate a yes/no-question or an imperative, lowered eyebrows to indicate a wh-question, and headshakes to indicate negation. As discussed in subsection 2.3.3, the non-manual marking of topicalisation was excluded from this study, as there is no description to date of this being an obligatory marker in SASL. That being the case, it was still observed that a small number of the participants were marking the topics of their sentences with the non-manual features associated with topicalisation. There was a total of 640 non-manual features across the test, 55 of which had to be excluded due to them occurring in responses categorised as Skipped or Unanalysable, thus leaving 585 sentences to be considered for non-manual features. Table 4.14 below provides the scores for the sentences that were reproduced with the correct or incorrect non-manual features, and the scores for when the participant omitted the non-manual features as a result of not producing them, producing unanalysable sentences, or having skipped the sentences altogether.

Table 4.14: Non-manual features' presence in the results

Result	Number (N=585) [%]
Correct non-manual features	258 [44.1%]
Incorrect non-manual features	14 [2.4%]
No non-manual features	313 [53.5%]

As can be seen in the table above, it was much more common for the participants not to produce the non-manual features. The presence of specific non-manual features is now of interest, in addition to whether or not certain non-manual features were more frequently and accurately produced than others. Table 4.15 below considers the specific non-manual features that the test contained.

Table 4.15: Non-manual features results

Non-manual feature (gloss/ manifestation used in the test)	**Total in model sentences × number of participants (40)**	**Number correctly reproduced**	**Number incorrectly reproduced**	**Number not reproduced**	**Number excluded due to Skipped or Unanalysable sentences**
Negation (hs)	200	168	0	16	16
Wh-question (le)	80	20	6	48	6
Yes/no-question (re)	120	23	1	80	17
Imperative (re)	40	14	0	26	0
Wh-cleft (re/le)	120	13	7	89	11
Conditional clause marking	80	20	0	54	6

Concerning the non-manual features that were signed incorrectly, these occurred across three types of sentences: wh-questions, wh-clefts, and one yes/no-question. Thirteen non-manual features were replaced with a different type of non-manual feature, eleven of these being raised eyebrows instead of the lowered eyebrows present in the model sentence. The other two instances were headshakes produced in sentences that were not negated, one occurring over a wh-cleft and being the only non-manual feature, while the other occurred over a yes/no-question along with its raised eyebrow feature.

As discussed in subsection 2.3.2, which focused on negation in SASL grammar, SASL appears to be a non-manual dominant language. This is interesting to keep in mind when considering one specific sentence in the test, C20 – see the model sentence in (4.8.a) below (the clip of which appears in Appendix L).

(4.8.a) TOMORROW RAIN INDEX$_1$ SWIM [model sentence – C20]
(re) (hs)

"If it rains tomorrow, I am not going to swim"

C20 is a QAC (see subsection 2.3.4) that features a headshake as its only negation marker. What was interesting in the results was that while all participants produced the headshake, many also added a manual negation sign (NEG) in sentence-final position – see examples (4.8.b) and (4.8.c) (the clips of which appear in Appendix M). Three manual negation signs were used: the sign for NO, a **[**-handshape and a back-and-forth movement like a headshake, a **B**-handshape that was also moved back and forth, and two hands in the **]**-handshape that moved inwards to cross over one-another and then back to their original positions at the participant's sides. NO occurred most commonly, in 13 of the 15 instances in which these manual negators were used. This was also found in the other negation sentences (S1, S2, and C15), although only occurring once across each sentence's reproductions. Thus the focus will remain on sentence C20. Thirteen participants added a manual negation element, nearly half of all of the participants tested. Not one participant failed to produce some form of negation for sentence C20. All of these examples were scored as Incorrect due to their word order and the insertion of the manual negation sign.

(4.8.b) INDEX$_1$ RAIN SWIM NEG (hs: INDEX$_1$ RAIN; hs: SWIM NEG) [Participant 58 – C20, scored as Incorrect]

(4.8.c) TOMORROW RAIN SWIM NO (hs: SWIM NO) [Participant 61 – C20, scored as Incorrect]

Some participants raised their eyebrows over their reproduction of the model sentences, most often when they were having trouble recalling some of the signs. They would pause in between signs, sit and think, and then suddenly sign one of the relevant signs with their eyebrows raised, sometimes also with a forward-lean of the body. The researcher observed many instances of this, and would describe it as possibly being a type of emotional intonation along the lines of surprise or excitement at recalling the correct sign, as there was no clear grammatical function[5].

Overall, the negation non-manual markings occurred much more often than any of the other non-manual features, with an 84% success rate. Participants were much less likely not to negate than they were, for example, not to indicate questions via the appropriate non-manual markings. The least commonly reproduced non-manual features were the more subtle ones. These features did not change the sentence's meaning as drastically as marking negation did,

[5] It is possible that this could also be the equivalent of a rising intonation in spoken language conveying the idea of "Am I correct in signing this?".

but rather added to the grammatical structure of the sentence either by changing it to an imperative or by marking it as a wh-cleft.

4.2.4 Multilingualism effects

In order to consider the possible effect that multilingualism could have had on the participants, the biographical information forms had to have been filled out by the parents. Due to consent being obtained from the principal of School 2, many participants did not have completed biographical information forms from their parents (see subsection 4.1.3, Table 4.3). Therefore, these participants (n=16) have missing data for this part of the analysis and, consequently, will be excluded in this brief inspection of the effect of multilingualism on their results.

The parents were asked to list the languages that they used at home, languages to which the child would have been exposed. As only one family of a participant was deaf, and this information was provided by the educator of the participant, all of the participants included in this section were exposed to spoken languages at home. The spoken languages that the participants were exposed to are detailed in Table 4.16 below. SASL has been excluded, as all of the participants have been and continue to be exposed to SASL.

Table 4.16: Number of participants exposed to specific spoken languages

Language	No. of participants (n=24)
English	24
Afrikaans	13
isiXhosa	9
isiZulu	2
Sesotho	2
isiNdebele	1
Xitsonga	1

The languages that occurred the most often were English, Afrikaans, and isiXhosa. These three languages are also the official provincial languages of the Western Cape (as mentioned in subsection 3.1.3; Western Cape Government Department of Cultural Affairs and Sport 2019: 3). The numbers of languages that participants are exposed to are shown in Table 4.17 below. SASL has been included in this table, as it is relevant to the number of languages to which the participants are exposed.

Table 4.17: Number of languages to which the participants are exposed

No. of languages	No. of participants (n=24)
2	1
3	18
4	3
5	1
6	0
7	1

It is clear that the majority of the participants included in this section of the results are multilingual, and the majority are exposed to three languages. The number of languages that these participants are exposed to could have an effect on their results, so their scores were considered to determine whether or not this was the case. Table 4.18 shows the participants' average scores on the SRT in comparison with the multiple languages to which they are exposed.

Table 4.18: Average SRT scores for participants with multiple languages

No. of languages	No. of participants (n=24)	Average SRT score
2	1	0
3	18	1.5
4	3	0.7
5	1	1
6	0	n/a
7	1	0

It is clear from the data in Table 4.18 that the participants' average SRT scores do not improve as the number of languages that they are exposed to increases. Furthermore, the highest average is from the group of participants with three languages used for communication (at school and/or at home). Although this has been a brief overview of this possible effect, it is clear that the average scores do not appear to be affected by the number of languages to which the child is exposed.

4.3 Conclusion

To conclude, quantitative scoring revealed that, overall, the older children performed better on the test, as well as those with a longer length of exposure to SASL. In addition, a school effect was found between the two schools from which the participants came. This could be due to School 1's participants being less familiar with this type of language testing. The scores on the sentences decreased as the sentences became longer, and also decreased as the estimated categorisation of the sentences' levels of grammatical complexity increased. However, related to this finding, outliers were indeed found, which will be discussed in the next chapter.

Through qualitative analysis, it was found that the word orders were difficult to observe. This resulted from most Incorrect sentence reproductions containing too little of the model sentence's signs to determine the word order or whether/how the participants may have changed this order. It was observed that if the word order change was noticeable, it was typically changed from an OSV to an SOV word order, with the verb rarely being moved from its sentence-final position. Question words and time adverbials were subject to some movement within the structures as well. Lexical substitutions were not that common, although all of the substituted signs that were able to be identified were made with lexical variants and were all produced by participants from the same school (School 1). The consideration of non-manual features showed that, above all, negation marking was reproduced often, whereas other grammatical non-manual features were not nearly as consistently reproduced. An interesting observation was that manual negation signs were often inserted into sentences that were negated using only a non-manual headshake. Lastly, a brief inspection of multilingualism having an effect on the results was conducted. This inspection showed that exposure to multiple languages had no visible effect on the participants' results.

