



Royal Institute for  
Deaf and Blind Children



# **The development of an online assessment tool for Auslan**

**RIDBC Thomas Pattison School**

**Final Report**



empowering  
**independent**  
education

# The development of an online assessment tool for Auslan

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# 1. Executive summary

In spite of advances in technology, many children who are born deaf enter school with a serious language delay in English, and—for those children who have Auslan as a preferred language—in Auslan. There is a near complete lack of formal assessment tools for such children or reference materials for their teachers. This is due to a dearth of research into the timetable and sequence of development of Auslan and other signed languages as well as little practical materials having been created by academics to share the knowledge they have gained in a form digestible by practitioners.

As a result of this, for Auslan-signing deaf children, teachers are unable to formally and consistently target developmentally-appropriate skills. Teachers of hearing students would access Speech Therapists and Psychologists for such information, however teachers of the deaf often have to just “make do” with their own limited knowledge and guess work.

The production of a valid and reliable assessment tool requires skills in the design of standardised assessments, an in-depth knowledge of the structure of a language as well as its developmental progression, and technical skills in graphic design and computer programming. This grant has allowed staff covering those skill sets to be able to work together to produce this much-needed tool.

The aim of this project was to produce a tool that can be administered reliably and efficiently by staff without extensive training, and that can validly give teachers useful information on a child’s strengths and areas of need in Auslan, in order that goals for intervention may be targeted. Although the assessment tool is not complete, it is in the final stages of construction, ready to be piloted. Further, artefacts have been produced as a result of the research behind the tool which will have a valuable place in the teacher of the deaf toolbox.

## 2. Introduction and background

At the RIDBC Thomas Pattison School (TPS), children from Kindergarten to Year 10 are taught in and about Auslan as their first language. English is taught primarily through literacy, but also through speech for those children for whom this is an option. TPS is the only bilingual school for the deaf in Sydney, and one of only a few in Australia. At TPS the regular NESA curriculum is taught with appropriate modifications as allowed and required to accommodate the significant proportion of children with delayed or disrupted language development as well as with any additional disabilities. Language intervention accounts for a significant proportion of students' programs at TPS as language is the foundational skill through which they learn all others.

### 2.1 Background demographics and definitions

It is important to explain upfront several demographic factors of this population given the reader is unlikely to be familiar with the field of deafness. Firstly, the preferred term of members of the Deaf community who use Auslan is “Deaf” with a capital D to indicate inclusion in a community and being a cultural minority rather than a disability group. Because it is unclear at what point non-native signing children become members of that community, and for ease of reading, the word “deaf” with lower case d is being used to refer to the students. Both Deaf and deaf are widely accepted and preferred terms by Deaf people, and have no negative connotations, unlike the problematic terms “hearing impaired” (for the focus on an impairment) or hearing loss (they never had hearing to lose it, generally).

The other very important factor to understand is that is that deafness is a very low-incidence disability. Only 0.3% children are identified with a significant and permanent hearing impairment and fitted with hearing aids or cochlear implants by school entry age (Australian Hearing, 2013). The incidence of profound deafness is much lower, accounting for only 0.03% of all children in Australia. Of those children, at least 95% are born into hearing families who have no knowledge of Auslan when their child is born (Johnston, 2004). This has profound effects on research, as will be outlined below.

Those who do have Deaf family members are called native signers and, barring any additional disability, will acquire Auslan as a first language as any hearing child acquires spoken languages and will not have any particular delay or disorder. These are the children from which a norming sample should be drawn, as they are the only ones

acquiring language as typically-developing children do. However, in the whole of Australia there is probably fewer than 50 in the right age group. It isn't economically feasible to seek to identify and travel to all of these students for cross-sectional norms and in any case, there would not be enough children to do so. This issue plagues sign language linguistics, particularly in countries with smaller populations.

The other 95-99% of deaf are born into hearing families. These children are typically given cochlear implants and access to Auslan is not provided unless they fall well below expected development. When this happens, children move to various educational environments and services that use some form of visual communication<sup>1</sup> but by this stage, they already have very delayed language development. Additionally, even with the best services, those children will not have the quantity and quality of exposure to language models that would be expected for a typically developing child. Therefore, they fall still further behind<sup>2</sup>.