Chapter 5

Discussion and Conclusion

This chapter will discuss the results obtained by this study, and use the results to answer the research questions as set out in section 2.6 (section 5.1). Future use of the SRT as a language testing tool for SASL is discussed in section 5.2, and a brief look at possible future research appears in section 5.3. Finally, section 5.4 concludes the thesis.

5.1 Research questions

5.1.1 The most important features of an SRT for young, deaf learners of SASL

As shown in section 4.1, the overall Correct scores were low. This suggests that some of the grammatical aspects tested here with seven- to nine-year-olds were too difficult for this age group, although further research in other schools is needed to verify this finding. More appropriate grammatical aspects for inclusion in the test need to be identified for the age groups being tested. This includes the non-manual features present, the sentence structures presented, and, most importantly, the lexical items included (discussed in the next paragraph). Finally, there needs to be a range of grammatical complexity throughout the test.

One of the most important features of an SRT for young, deaf learners is the use of appropriate lexical items. Lexical items are a prerequisite for the development of the SRT, and it is vital that all participants should be familiar with them. Should the participant not be familiar with particular lexical items, they will then struggle to produce the sign, possibly affecting their production of the entire sentence. Children of this age group have not necessarily been exposed to other variants that might exist in the language. Familiarity with lexical variation also needs to be taken into consideration for scoring, as participants might use known lexical variants that the scorer is not familiar with, and get penalised for them. (This is only relevant if the SRT scoring method allows for lexical substitutions). Variation has typically not been addressed by other researchers working with SRTs (see subsection 2.5.2), but it is a very important feature.

The participants should, as far as possible, be familiar with this type of testing situation. This ensures that they are comfortable with the procedure, and that there are no misunderstandings concerning what is expected of them.

The SRT for this study was constructed following the standard methods, as nothing about the South African context demanded that the process be approached any differently. One approach that was found to have a positive effect on the participants was to have the persons conducting the test be as familiar to them as possible.

5.1.2 The relationship between the scores on the SRT and chronological age

It was expected that the scores would improve as the age of participants increased, and they did. The older participants were found to perform better on the test, with not only more Correct sentences produced but also fewer Skipped or Unanalysable sentences. In comparison, the younger participants scored lower, and had more Skipped and Unanalysable sentences between them.

5.1.3 The relationship between the scores on the SRT and length of exposure to SASL

The longer the child's length of exposure was, the better they scored on the test. However, an exception was found with five participants, all from School 1, whose lengths of exposure were above average but who also produced many of the sentences scored as Unanalysable. It is possible that their fluency could have influenced their results. As discussed above, an increase in scores alongside the increase in age reflects the lengths of exposure to SASL that the children are expected to have had, as well as their cognitive development. As mentioned earlier, however, the length of exposure does not always correlate with the age of the participant, as some participants were only exposed to SASL at a later age, and others had been in a deaf school since the age of three (see section 2.1).

5.1.4 The relationship between the scores on the SRT and school

The scores between the two schools were not expected to differ, but they did. Participants from School 1 had fewer Correct sentences and more Skipped and Unanalysable sentences. Conversely, participants from School 2 had more Correct sentences and almost no Skipped or Unanalysable sentences. A possible reason for this difference in results could be the respective participants' familiarity with this type of language test. It is possible that the participants from School 2 had received more exposure to this type of exercise and/or language test, and thus followed the instructions better and were more comfortable with the test. These are all possible contributing factors to their scores. School 1's participants struggled more with the test,

possibly as a result of not being familiar with this form of testing/activity. It should not be ruled out, however, that the participants' levels of fluency, and subsequent storytelling, could also have had an influence on their results. The familiarity of the test administrators could also play a role. At School 1, the participants – children, it must be noted again – were faced with two people whom they did not know or may not necessarily have felt comfortable around. Although every effort was made to make sure that the participants felt comfortable, with both the test and the instructions, it is entirely possible that they did not feel like they could ask questions of the administrators or felt too shy to do so. School 2's Deaf assistant was a class assistant who worked at this school, so the participants were all familiar and comfortable with her. The participants from this school were attentive and asked more questions than the participants at School 1. For future research and future use of an SRT with young, deaf children, every effort should be made to use a Deaf research assistant with whom the children are acquainted and familiar.

5.1.5 The relationship between the scores on the SRT and sentence categorisation

It was expected that the scores would decrease as the sentences' complexity increased. Although this is true overall – with the trendline in Figure 4.3 clearly demonstrating this – there were many outliers. These outliers included S2 (a negative declarative sentence), S5 (an alternate question), M8 and M12 (declarative sentences), and M9 (a declarative sentence with a wh-cleft), which scored lower than expected, and C13 (a declarative sentence with a temporal clause), C17 (a declarative sentence with a complement clause), and C20 (a negative declarative sentence with a conditional clause, also containing a QAC), which scored higher than what was expected for Complex sentence. It is not possible in the context of this thesis to fully explore what might have been the determining factors in these outliers. There does not appear to be a common denominator which would explain why these outliers would be easier or more difficult than the other sentences; for example, S1 and S2 are both negative declarative sentences, but participants scored better on S1.

These outliers need to be re-examined for future use of the test. It is also notable that there is not a clear boundary between Moderate and Complex sentences scored, as one would have expected to see. The test needs to be balanced, with more or less equal numbers of Simple, Moderate and Complex sentences that increase in their level of difficulty. This balance is necessary to understand the results of the test and to understand where participants might be scoring differently and why, without the sentences' categorisation or level of difficulty needing

to be questioned. Thus, it is necessary for future research to re-examine what differentiates the groups of sentences and their levels of complexity from one another.

5.1.6 The relationship between the scores on the SRT and sentence length

Lastly, it was expected that the scores would decrease as sentence length increased, which was found to be true. This calls into question whether participants were making errors on longer sentences due to the grammatical complexity of these sentences or because the sentence length was encroaching on the participants' short-term memory capacity. The longer sentences in the SRT had sentence lengths of more than five signs, specifically six signs (M8, M9, C15, C16, and C17) and seven signs (C14 and C18). Another situation where memory might have come into play was noted: participants sometimes paused and struggled to remember signs, suddenly signing a single sign from the sentence and then going back to their pondering. It is possible that, between these pauses, participants were signing signs as they remembered them, and not necessarily in the order that they would naturally have used if they could remember all of the signs. There is possibly more happening with the participants' short-term memory capacity than previous research has indicated, and this therefore requires further investigation. In subsection 3.1.1, the background questionnaires were described, including the question regarding any additional deficits or impairments that would thus exclude the child from the data, as these deficits/impairments could affect the study. Attention deficit disorders and concentration problems were mentioned, but it is possible that some of the participants may not yet have been formally diagnosed with Attention-Deficit/Hyperactivity Disorder or that their parents neglected to report these diagnoses. This could have influenced the results found for the relationship between the scores on the SRT and the sentence lengths.

5.2 Future use of the SRT

This version of the SRT for SASL is not without its flaws. One of the major factors that plays a role in the creation and use of this SASL SRT is lexical variation, as the sentences need to be constructed using signs with which the participants are familiar. As is the case in many other countries, South Africa currently has great lexical variation across schools and regions[6]. Should an SRT be used, it would always need to have its lexical items adjusted for the signers who will be tested, as mentioned in subsection 5.1.1. Due to this extensive variation, every school

[6] It is possible that, due to the distribution of centralised materials for use in schools for the deaf in the South African context, lexical variation may reduce over time (Van Niekerk, in prep.).

that wants to make use of this SRT will need to check the lexical items used in their own school and create their own stimulus videos if necessary.

The categorisation of sentences may also need to be adjusted, as some participants performed well on some sentences that were categorised as Complex, and other participants performed poorly on some sentences that had been categorised as Simple. Overall, the scores were lower across the test than the researcher had initially expected. For the age range being tested, there needs to be some sentences in the Simple category which are even simpler in their grammatical structure than the current sentences. This would ensure that the Simple sentences are accessible for the younger children being tested as well. The difference between Moderate and Complex sentences was not as clear-cut as expected.

To make the test more easily accessible for users and to allow for similar scoring of one learner across testing times (where the learner's progress is being tracked), a strict scoring template should be developed, focusing only on the grammatical elements that the user finds relevant, and scoring the participants as strictly as possible. This makes the test quicker to administer. If the lexical items have been checked and the sentence categorisations adjusted, then an SRT for SASL makes an insightful and easy tool for use in language testing.

We now have a feasible instrument that can test SASL proficiency and assist educators in tracking the language developmental progress of their learners. However, future work will be beneficial to this test. First and foremost, test-internal tests need to be run on the SRT before it is used as a testing tool, for example, an item analysis and a reliability test, amongst others. The results were scored solely by the researcher. As such, there is no inter-rater reliability and the intra-rater reliability was not tested. The results would need to be score by more than one rater in future and intra-rater reliability would need to be considered. Of no less importance, we need to gain a better picture of adult SASL grammar.

Currently, the reliability of data collected on the language use of deaf children and adults could be questioned due to the possible influences from the hearing environment. This can be mitigated by having the test administered by only Deaf teachers and/or assistants. It is important to note, however, that deaf people are required to function in a hearing world, which means that they are subject to daily interaction with spoken languages. Language interference is an undeniable factor in many signers' language use, where spoken forms find their way into signing. De Barros and Siebörger (2016: 6) warn of instances of code switching between manually coded varieties of spoken languages and natural sign languages, which could affect

the word order and choice of lexical items being used. Thus, there is always the possibility of native signer data being influenced by surrounding spoken languages.

5.3 Future research

This study has created an SRT for SASL and piloted it with 40 children. The study worked with grammatical structures about which we know a reasonable amount. However, we still know too little about SASL grammar. Future research should turn to the gaping holes in our knowledge of SASL grammar, for example, the range of word orders in SASL, and the obligatory nature of marking topicalisation or using INDEX. Lexical variation is an important aspect to consider when using this test, and current research is exploring this variation across time (Njeyiyana, in prep.). Variation has been explored across some schools and provinces, but the impact of centrally distributed school materials for classroom use needs to be charted, as standardisation may take place. The SRT developed here was aimed at seven- and nine-year-olds. As such, the test needs to be expanded to different age groups. Furthermore, the SRT targets grammar, while tests for phonological ability, vocabulary, and pragmatics are also needed. These tests would need to be easy to administer, score, and understand so that educators in myriad different settings would be able to use them.

5.4 Conclusion

This thesis has taken a comprehensive look at what we know about South African Sign Language (SASL), specifically the little that we know about the grammar of this language. This information was used to create the first sentence repetition test for young, deaf signers of SASL. Through the administration of this test and the analysis of the resulting data, confirmation was obtained of the positive effect that a younger age of first exposure and an increased length of exposure have on a child's grammatical knowledge. It was observed that the potential familiarity with language testing and with the administrators of the test had a positive effect on the participants. It was also noted that the test could be improved upon and easily adapted for future use in deaf schools. By creating this test, this study has proposed a method of testing that is available to schools that, until now, have not had a language testing instrument. Language testing tools are essential, especially if the language in question is used in the school's curriculum. Schools need reliable and easy methods of testing their learners so that they can evaluate these learners' proficiency and track their language developmental progress, with the option to intervene when it is deemed necessary.

This is hopefully the start of language testing tools being developed for SASL and deaf schools in South Africa. By being able to test a child's language development, we start to gain an understanding of the development of language within a group of children with such varied access and late exposure to SASL.

Bibliography

Aarons, D. and P. Akach. 1998. South African Sign Language – One language or many? A sociolinguistic question. *Stellenbosch Papers in Linguistics* 31: 1–28.

Baker, A.E., B. van den Bogaerde, R. Pfau and T. Schermer. (eds.) 2016. *The linguistics of sign languages: An introduction.* Amsterdam: John Benjamins Publishing Company.

Batchelor, M. 2010. The teacher experience: Deaf education at Sizwile School: Challenges and strengths. In D. Martin and C. Storbeck (eds.) *American Annals of the Deaf* 155(4): 488–518.

Centre for Sign Linguistics and Deaf Studies at the Chinese University of Hong Kong. 2013. *Handshape font*. Available online: http://www.cslds.org/v3/resources.php?id=1 (Accessed 26 September 2019).

Constitutional Assembly of the Republic of South Africa. 1996. *Constitution of the Republic of South Africa: Act no. 108 of 1996*. Available online: https://www.gov.za/sites/default/files/images/a108-96.pdf (Accessed 20 September 2019).

Cormier, K., A. Schembri, D. Vinson and E. Orfanidou. 2012. First language acquisition differs from second language acquisition in prelingually deaf signers: Evidence from sensitivity to grammaticality judgement in British Sign Language. *Cognition* 124(1): 50–65.

De Barros, C. and I. Siebörger. 2016. Sentential negation in South African Sign Language: A case study. *Literator* 37(2): a1285.

DeafSA. 2018. *About Us*. Available online: http://deafsa.co.za/about_us/ (Accessed 26 September 2019).

Fleckstein, A., P. Prévost, L. Tuller, E. Sizaret, and R. Zebib. 2018. How to identify SLI in bilingual children: A study on sentence repetition in French. *Language Acquisition* 25(1): 85–101.

Gagiano, S. and F. Southwood. 2015. The use of digit and sentence repetition in the identification of language impairment: The case of child speakers of Afrikaans and South African English. *Stellenbosch Papers in Linguistics* 44: 37–60.

Haug, T. 2008. Review of sign language assessment instruments. In A.E. Baker and B. Woll (eds.) *Sign language acquisition*. Amsterdam: John Benjamins Publishing Company. pp. 51–87.

Haug, T. 2011. *Adaptation and evaluation of a German Sign Language test: A computer-based receptive skills test for deaf children ages 4–8 years old.* Hamburg: Hamburg University Press.

Hauser, P., R. Paludneviciene, T. Supalla and D. Bavelier. 2006. *American Sign Language – Sentence reproduction test: Development and implications*. Available online: http://scholarworks.rit.edu/other/596 (Accessed 12 August 2018).

Hermans, D., H. Knoors and L. Verhoeven. 2009. *Assessment of sign language development: The case of deaf children in the Netherlands*. Oxford: Oxford University Press.

Huddlestone, K. 2017. A preliminary look at negative constructions in South African Sign Language: Question-answer clauses. *Stellenbosch Papers in Linguistics* 48: 93–104.

Huddlestone, K. 2019. Negation and Polar Question-Answer Clauses in Sign Languages. Unpublished manuscript, Stellenbosch University.

Klem, M., M. Melby-Lervåg, B. Hagtvet, S. Halaas Lyster, J.-E. Gustafsson and C. Hulme. 2015. Sentence repetition is a measure of children's language skills rather than working memory limitations. *Developmental Science* 18(1): 146–154.

Leeson, L., T. Haug, C. Rathmann, N. Sheneman and B. van den Bogaerde. 2018. *Survey Report from the ECML Project – ProSign: Sign Languages for Professional Purposes (2012–2015): The Implementation of the Common European Framework of Reference (CEFR) for Sign Languages in Higher Education: Results of an International Survey.* Available online: https://www.researchgate.net/publication/326059817_Survey_Report_from_the_ECML_Project_ProSign_Sign_Languages_for_Professional_Purposes_The_Implementation_of_the_Common_European_Framework_of_Reference_CEFR_for_Sign_Languages_in_Higher_Education_Result (Accessed 20 September 2019).

Lenth, R.V. 2014. *Using lsmeans.* Available online: https://pdfs.semanticscholar.org/38b2/5514888b4768bec2d0a812b1a9ab60d61b2c.pdf (Accessed 17 October 2019).

Marinis, T. and A.S. Armon-Lotem. 2015. Sentence repetition. In A.S. Armon-Lotem, J. de Jong and N. Meir (eds.) *Assessing multilingual children: Disentangling bilingualism from language impairment*. Bristol: Multilingual Matters. pp. 95–124.

Marshall, C., K. Mason, K. Rowley, R. Herman, J. Atkinson, B. Woll and G. Morgan. 2014. Sentence repetition in deaf children with specific language impairment in British Sign Language. *Language Learning and Development* 11: 237–251.

Mathur, G. and C. Rathmann. 2012. Verb agreement. In R. Pfau, M. Steinbach and B. Woll (eds.) *Sign languages: An international handbook*. Berlin: Walter de Gruyter. pp. 136–157.

Mayberry, R.I., E. Lock and H. Kazmi. 2002. Linguistic ability and early language exposure. *Nature* 417: 38.