## 2.2 The need for an assessment

The majority of the TPS school population therefore experience significant language delay. Since skill in Auslan is integral to these children's success in all other areas—particularly literacy and numeracy—and since we know they are arriving delayed and do not have the same quantity or quality of language input as their typically-developing peers, it is crucial that their language skills are assessed and their progress tracked to determine whether and what intervention is required. Such information is essential to enable teachers to set developmentally-appropriate goals and to target their intervention effectively. This need has always been there, but there is an increasing focus on it due to the drive for data-driven accountability in schools and in NDIS practices.

Additionally, educators need to distinguish between those children with a delay and those with an actual language impairment or disorder. Results from appropriate

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<sup>1</sup> The broad term “visual communication” is used here because it is not always exclusively Auslan to which the children have been exposed. Up until their engagement with TPS, they may have been exposed to some form of “English-like” or “key word” signing where signs are used primarily to support spoken language use.

<sup>2</sup> There is also a “Matthew Effect”: that is, linguistic skill has been shown to correlate with popularity in young children, and interaction between peers has a significant and positive impact on language development (Mashburn et al, 2009; Albers, 2013).

language assessments are also required to allow teachers of the deaf to validly evaluate whether a child's performance on other academic tasks reflects content understanding or language ability.

However, internationally there is a dearth of assessment tools for monitoring the acquisition of language structure by learners of sign languages. The lack of such tools has long been recognised as a problem in the field (see, for example, Mann & Prinz, 2006; Hermans et al., 2010; Haug & Mann, 2008; and Haug, 2005). Surveys of educators of the deaf in the US (Mann & Prinz, 2006) and in Germany (Haug & Hintermair, 2003) found that a large majority reported a strong need for a good assessment tool but less than 50% in the US and only 11% in Germany reported that any regular assessment was occurring in regard to the signed language development of their students.

Tracking of a child's development of Auslan has been further hindered by the lack of any published (or unpublished) resource drawing together the research on the development of Auslan or other signed languages into a scale or sequence for an appropriate checklist of skills for teachers. There have been, over the years, some unpublished and informal lists, including one the author compiled and used in workshops from 2006 onwards. However, these lists lacked detail and many were compiled by authors without reference to the literature and thus the sequences were sometimes invalid. Also, they usually only said what a child should do at a particular age, rather than how that skill developed over time and what stages a child goes through which is essential for intervention.

As it stands currently, there is no assessment tool of Auslan that is valid, reliable and practical for use that gives teachers the type of criterion-referenced information to use formatively as a basis for establishing valid educational goals to provide effective intervention. There is indeed only one tool that has been standardised at all for Auslan (see below). Despite this, organisations are being expected and required to provide just such data.

### 2.3 Issues in the development of signed language assessment tool

Following is a brief overview of some of the main issues that have made and continue to make the development of assessment tools for signed languages problematic. These include issues associated with content validity; assessment of psychometric properties; the practicality of administration and scoring; usability; and technical issues.

### Content validity

The first, and in many respects the biggest problem, has been the lack of research into the structure of signed languages. Until very recently—and still in many signed languages—descriptions of grammar have been based on very small samples of signers or simply native speaker intuition. Even less research has occurred on the acquisition of signed languages. Indeed, there is only one study on the acquisition of Auslan by native-signing children (by the author of this report), with that being focused on only one area of grammar. Given this dearth of research evidence, test developers have typically relied on research from other signed languages, making assumptions about the applicability to their own. Therefore, the authors of assessment tools cannot have been sure that the structures they are testing are really those that are used, or most commonly used, in the language that they are seeking to assess. Neither have they been able to ensure that the structures targeted by their assessments have been those that are produced by children at a particular age. This is no fault of the assessment developers, but rather, are a direct result of the next two issues.

### Psychometric properties

A second major problem, which is also a reason for the lack of research, is the size of the population. As discussed above, deafness is a low-incidence disability, and most deaf people are born to hearing parents who cannot sign. Children's linguistic experiences will vary greatly depending on a range of factors such as hearing status of parents, age of introduction to a signed language, quality and quantity of signed language use at home, type of assistive hearing device used (i.e., hearing aids or cochlear implants), and availability of signing models at school (Cormier et al., 2012; Mann & Haug, 2015). This heterogeneity makes many children an inappropriate choice for inclusion in a sample of native<sup>3</sup> sign language users for the establishment of “norms”. Consequently, only about 5% of the already very small population of deaf children that could be appropriately included in such sign language research are actually suitable for inclusion in any normative study. Of the few assessment tools that actually provide norms, most are based on small numbers, and the bulk of the children in the norming sample are

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<sup>3</sup> Remember, native signers are children who have learnt to sign in the family from birth – usually because of having Deaf family members. These children acquire language as any typically-developing child does.

latecomers to language compared to other typically-developing language users (e.g., native users of a spoken language).