McDonald, J.H. 2014. *Handbook of biological statistics*. Baltimore: Sparky House Publishing.

McIntire, M.L. and J. Snitzer Reilly. 1988. Non-manual behaviors in L1 and L2 learners of American Sign Language. *Sign Language Studies* 61: 351–375.

Morgan, R.Z., M. Glaser and L. Magongwa. 2016. Constructing and rolling out the new South African Sign Language (SASL) curriculum – reflexive critique. *Per Linguam* 32(2): 15–29.

National Department of Basic Education. 1998. General notices: Notice 2433 of 1998. South African Schools Act, 1996 (Act No. 84 of 1996) and National Education. Age Requirements for Admission to an Ordinary Public School. *Government Gazette* 400(19377). Available online: https://www.westerncape.gov.za/text/2004/6/notice_age_requirement_school.pdf (Accessed 23 October 2019).

National Department of Basic Education. 2014. *South African Sign Language: Home Language. Foundation Phase: Grades R-3. National Curriculum Statement (NCS): Curriculum and Assessment Policy Statement (CAPS).* Available online: https://www.realsasl.com/learn-sa-sign-language/30-download-sign-language-caps-documents (Accessed 30 April 2019).

Njeyiyana, M.S. In preparation. Lexical Variation and Change in SASL: A Case Study of a Western Cape School-Lect. MA thesis, Stellenbosch University.

Palmer, A. 2018. Testing L2M2 Acquisition of South African Sign Language: Developing a Sentence Repetition Task. Unpublished Honours research project, Stellenbosch University. (Available upon request.)

Polišenská, K., S. Chiat and P. Roy. 2015. Sentence repetition: What does the task measure? *International Journal of Language and Communication Disorders* 50(1): 106–118.

Quer, J. 2012. Negation. In R. Pfau, M. Steinbach and B. Woll (eds.) *Sign language: An international handbook*. Berlin: Walter de Gruyter. pp. 316–339.

Reagan, T. 2008. South African Sign Language and language-in-education policy in South Africa. *Stellenbosch Papers in Linguistics* 38: 165–190.

Rosen, R.S. 2004. Beginning L2 production errors in ASL phonology: A cognitive phonology model. *Sign Language and Linguistics* 7(1): 31–61.

Schüller, A. 2018. NGT–SRT: De Ontwikkeling van een Zinsherhalingstest voor Nederlandse Gebarentaal. Unpublished MA thesis, Utrecht University.

Supalla, T., P.C. Hauser and D. Bavelier. 2014. Reproducing American Sign Language sentences: Cognitive scaffolding in working memory. *Frontiers in Psychology* 5: 859.

Van Herreweghe, M. and Vermeerbergen, M. 2012. Verbal predicates in Flemish Sign Language (VGT) and South African Sign Language (SASL). In M. van Peteghem, P. Lauwers, E. Tobback, A. Demol and L. de Wilde (eds.) *Le verbe en verve: Réflexions sur la syntaxe et la sémantique verbales*. Ghent: Academia Press. pp. 401–420.

Van Niekerk, A. In preparation. Lexical Borrowing in South African Sign Language. MA thesis, Stellenbosch University.

Van Niekerk, A., D. Ebersohn, K. Huddlestone and A.E. Baker. In preparation. Studying lexical variation in sign languages: The case of South African Sign Language. In A.E. Baker, M. Kaneko, V. Nyst, E.H. Ramene and A. Asmal (eds.) *Sign Languages in Africa*.

Vermeerbergen, M. 2006. Past and current trends in sign language research. *Language and Communication* 26: 168–192.

Vermeerbergen, M., M. van Herreweghe and P. Akach. 2007. Constituent order in Flemish Sign Language (VGT) and South African Sign Language (SASL): A cross-linguistic study. *Sign Language and Linguistics* 10(1): 23–54.

Western Cape Government Department of Cultural Affairs and Sport. 2019. *Western Cape language policy: The official language policy of the Western Cape Government*. Available online: https://www.westerncape.gov.za/assets/departments/cultural-affairs-sport/western_cape_language_policy.pdf (Accessed 25 October 2019).

Williams, L.J and H. Abdi. 2010. Fisher's Least Significant Difference (LSD) test. In N.J. Salkind (ed.) *Encyclopedia of research design*. Thousand Oaks, CA: Sage. pp. 1–6. Available online: https://sk.sagepub.com/reference/download/researchdesign/n154.pdf (Accessed 23 October 2019).

Appendices

Appendix A: Letter to School 1

RESEARCH PROJECT: Developing a Sentence Repetition Test for the Evaluation of Deaf Children's Use of South African Sign Language

---

Dear [redacted]

My name is Amy Palmer. I am a student who is currently doing a Master's degree in General Linguistics at Stellenbosch University. I am doing research on the development and piloting of a sentence repetition test for young, deaf users of South African Sign Language (SASL). A sentence repetition test is a method of language testing used for clinical or educational purposes. As of yet, no sentence repetition test exists for SASL, let alone one adapted for younger children. The results could also help us to establish norms for young users of SASL, as we do not currently have any, which can aid in the education and clinical practices related to the deaf and to sign languages in general. I am gathering data from young, deaf users of SASL between the ages of 7 and 9 years old.

I would like to ask your permission and assistance to send out consent forms and background questionnaires to the parents of the 7- to 9-year-old children in your school. These letters will explain the study and ask parents if they would be willing to let their children participate in this study. I would also like to ask your permission to conduct the data collection in your school during times that are convenient to the teachers and the learners. Lastly, I would like to ask your permission to provide the teachers of the students with background questionnaires as well. The results of my study will only be used for academic purposes and every participant will remain anonymous. There is no direct benefit to the participating children, but there are also no extraordinary risks to participation. The researcher will approach the parents for their consent and the child for their assent to take part in the study. If the child agrees to take part in the study, he/she will be asked to complete a sentence repetition test. This should take roughly 30 minutes per child, depending on how long they take to repeat the sentence, or how long it takes for us to make sure that they understand the procedure and feel comfortable enough to start. This will be done at their school during the school day. I will also explain that he/she may at any time ask for a break and may at any time refuse to continue with the task.

I am willing to return to your school at the end of the year to speak about the results and the findings of the study. I can also then demonstrate how the sentence repetition test is used and then how the results are analysed. If you have any enquiries, please feel free to contact me or my supervisor, Dr Kate Huddlestone, via email or telephone.

Should you consent to this data collection taking place at your school and be prepared to assist with the requests mentioned about, please sign below.

Thank you.

Amy Palmer	Dr Kate Huddlestone
0783515350	021 808 2007
19433670@sun.ac.za	katevg@sun.ac.za

Appendix B: Letter to School 2

RESEARCH PROJECT: Developing a Sentence Repetition Test for the Evaluation of Deaf Children's Use of South African Sign Language

---

Dear [redacted]

My name is Amy Palmer. I am a student who is currently doing a Master's degree in General Linguistics at Stellenbosch University. I am doing research on the development and piloting of a sentence repetition test for young, deaf users of South African Sign Language (SASL). A sentence repetition test is a method of language testing used for clinical or educational purposes. As of yet, no sentence repetition test exists for SASL, let alone one adapted for younger children. The results could also help us to establish norms for young users of SASL, as we do not currently have any, which can aid in the education and clinical practices related to the deaf and to sign languages in general. I am gathering data from young, deaf users of SASL between the ages of 7- and 9-years-old.

I would like to ask your permission and assistance to send out consent forms and background questionnaires to the parents of the 7- to 9-year-old children in your school. These letters will explain the study and ask parents if they would be willing to let their children participate in this study. I would also like to ask your permission to conduct the data collection in your school during times that are convenient to the teachers and the learners. Lastly, I would like to ask your permission to provide the teachers of the students with background questionnaires as well.

The results of my study will only be used for academic purposes and every participant will remain anonymous. There is no direct benefit to the participating children, but there are also no extraordinary risks to participation. The researcher will approach the parents for their consent and the child for their assent to take part in the study. If the child agrees to take part in the study, he/she will be asked to complete a sentence repetition test. This should take roughly 30 minutes per child, depending on how long they take to repeat the sentence or how long it takes for us to make sure that they understand the procedure and feel comfortable enough to start. This will be done at their school after the school day. I will also explain that he/she may at any time ask for a break and may at any time refuse to continue with the task. I am willing to return to your school at the end of the year to speak about the results and the findings of the study. I can also then demonstrate how the sentence repetition test is used and then how the results are analysed. If you have any enquiries, please feel free to contact me or my supervisor, Dr Kate Huddlestone, via email or telephone.