### Lack of a written form

Signed languages have no accepted written form. This makes data-mining in research difficult, especially prior to the construction of tagged, machine-readable corpora. Also, because signed languages do not have a written form, the administration of any assessment items that require a constructed response (i.e., as opposed to a selected response such as multiple-choice answers) requires videotaping answers and responses being coded afterwards. As well as being time consuming, this analysis requires a level of grammatical knowledge that most teachers do not have. The freer the response to an item, the more naturalistic the language, however the more variation in answers, and the better trained an assessor needs to be to analyse the sample of sign language reliably.

In an investigation into attitudes of educators of the deaf in the US toward sign language assessment tools (Mann & Prinz, 2006), the most important factor respondents gave for whether they would use a tool is the level of linguistic expertise they would require. The authors concluded that assessments need to be “designed in a way that allows individuals with varying levels of linguistic expertise in a natural sign language such as ASL to administer and score them” (p. 362).

### Test purposes

Most assessments are designed by, and sometimes for, linguists, psychologists and researchers. These professionals may be interested in whether a child has age-appropriate language and perhaps whether there are areas of weakness or strengths. However, they are not typically interested in producing the type of formative information that can guide intervention for development (i.e., providing guidance as to what measurable goal a teacher should set depending on a child’s assessment outcome). It is this type of formative assessment that educators very much require in order to do something meaningful with the results of assessments in an educational context.

### Technology

Finally, a lack of technical infrastructure and expertise has delayed use of computer and internet technology in sign language assessments. Mann and Haug (2015) report that institutions need considerable technical infrastructure in place for online assessments, including a high-speed Internet connection and onsite technical support. Haug (2014)

found that respondents to an international survey claimed technical issues were a major problem for computerized tests of signed languages.

To summarise, the tools that have been created internationally—through no fault of the creators—suffer from several issues that mean they do not meet the needs of our school.

The main issues many of these tools have are:

- a lack of validation through psychometric analyses;
- the tool being unpublished or unavailable;
- there being no Auslan translation or revalidation of the test;
- no norms are provided or norms that are, are based on a non-typically-developing population (that is, late signers);
- assessors require an in-depth knowledge of the structure of signed languages to score, and this is knowledge not taught in teacher preparation classes or anywhere professionals usually go to for professional development; and
- the results from a test do not provide staff with information about which skills a child has and what would be appropriate to target next.

A comprehensive list of available assessments of morpho-syntactic skills of various signed languages is provided in Appendix B. Although each of these tools has particular strengths none of them meet all our needs, the most pressing of which—at least in the eyes of the author—are practicality of administration and the ability to target developmentally-appropriate goals.

### [What is required in a signed language assessment tool](#)

Although all assessments will have advantages and disadvantages, and no single tool will meet all criteria, ideally an assessment for a child’s development of Auslan will have:

- robust psychometric properties;
- a design permitting efficient administration;
- a standard procedure for administration to ensure reliability;
- results that can be analysed in such a way as to provide goals for a child; and
- norms provided so that it is clear when intervention is necessary.

Currently, no test for Auslan or BSL (a related language, British Sign Language) meets all of these criteria. Although the “Assessing Auslan Development” tool (VDEI, 2015)

provides norms these are based on native signers as well as non-native (for the reasons explained above). Further, insufficient information is given for goal setting<sup>4</sup>.

For this reason, we set out to create a new assessment tool that solves many—although not all—of the issues mentioned here.