Should you consent to this data collection taking place at your school and be prepared to assist with the requests mentioned above, please respond with an official letter stating this, as agreed upon at our meeting on 12 April 2019.

Thank you.

Amy Palmer	Dr Kate Huddlestone
0783515350	021 808 2007
19433670@sun.ac.za	katevg@sun.ac.za

Appendix C: Letter of permission from the WCED

Western Cape Government
Education

Directorate: Research

Audrey.wyngaard@westerncape.gov.za
tel: +27 021 467 9272
Fax: 0865902282
Private Bag x9114, Cape Town, 8000
wced.wcape.gov.za

REFERENCE: 20190306-2512

ENQUIRIES: Dr A T Wyngaard

Ms Amy Palmer
Department of General Linguistics
Stellenbosch University
Private Bag X1
Matieland
7602

Dear Ms Amy Palmer

RESEARCH PROPOSAL: DEVELOPING A SENTENCE REPETITION TEST FOR THE EVALUATION OF DEAF CHILDREN'S USE OF SOUTH AFRICAN SIGN LANGUAGE

Your application to conduct the above-mentioned research in schools in the Western Cape has been approved subject to the following conditions:

1. Principals, educators and learners are under no obligation to assist you in your investigation.
2. Principals, educators, learners and schools should not be identifiable in any way from the results of the investigation.
3. You make all the arrangements concerning your investigation.
4. Educators' programmes are not to be interrupted.
5. The Study is to be conducted from **02 April 2019 till 31 May 2019**
6. No research can be conducted during the fourth term as schools are preparing and finalizing syllabi for examinations (October to December).
7. Should you wish to extend the period of your survey, please contact Dr A.T Wyngaard at the contact numbers above quoting the reference number?
8. A photocopy of this letter is submitted to the principal where the intended research is to be conducted.
9. Your research will be limited to the list of schools as forwarded to the Western Cape Education Department.
10. A brief summary of the content, findings and recommendations is provided to the Director: Research Services.
11. The Department receives a copy of the completed report/dissertation/thesis addressed to:

The Director: Research Services
Western Cape Education Department
Private Bag X9114
CAPE TOWN
8000

We wish you success in your research.

Kind regards.
Signed: Dr Audrey T Wyngaard
Directorate: Research
DATE: 07 March 2019

Appendix D:

Appendix D(a): Parental background questionnaire (School 1)

UNIVERSITEIT•STELLENBOSCH•UNIVERSITY
jou kennisvennoot • your knowledge partner

DEPARTMENT OF GENERAL LINGUISTICS

BACKGROUND QUESTIONNAIRE FOR PARENTS

Information about you as Parent/Guardian #1

What is your hearing status?

☐ Hearing ☐ Hard of Hearing

☐ Deaf ☐ Age of becoming Deaf _____

What do you consider to be your first language?_____

What other languages do you speak? _____

In what language do you communicate with your family at home? _____

In what language do you communicate with your deaf child? _____

When were you first exposed to South African Sign Language? _____

What is your self-rated proficiency in South African Sign Language? Please circle:

1 being the lowest (unable to sign), 3 being basic signs to communicate, 5 being the highest proficiency (fluent in South African Sign Language

South African Sign Language Production: 1 - 2 - 3 - 4 - 5

South African Sign Language Comprehension: 1 - 2 - 3 - 4 - 5

Are there any other deaf members in the family? _____

If yes, how often is your child exposed to them? _____

In everyday life, when and where do you use sign language?_____

_____

Information about your child

Name: _____ Age of child: _____

Gender of child: □ Male □ Female

What is your child's hearing status?

□ Hearing □ Hard of Hearing

□ Deaf □ Age of becoming Deaf _____

Please indicate the child's degree of hearing loss:

□ mild (25 to 40 dB)

□ moderate (40 to 70 dB)

□ severe (70 to 90 dB)

□ profound (> 100 dB)

How old was your child when they were diagnosed as deaf/hard of hearing?_____

How old was your child when they first started learning sign language?_____

Please rate your child's proficiency in sign language as you see it:

1 being the lowest (unable to sign), 3 being basic signs to communicate, 5 being the highest proficiency (fluent in South African Sign Language

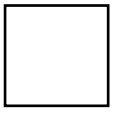
South African Sign Language Production: 1 - 2 - 3 - 4 - 5

South African Sign Language Comprehension: 1 - 2 - 3 - 4 - 5

We are now going to ask some questions about your child's medical history. We ask these questions specifically because the conditions listed below could influence the results of the study.

- Attention deficiencies (such as ADD, ADHD or any problems with concentration;
- Children with visual impairments (such as children with glasses or children who struggle to read);
- Children with any physical deficits to do with their arms or hands (affecting their movement);
- Children with any cognitive or intellectual deficits (such as children who struggle with learning new things or are slow learners).

Please indicate if any of these conditions apply to your child by ticking the box below:



UNIVERSITEIT•STELLENBOSCH•UNIVERSITY
jou kennisvennoot • your knowledge partner

DEPARTMENT OF GENERAL LINGUISTICS

BACKGROUND QUESTIONNAIRE FOR PARENTS

Information about you as Parent/Guardian #2

What is your hearing status?

☐ Hearing ☐ Hard of Hearing

☐ Deaf ☐ Age of becoming Deaf _____

What do you consider to be your first language?

_____

What other languages do you speak?

_____

In what language do you communicate with your family at home? _____

In what language do you communicate with your deaf child? _____

When were you first exposed to South African Sign Language? _____

What is your self-rated proficiency in South African Sign Language? Please circle:

1 being the lowest (unable to sign), 3 being basic signs to communicate, 5 being the highest proficiency (fluent in South African Sign Language

South African Sign Language Production: 1 - 2 - 3 - 4 - 5

South African Sign Language Comprehension: 1 - 2 - 3 - 4 - 5

Are there any other deaf members in the family? _____

If yes, how often is your child exposed to them?_____

In everyday life, when and where do you use sign language?_____

_____

Please rate your child's proficiency in sign language as you see it:

1 being the lowest (unable to sign), 3 being basic signs to communicate, 5 being the highest proficiency (fluent in South African Sign Language

South African Sign Language Production: 1 - 2 - 3 - 4 - 5

South African Sign Language Comprehension: 1 - 2 - 3 - 4 - 5

Appendix D(b): Parental background questionnaire (School 2)

UNIVERSITEIT•STELLENBOSCH•UNIVERSITY
jou kennisvennoot • your knowledge partner

DEPARTMENT OF GENERAL LINGUISTICS

BACKGROUND QUESTIONNAIRE FOR PARENTS

Information about you as Parent/Guardian #1

What is your hearing status?

☐ Hearing ☐ Hard of Hearing

☐ Deaf ☐ Age of becoming Deaf _____

What do you consider to be your first language?_____

What other languages do you speak? _____

In what language do you communicate with your family at home? _____

In what language do you communicate with your deaf child? _____

When were you first exposed to South African Sign Language? _____

What is your self-rated proficiency in South African Sign Language? Please circle:

1 being the lowest (unable to sign), 3 being basic signs to communicate, 5 being the highest proficiency (fluent in South African Sign Language

South African Sign Language Production: 1 - 2 - 3 - 4 - 5

South African Sign Language Comprehension: 1 - 2 - 3 - 4 - 5

Are there any other deaf members in the family? _____

If yes, how often is your child exposed to them? _____

In everyday life, when and where do you use sign language?_____

_____

Information about your child

Name: _____ Age of child: _____

Gender of child: □ Male □ Female

What is your child's hearing status?

□ Hearing □ Hard of Hearing

□ Deaf □ Age of becoming Deaf _____

Please indicate the child's degree of hearing loss:

□ mild (25 to 40 dB)

□ moderate (40 to 70 dB)

□ severe (70 to 90 dB)

□ profound (> 100 dB)

How old was your child when they were diagnosed as deaf/hard of hearing?_____

How old was your child when they first started learning sign language?_____

Please rate your child's proficiency in sign language as you see it:

1 being the lowest (unable to sign), 3 being basic signs to communicate, 5 being the highest proficiency (fluent in South African Sign Language

South African Sign Language Production: 1 - 2 - 3 - 4 - 5

South African Sign Language Comprehension: 1 - 2 - 3 - 4 - 5

UNIVERSITEIT•STELLENBOSCH•UNIVERSITY
jou kennisvennoot • your knowledge partner

DEPARTMENT OF GENERAL LINGUISTICS

BACKGROUND QUESTIONNAIRE FOR PARENTS

Information about you as Parent/Guardian #2

What is your hearing status?

☐ Hearing ☐ Hard of Hearing

☐ Deaf ☐ Age of becoming Deaf _____

What do you consider to be your first language?

_____

What other languages do you speak?

_____

In what language do you communicate with your family at home? _____

In what language do you communicate with your deaf child? _____

When were you first exposed to South African Sign Language? _____

What is your self-rated proficiency in South African Sign Language? Please circle:

1 being the lowest (unable to sign), 3 being basic signs to communicate, 5 being the highest proficiency (fluent in South African Sign Language

South African Sign Language Production: 1 - 2 - 3 - 4 - 5

South African Sign Language Comprehension: 1 - 2 - 3 - 4 - 5

Are there any other deaf members in the family? _____

If yes, how often is your child exposed to them?_____

In everyday life, when and where do you use sign language?_____

_____

Please rate your child's proficiency in sign language as you see it:

1 being the lowest (unable to sign), 3 being basic signs to communicate, 5 being the highest proficiency (fluent in South African Sign Language

South African Sign Language Production: 1 - 2 - 3 - 4 - 5

South African Sign Language Comprehension: 1 - 2 - 3 - 4 - 5

Appendix E: Educator background questionnaire

UNIVERSITEIT•STELLENBOSCH•UNIVERSITY
jou kennisvennoot • your knowledge partner

DEPARTMENT OF GENERAL LINGUISTICS

Background Questionnaire for Educators

Section A: Information about the educator

Name: _____

What is your hearing status?

☐ Hearing ☐ Hard of Hearing

☐ Deaf ☐ Age of becoming Deaf _____

What subject do you teach the child in question? _____

_____

What do you consider to be your first language? _____

In what language do you communicate with your family at home? _____

When were you first exposed to South African Sign Language? _____

What is your self-rated proficiency in South African Sign Language? Please circle:

1 being the lowest (unable to sign), 3 being basic signs to communicate, 5 being the highest proficiency (fluent in South African Sign Language

South African Sign Language Production: 1 - 2 - 3 - 4 - 5

South African Sign Language Comprehension: 1 - 2 - 3 - 4 - 5

In what language do you communicate with your class at this school? _____

_____

In everyday life, when and where do you use sign language? _____

_____

Section B: Information about the child tested in your class

Teacher: _____

Name of child: _____ Age of child:_____

Gender of child: □ Male □ Female

What is their hearing status?

□ Hearing □ Hard of Hearing

□ Deaf □ Age of becoming Deaf _____

Do you know how old the child was when they were diagnosed as deaf/hard of hearing?

_____

Do you know how old the child was when they first started learning sign language?_____

_____

Please indicate the child's degree of hearing loss:

□ mild (25 to 40 dB)

□ moderate (40 to 70 dB)

□ severe (70 to 90 dB)

□ profound (> 100 dB

Hearing status of parents:

Mother: ❑ Deaf □ hard of hearing □ hearing

Father: ❑ Deaf □ hard of hearing □ hearing

What form of communication is used at the child's home, to your knowledge?_____

_____

Please rate your learner's proficiency in sign language as you see it:

1 being the lowest (unable to sign), 3 being basic signs to communicate, 5 being the highest proficiency (fluent in South African Sign Language

South African Sign Language Production: 1 - 2 - 3 - 4 - 5

South African Sign Language Comprehension: 1 - 2 - 3 - 4 - 5

Appendix F: Participant biographical information

Participant	Age	Gender	School	Age of diagnosis (0=birth)	Length of exposure (years)	Home language	Other language(s) at home
P2	8	M	1	1.5	4	English	Shona
P5	7	M	1	4	5	Afrikaans, English	isiXhosa
P6	9	M	1	2	4	English, isiXhosa	Afrikaans, Sesotho, isiNdebele, Sepedi
P8	9	F	1	0,5	6	English	Afrikaans
P9	9	F	1	0,25	6	Xitsonga	English
P10	9	M	1	2	3	Afrikaans	English
P11	7	F	1	1,5	4	English	Afrikaans
P12	7	M	1	3	2	English	isiXhosa
P13	7	F	1	0	3	isiXhosa	English
P14	8	M	1	3,5	3	isiXhosa	English, isiZulu
P19	7	M	1	2	4	Afrikaans	English
P20	7	F	1	0	1	Afrikaans	English
P22	7	F	1	2	7	English	Afrikaans

Participant	Age	Gender	School	Age of diagnosis (0=birth)	Length of exposure (years)	Home language	Other language(s) at home
P23	7	F	1	0,75	4	Swahili	English
P24	7	F	1	3	3	Afrikaans, English	
P25	7	M	1	5	1	isiXhosa	English, Sesotho
P26	8	M	1	0	5	English	isiXhosa
P29	7	F	1	2	3	isiXhosa	
P30	9	F	1	2	3	English	
P31	9	F	1	1	5	Afrikaans	English
P33	9	M	1	3	4	Afrikaans	English
P38	9	F	2	0,75	5	Afrikaans	English
P39	9	F	2	0	3	Afrikaans	
P40	9	F	2	0	5		
P45	9	F	2	2	3		
P46	8	F	2	-	1	Afrikaans	
P48	8	F	2	0	4	Afrikaans	
P51	7	M	2	5	2		
P53	8	M	2	2	1		

Participant	Age	Gender	School	Age of diagnosis (0=birth)	Length of exposure (years)	Home language	Other language(s) at home
P54	8	M	2	3	4	English	isiZulu, isiXhosa, Afrikaans
P55	9	M	2	0	3	Afrikaans	
P57	8	M	2	0	7		
P58	8	M	2	0	2		
P60	8	M	2	6	2	Afrikaans	
P61	8	M	2	4	2		
P62	8	M	2	4	2	Afrikaans	English
P63	9	M	2	0	9		
P64	8	M	2	1	5		
P65	9	M	2	2	6		
P66	9	M	2	0	4	Afrikaans	

Appendix G: Parental consent form

UNIVERSITEIT•STELLENBOSCH•UNIVERSITY
jou kennisvennoot • your knowledge partner

STELLENBOSCH UNIVERSITY

PARENT/LEGAL GUARDIAN CONSENT FOR CHILD TO PARTICIPATE IN RESEARCH

I would like to invite your child to take part in a study conducted by Amy Palmer, a Master's student in the Department of General Linguistics at Stellenbosch University. Your child has been invited as a possible participant because they are deaf, young users of South African Sign Language (SASL) and they are in the age range that this study has chosen to focus on.

1. PURPOSE OF THE STUDY

This study aims to develop and pilot a sentence repetition activity for young, deaf users of SASL. A sentence repetition activity is a method of language measuring used for clinical or educational purposes. As of yet, no sentence repetition activity exists for SASL, let alone one adapted for younger children. The results could also help us to establish norms for young users of SASL, as we do not currently have any, which can aid in the education and clinical practices related to the deaf and to sign languages in general.

2. WHAT WILL BE ASKED OF MY CHILD?

If you consent to your child taking part in this study, the researcher will then approach the child for their assent to take part in the study. If the child agrees to take part in the study, he/she will be asked to complete a sentence repetition activity. This means that your child will sit in front of a computer screen and a video-camera. We will play recordings of sentences signed by a native signer of SASL to your child and they then have to try to repeat/reproduce the sentence back to us as accurately as possible. This should take about 20 minutes per child, depending on how long they take to repeat the sentence, or how long it takes for us to make sure that they understand the procedure and feel comfortable enough to start. This will be done at their school during the school day.

3. POSSIBLE RISKS AND DISCOMFORTS

There are no evident risks to partaking in this study, but should your child start to feel uncomfortable for any reason, the activity will be stopped immediately and we will do our best to set your child at ease before letting them return to their class. Should the children experience any form of distress, a native signer of SASL will be on hand to help sort out the problem and reassure the child. The child will also then be referred to the school's councillor, so as to ensure that there are no negative repercussions for the child.

4. POSSIBLE BENEFITS TO THE CHILD OR TO THE SOCIETY

There are no direct benefits to the children who partake in this study. The study aims to pilot a possible educational and clinical language measuring method, to help provide one where there is currently none. By participating, your child will be assisting in an attempt to start building and establishing norms for young signers of SASL. This will help us to understand SASL and its acquisition better, also helping educational and clinical practices with deaf children.