## 2.4 The online Auslan assessment tool

Features that are original to the tool described here, and that solve issues with previous attempts are:

- the integration of goal setting into the assessment results, allowing teachers without an in-depth knowledge of the structure of signed languages to feel confident about what they should next be targeting with their students.
- the integration of comprehension and production in the one assessment tool. This has occurred in limited assessments created internationally (for example, Hermans et al 2012), but not in Australia or most other countries.
- the online administration. This resolves several issues:
  - access to fluent signing staff in regional areas: the one tool that does exist in Auslan has to be administered by someone fluent in the language and who has attended a course and been accredited to use it. Many areas do not have such staff.
  - ease of scoring: no data entry at the end of the assessment
  - ability to store data to track a student's progress over time.
- the addition of 2 subsections to accompany the main one on the grammatical features of Auslan. These two areas are commonly assessed by Speech Therapists on spoken languages, but as far as the author knows (and as far as is included in the international website that lists all assessments for signed languages), have not been included in any signed language assessments internationally. The definitions of these will be described more in Design Processes), but they are:
  - basic relational terms (sometimes called “basic concepts”) and
  - semantic relations,

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<sup>4</sup> This is not to say such a tool does not have a place in an assessment repertoire for institutions or schools with the personnel to administer it; for example, the data provided in the Assessing Auslan Production is more naturalistic than will be used in the tool described herein.

- the design of a process by which to capture and collect data over the long term in order to be able to describe norms for native signers. In designing a tool to collect data longitudinally, we will be able to provide:
  - a comparison of a student's age and a particular level with the age range of native signers at the same level of skill; and
  - a comparison with of a student's performance with that of students who have been signing for a similar length of time.

This project therefore provides a criterion-referenced tool that can be used to set specific, measurable and developmentally-appropriate language goals for Auslan-signing Deaf students in order to maximise their language learning. It will also allow teachers to know which basic relational terms a child can understand and use, and which need to be taught and will give an indication of their level of processing of semantic relations.

The tool will also function as a standard and reliable mechanism for collecting data over the longer term; to this end, children will be profiled to see their results and progress over time. Further, norms can, in time, be created as a consequence of repeatedly applying the instrument. Thus, eventually, it will be used to inform teachers as to how delayed a child is, as well as whether there could be a linguistic issue other than a delay.

## 2.5 Structure of this report

This report is structured according to the stages in the process of designing an assessment tool, rather than as a typical scientific report. It begins with a statement of the aims of the project, the original research questions and the slightly adapted questions. The main section of the report will be divided into the stages of the design process: conceptualisation, construction, piloting and analysing, and then revising. The author will explain what has occurred and what still has to be done, as well as how the final stages will be achieved. Throughout the project, the literature of several areas has been reviewed: the acquisition of languages and signed languages in particular, the acquisition of basic relational terms, the design of assessment tools, and in particular psychometric testing. The review of each area of literature will be included in the description of each stage of the design process.

## 3. Aims & research questions

### 3.1 Aims

The main aim of this project was to develop and trial a valid, reliable and practical formative assessment tool that can be used to assess deaf children's level of Auslan ability and assist in goal setting for intervention. Specifically, the intention was to adapt (i.e., from existing valid instruments used assessing for sign languages internationally) and, where necessary, develop a tool that can be administered by professional staff (teachers and therapists) with minimal training, in order to provide appropriate goals for educational intervention.

We also aimed to create a process for storing results such that in the long-term norms can be created based on the stored data. This was in order to collect much-needed data on the order and timing of the development of structures for children learning Auslan either as native-signers or as late-learners.

### 3.2 Research questions

The original research questions were:

1. Do the materials used in the new online Auslan Assessment being piloted reliably elicit the target structure in each item?
2. Does the new online Auslan Assessment tool have sound psychometric properties. Specifically, evidence was sought and verified to determine:
  - a. Are the test items of appropriate difficulty with good item discrimination?
  - b. Are the distractor items used are effective?
  - c. Is overall test is reliable and appropriately homogenous?
  - d. Does the overall test have content validity?
  - e. Do professionals who use and score the test demonstrate high inter-rater reliability scores relative to various levels of training?

These questions have been re-ordered and elaborated as the project has progressed although still related to psychometric testing. They are now:

1. Does the assessment show evidence of content validity and how is that shown?
2. Does the item analysis show that:
  - a. the test items are of appropriate difficulty with good item discrimination?
  - b. the distractor items used are effective?

- c. the overall test is reliable and appropriately homogenous?
3. Do children who are acquiring Auslan on a delayed timetable follow the same orders of development of various areas of grammar or are there differences?

The focus changed for two reasons which will be explained in more depth below.

However, briefly, the reasons are that: the tool's design changed from what was originally envisaged, such that the teacher's role in scoring is now simply a fixed-choice answer, making it more reliable and the issue of training less relevant; and that questions arose as to the validity of assuming late-signers would follow the same developmental path as native, albeit with delayed timing. This last question is one that will not be answered until there data has been collected for a few years.

The design of the assessment tool was the major part of the project. It was originally envisaged—optimistically—to be about half of the project. In reality it has consumed the full 2 years. Some of this is because it simply took longer than planned, especially with regards to item creation and what was required for a software developer to code the tool according to the design features. However, it was partly due to increasing the coverage of the test, which will be explained below in the conceptualisation phase of design.

## 4. Design process & literature review

There are five stages to the development of a psychological test, the final three of which repeat until the tool is finalised: conceptualisation, construction, pilot, analysis, and revision (Cohen et al. 2013). The phases are not discrete, however. Conceptualisation overlapped with construction, and construction is currently overlapping with piloting. The analysis and revision will be discussed below, although the project is only in the initial stages of these phases.

### 4.1 Conceptualisation

During the conceptualization phase, decisions were made about:

- the purpose of the assessment;
- who administers the assessment, and to whom;
- what is measured and how;
- how it is administered;
- what format the test takes, including whether there is more than one form;
- and how meaning will be attributable to scores.

### Surveying existing assessment tools

A major task in the first year of the project was a comprehensive survey of the main standardized assessment tools that target language—albeit spoken languages—used by speech therapists for deaf children or children with language delays or disorders. A table of tools was compiled from the author’s experience, as well as from talking to speech therapists and other teachers of the deaf and searching various publications on assessment tools for deaf children, such as the excellent guide from the National Deaf Children’s Society in the UK (2017). This was done to ascertain what content is typically included on standardised language tests for children. After compiling a list of relevant assessments, the assessments were examined for areas of content, population assessed and various other features. Appendix C shows the table of assessments surveyed.

It became clear that merely eliciting items focussed on the structure of Auslan (the “grammar” in lay people’s terms) meant much of the skills in language that are not necessarily language specific were not being measured. These areas are particularly beneficial to assess, as they allow for a comparison of a student’s Auslan and English more easily. In addition, these areas of assessment are usually included in assessments whose primary purpose is to establish whether a child has a language disorder, and thus was important information for the online Auslan assessment tool.

As such, several areas were considered for inclusion that had not been previously: the acquisition of basic relational terms, semantic relations, working memory and higher-order comprehension.

### Surveying Teachers of the Deaf

As a result of a presentation at our very first School-Based Research Project workshop on Knowledge Translation, the decision was made early on to survey teachers of the deaf within Australia on what they would like in an Auslan assessment tool. The survey was distributed by email and through a link to Survey Monkey. 30 teachers responded which is a reasonable number given the fairly small group of applicable practitioners, especially that could be reached through networks (those involved in the Deaf community and in a larger school). A copy of the pdf version of the survey is attached in Appendix D.

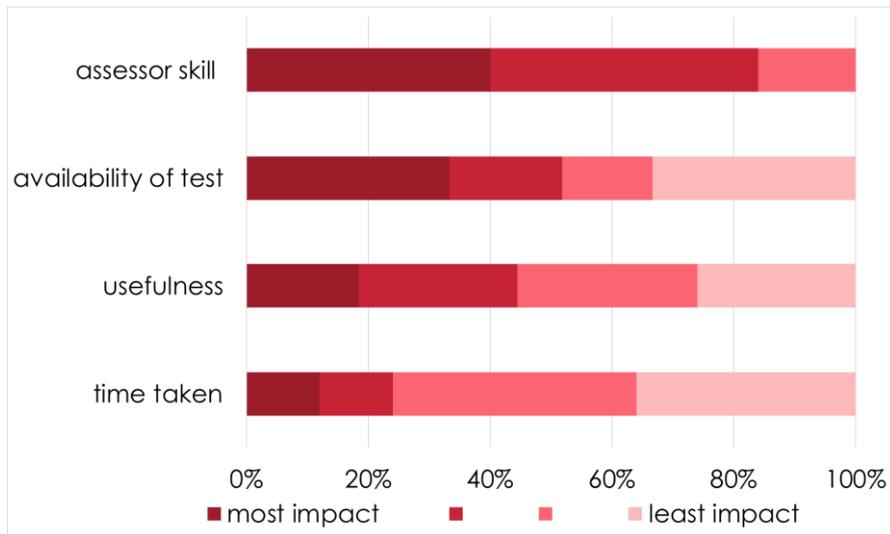


Figure 4.1 Percentage of teachers of the deaf on factor ratings for impacts on why Auslan is not assessed more in their schools.