5. PAYMENT FOR PARTICIPATION

The participants will not receive payment or any form of compensation for their participation.

6. PROTECTION OF YOUR AND YOUR CHILD'S INFORMATION, CONFIDENTIALITY AND IDENTITY

Any information you or your child will share with me during this study and that could possibly identify you or your child will be protected. This will be done by using code names for each participant and protecting the data collected. The data will be kept on two hard drives in password protected folders. These hard drives will stay with the supervisor (Dr K Huddlestone) and the researcher (Ms A Palmer) only. They will be kept in rooms that will remain locked to anyone without permission to enter. Participants can choose, at any time, to have their information and data removed from the study, they only need to contact the researcher.

The children will be videotaped and the recordings will be analysed. Clips and stills from these videos may be used in the thesis and in articles and conference presentations resulting from the thesis. Due to the nature of sign languages, we will not be able to blur their faces or black out their eyes, because this will cause us to lose crucial linguistic information. However confidentiality and anonymity will be maintained as far as possible, given these constraints. Due to the age of the children, they will become less recognizable from the videos recorded for this research as they grow older and their facial features mature. These recordings will be stored for possible future use in research aimed at developing norms for child signers of SASL. Should other researchers be interested in accessing the data collected for this study, they can contact the researcher or supervisors. They will only be granted access to the information if they can prove their credentials and provide valid reasons for needing to see the data.

7. PARTICIPATION AND WITHDRAWAL

You and your child can choose whether to be part of this study or not. If you consent to your child taking part in the study, please note that your child may choose to withdraw or decline participation at any time without any consequence. Your child may also refuse to answer any questions they don't want to answer and still remain in the study. The researcher may withdraw your child from this study if they appear to show any signs of distress, even if they do not mention it.

8. RESEARCHERS' CONTACT INFORMATION

If you have any questions or concerns about this study, please feel free to contact Amy Palmer at 078 351 5350 or via email at 19433670@sun.ac.za, and/or the supervisor Dr Kate Huddlestone at katevg@sun.ac.za.

9. RIGHTS OF RESEARCH PARTICIPANTS

Your child may withdraw their consent at any time and discontinue participation without penalty. Neither you nor your child are waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your or your child's rights as a research participant, contact Ms Maléne Fouché [mfouche@sun.ac.za; 021 808 4622] at the Division for Research Development.

DECLARATION OF CONSENT BY THE PARENT/ LEGAL GUARDIAN OF THE CHILD- PARTICIPANT

As the parent/legal guardian of the child I confirm that:

- I have read the above information and it is written in a language that I am comfortable with.
- I have had a chance to ask questions and all my questions have been answered.
- All issues related to privacy, and the confidentiality and use of the information have been explained.

By signing below, I _____ *(name of parent)* agree that the researcher may approach my child _____ *(name of child)* to take part in this research study, as conducted by Amy Palmer

_____ _____

Signature of Parent/Legal Guardian **Date**

DECLARATION BY THE PRINCIPAL INVESTIGATOR

As the **principal investigator,** I hereby declare that the information contained in this document has been thoroughly explained to the parent/legal guardian. I also declare that the parent/legal guardian was encouraged and given ample time to ask any questions.

_____ _____

Signature of Principal Investigator **Date**

Appendix H: Educator consent form

UNIVERSITEIT•STELLENBOSCH•UNIVERSITY
jou kennisvennoot • your knowledge partner

STELLENBOSCH UNIVERSITY

CONSENT TO PARTICIPATE IN RESEARCH

You are invited to take part in a study conducted by Amy Palmer, from Department of General Linguistics at Stellenbosch University. You were approached as a possible participant because you are the educator of the learners being tested in this study.

1. PURPOSE OF THE STUDY

This study aims to develop and pilot a sentence repetition test for young, deaf users of SASL. A sentence repetition test is a method of language testing used for clinical or educational purposes. As of yet, no sentence repetition test exists for SASL, let alone one adapted for younger children. The results could also help us to establish norms for young users of SASL, as we do not currently have any, which can aid in the education and clinical practices related to the deaf and to sign languages in general.

2. WHAT WILL BE ASKED OF ME?

If you agree to take part in this study, you will be asked to sign a consent form that gives permission for your classroom to be used and for your students to be excused to be tested, as well as indicates that you agree to fill in two questionnaires. Once you have signed the consent form, you will be asked to fill out a language background questionnaire about yourself, as well as a learner questionnaire about the learners being tested. These will be given to you on the day of testing at the school, and should not take more than ten minutes to complete in full. The data and information provided will be kept confidential.

3. POSSIBLE RISKS AND DISCOMFORTS

There are no evident risks to partaking in this study, but should you start to feel uncomfortable for any reason, the answering of the questionnaires will be stopped immediately and we will do our best to set you at ease. Should you experience any form of distress you can be referred to the school's councillor, so as to ensure that you suffer from no negative repercussions.

4. POSSIBLE BENEFITS TO PARTICIPANTS AND/OR TO THE SOCIETY

There are no direct benefits to the educators who partake in this study. The study aims to pilot a possible educational and clinical language testing method, to help provide one where there is currently

none. By participating, you will be assisting in an attempt to start building and establishing norms for young signers of SASL. This will help us to understand SASL and its acquisition better, also helping educational and clinical practices with deaf children.

5. PAYMENT FOR PARTICIPATION

The participants will not receive payment or any form of compensation for their participation.

6. PROTECTION OF YOUR INFORMATION, CONFIDENTIALITY AND IDENTITY

Any information you will share with me during this study and that could possibly identify you or your learners will be protected. This will be done by using code names for each participant and protecting the data collected. The data will be kept on two hard drives in password protected folders. These hard drives will stay with the supervisor (Dr K Huddlestone) and the researcher (Ms A Palmer) only. They will be kept in rooms that will remain locked to anyone without permission to enter. Participants can choose, at any time, to have their information and data removed from the study, they only need to contact the researcher.

The children will be videotaped and the recordings will be analysed. Clips, stills and quotes from these videos and questionnaires may be used in the thesis and in articles and conference presentations resulting from the thesis. Due to the nature of sign languages, we will not be able to blur their faces or black out their eyes, because this will cause us to lose crucial linguistic information. However confidentiality and anonymity will be maintained as far as possible, given these constraints. These recordings will be stored for possible future use in research aimed at developing norms for child signers of SASL. Should other researchers be interested in accessing the data collected for this study, they can contact the researcher or supervisors. They will only be granted access to the information if they can prove their credentials and provide valid reasons for needing to see the data.

7. PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you agree to take part in this study, you may withdraw at any time without any consequence. You may also refuse to answer any questions you don't want to answer and still remain in the study. The researcher may withdraw you from this study if you exhibit what appears to be distressed behaviour, even if you do not mention it yourself. If you withdraw from the study, all data and information collected about you will be destroyed.

8. RESEARCHERS' CONTACT INFORMATION

If you have any questions or concerns about this study, please feel free to contact Amy Palmer at 078 351 5350 or via email at 19433670@sun.ac.za, and/or the supervisor Dr Kate Huddlestone at katevg@sun.ac.za.

9. RIGHTS OF RESEARCH PARTICIPANTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you

have questions regarding your rights as a research participant, contact Ms Maléne Fouché [mfouche@sun.ac.za; 021 808 4622] at the Division for Research Development.

DECLARATION OF CONSENT BY THE PARTICIPANT

As the participant I confirm that:

- I have read the above information and it is written in a language that I am comfortable with.
- I have had a chance to ask questions and all my questions have been answered.
- All issues related to privacy, and the confidentiality and use of the information I provide, have been explained.

By signing below, I _____ *(name of participant)* agree to take part in this research study, as conducted by Amy Palmer.

_____ _____

Signature of Participant **Date**

DECLARATION BY THE PRINCIPAL INVESTIGATOR

As the **principal investigator,** I hereby declare that the information contained in this document has been thoroughly explained to the participant. I also declare that the participant has been encouraged (and has been given ample time) to ask any questions. In addition I would like to select the following option:

	The conversation with the participant was conducted in a language in which the participant is fluent.
	The conversation with the participant was conducted with the assistance of a translator (who has signed a non-disclosure agreement), and this "Consent Form" is available to the participant in a language in which the participant is fluent.

_____ _____

Signature of Principal Investigator **Date**

Appendix I: Child assent form

	STELLENBOSCH UNIVERSITY

ASSENT FORM FOR MINORS

TITLE OF THE RESEARCH PROJECT: Developing an SRT for the Evaluation of Deaf Children's Use of South African Sign Language

RESEARCHER'S NAME(S): Amy Palmer

RESEARCHER'S CONTACT NUMBER: 0783515350

What is RESEARCH?

Research is something we do to find **NEW KNOWLEDGE** about the way things (and people) work. We use research projects or studies to help us find out more about children and teenagers and the things that affect their lives, their schools, their families and their health. We do this to try and make the world a better place!

What is this research project all about?

This project is about the way that children use sign language. We are going to look at the way that you sign in our activity and then try to see if some factors are influencing your signing. For example, does you signing tell us about how old you are? Or does your signing show us when you first learnt sign language? We are also going to look at how you sign because we don't know for sure how children should sign. That means that the way that you sign will be teaching us about sign language and children!

Why have I been invited to take part in this research project?

You have been invited to help us with this research because you use South African Sign Language and because you are the right age for us to get the results that we are looking for to help us learn about children who sign, just like you.

Who is doing the research?

My name is Amy Palmer and I am a masters student at the University of Stellenbosch. I really enjoy researching sign language and I am very interested in the way that children sign.

What will happen to me in this study?

You will be asked to come into the room with me and my interpreter and helper. We are going to explain the steps to you and then show you some sentences in sign language. You can ask us questions for the first 3 sentences. After that we are not going to talk anymore, and you have to watch the next 20 sentences. You have to watch them very carefully, and when the sentence is done you have to try and show us the sentence again just like the signer on the video did it.

Can anything bad happen to me?

There are not supposed to be any things bad that can happen to you while you help us with this research. If anything does make you feel bad or uncomfortable, then you can tell us and we can stop the process immediately. Nobody is going to be mad at you for stopping.

Can anything good happen to me?

Nothing good will happen to you specifically, but this information can be used to help other children like you in the future.

Will anyone know I am in the study?

All of the information about you will only be available to me and my supervisors (my teachers who help me with this project). We can't blur your faces, but we will not use your names or anything that can tell people who you are. You are still very young, and

as you get older your face will change, so it will be more difficult for people to recognise you as you grow up.

Who can I talk to about the study?

You can talk to me, Amy, via email (19433670@sun.ac.za) or via telephone (078 351 5350). You can also contact my supervisor, Dr Kate Huddlestone, via email (katevg@sun.ac.za).

What if I do not want to do this?

You can decide that you don't want to do this at any time, even if we have already started. Your parents might have already given permission for you to do this, but it is your choice whether or not you want to start it or continue it. No one will be angry or upset with you, there will be no negative consequences.

Do you understand this research study and are you willing to take part in it?

YES	NO

Has the researcher answered all your questions?

YES	NO

Do you understand that you can STOP being in the study at any time?

YES	NO

_____ _____

Signature of Child Date

Appendix J: English version of the instructions that were given to the participants, signed by a Deaf, native signer of SASL

Hello!

Today I am going to explain this game to you. You should be excited! You will concentrate, produce signs and play.

Now you are going to sit in front of a desk. Amy will be sitting on the other side of the desk. Next to Amy there is a teacher. On your left there will be a video camera. You mustn't look at the video camera, you should look at the TV-screen in front of you. When the mouse is clicked, a signer will appear on the screen.

You must focus carefully and watch the signs and facial expressions of the signer. You must sit and take them all in, as best you can. You must store it in your head so that you can remember what you see. When the signer has finished signing, the video will turn off and now you can turn to the video camera. You will then try to remember the sentence that you just saw on the TV-screen and try to reproduce the sentence that you stored in your head. When you have finished signing, then you will turn back to the TV-screen and do it again. When you try to reproduce the sentence that you saw, you should try to remember it and try to sign the same sentence that you saw.

This game is exciting! When your signing is finished, you will get a sweetie!

Now we will do some practicing first, so that you can practice how to watch and remember the sentences so that you can repeat them. When we have finished practicing then we will start. Good luck!

Appendix K: Research assistant confidentiality form

Research Assistant Confidentiality Agreement

A. CONFIDENTIALITY OF A RESEARCH STUDY

Confidentiality is the treatment and maintenance of information that an individual has disclosed in a relationship of trust and with the expectation that it will not be divulged to others in ways that are inconsistent with the understanding of the original disclosure (the consent form) without permission. Confidential information relating to human subjects in a research study may include, but is not limited to:

- Name, date of birth, age, sex, address, and contact information;
- Current contact details of family, guardian etc.;
- Medical or educational history and/or records;
- Sexual lifestyle;
- Personal care issues;
- Service records and progress notes;
- Assessments or reports;
- Ethnic or racial origin;
- Political opinions, religious or philosophical beliefs.

As a research assistant you will have access to confidential information pertaining to the research study. Many participants will only reveal information to investigators because principal investigators have assured participants that every effort will be made to maintain confidentiality. That is why it is of the upmost importance to maintain full confidentiality when conducting a research study. *Below is a list of expectations you will be required to adhere to as a research assistant. Please carefully review these expectations before signing this form.*

B. EXPECTATIONS FOR A RESEARCH ASSISTANT

In order to maintain confidentiality, I agree to:

1. Keep all research information that is shared with me (e.g. observations, flash drives, notes, transcripts, data, etc.) confidential by not discussing or sharing this information verbally or in any format with anyone other than the principal investigator of this study;
2. Hold in strictest confidence the identification of any individual that may be revealed during the course of performing the research tasks;

3. Ensure the security of research information while it is in my possession. This may include:
    - Keeping all documents and/or data related to the research study on a password protected computer with password protected files;
    - Closing any programs, documents, or data files related to the research study when away from the computer;
    - Keeping any printed documents and/or data related to the research study in a secure location such as a locked filing cabinet;
    - Permanently deleting any digital communication containing documents and/or data related to the research study.
4. Not make copies of documents and/or data related to the research study unless specifically instructed to do so by the principal investigator;
5. Give all research information/data and research participant information/data back to the principal investigator upon completion of my duties as a research assistant;
6. After discussing it with the principal investigator, erase or destroy all research information that cannot be returned to the principal investigator upon completion of my duties as a research assistant.

By signing this form I acknowledge that I have reviewed, understand, and agree to adhere to the expectations for a research assistant described above. I agree to maintain confidentiality while performing my duties as a research assistant and recognise that failure to comply with these expectations may result in disciplinary action.

_____ _____

Signature of Research Assistant Date

_____

Print Name

Appendix L: Supplementary data – video files

This appendix contains the video clips that have were used as the test sentences in this SASL SRT.

Simple 1

Simple 2

Simple 3

Simple 4

Simple 5

Simple 6

Moderate 7

Moderate 8

Moderate 9

Moderate 10

Moderate 11

Moderate 12

Complex 13

Complex 14

Complex 15

Complex 16

Complex 17

Complex 18

Complex 19

Complex 20

Appendix M: Supplementary data – test sentences

This appendix contains specific video clips that have been transcribed and presented as examples in this thesis. These video clips are from the data collected by testing the participants with the SRT, as done by the researcher for this study. These clips do not include examples used from other researchers' works nor from the adult signers' video clips.

Example (3.1.b) clip [Participant 57 S1, scored as Correct]

Example (4.1.b) clip [Participant 33 S3, scored as Incorrect]

Example (4.1.c) clip [Participant 24 S3, scored as Incorrect]

Example (4.2.b) clip [Participant 30 S5, scored as Unanalysable]

Example (4.3.b) clip [Participant 58 S1, scored as Incorrect]

Example (4.3.d) clip [Participant 38 S4, scored as Incorrect]

Example (4.4.b) clip [Participant 29 S4, scored as Incorrect (SVO)]

Example (4.4.c) clip [Participant 20 S4, scored as Incorrect (VSO)]

Example (4.4.d) clip [Participant 8 S4, scored as Incorrect (OVS)]

Example (4.5.b) clip [Participant 2 C20, scored as Incorrect]

Example (4.5.c) clip [Participant 9 C20, scored as Incorrect]

Example (4.6.b) clip [Participant 20 S2, scored as Incorrect]

Example (4.6.c) clip [Participant 10 S2, scored as Incorrect]

Example (4.7.b) clip [Participant 13 S3, scored as Incorrect]

Example (4.7.c) [Participant 19 S3, scored as Incorrect] – Clip excluded due to video corruption after transcriptions were completed

Example (4.8.b) clip [Participant 58 C20, scored as Incorrect]

Example (4.8.c) clip [Participant 61 C20, scored as Incorrect]