As can be seen in Figure 4.1, 40% of teachers rated the level of skill of assessors as having the most impact on assessment decisions, whereas few teachers considered the time taken to score an important factor. This survey confirmed for me that what is wanted is an assessment that can be scored by a wider range of professionals.

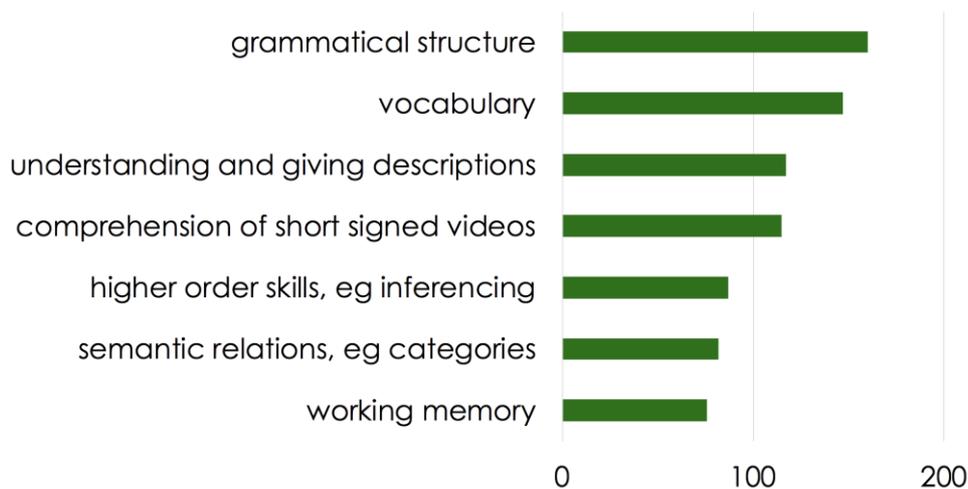


Figure 4.2 Preference-ranks as weighted votes for content areas desired in an Auslan assessment tool

Voting preferences for areas of grammar were given a weighted score and the results are shown in Figure 4.2. It was clear that the grammatical section of the test and vocabulary were seen as most important, and higher order skills, semantic relations and working memory were the least preferred. These 3 areas are included in assessments used by speech therapists in spoken language tests but have not traditionally been evaluated by

teachers in sign language tests and checklists. Some of these skills were merged into the grammar section, such as comprehension of some short, signed videos and brief descriptions. However, it was decided that it wouldn't be possible to devise a simple, real-time scoring system useable by less fluent staff for a child giving full descriptions. Teachers expressed a strong desire for a vocabulary test but this was also excluded from the design as a very good one exists in BSL that could be translated into Auslan by someone familiar with test adaptation without too much trouble.

Perhaps the most valuable findings came from the extra comments that teachers made (see Appendix E), which gave me a much richer understanding of all of the reasons for which teachers assess Auslan in school students. There were several great suggestions that were not practical, for example including even more areas such as pragmatics or conversations (then the issue of the skill level of scorers becomes insurmountable); or the inclusion of related resources for how to target the areas (this is something I intend to do but this was outside the scope of the project). There was also the very good suggestion not previously considered of including a subsection assessing fingerspelling.

#### [Discussions with mentors on assessment design](#)

In the initial stages of conceptualisation, the author worked closely with two mentors from Europe who have made similar tools—and one is beginning to remake his in 2019—who were and are able to provide very practical advice. These mentors were essential to be able to discuss some of the recurrent issues in the assessment of languages in general and the extra issues with assessing signed languages with no written form (such as getting a natural sample, while making it easy to score, or how to engage younger children in formal assessments).

My original plan was that the assessment tool would record the students' signing samples, and teachers would then go back and watch the clips and score them. However, the advice of my European colleagues was that this introduced many problems:

- It would be hard to get children to sign “at” a screen not a person.
- Scoring would take much more time, and therefore the tool was far less practical.
- The types of features requiring this style of scoring would rely on more fluent signing skills than many of the teachers possess; and finally
- There would be issues with the software development and hardware required for recording the data within the platform.

Therefore, at an early stage of the project we decided the test would be scored in real time and responses did not have to be filmed.

However, we still wanted the tool practical to use, and therefore not require a great deal of training. Figure 4.3 shows some of the ways data is collected in language assessments. There is always a trade-off between how naturalistic the data is, and how difficult it is to code.

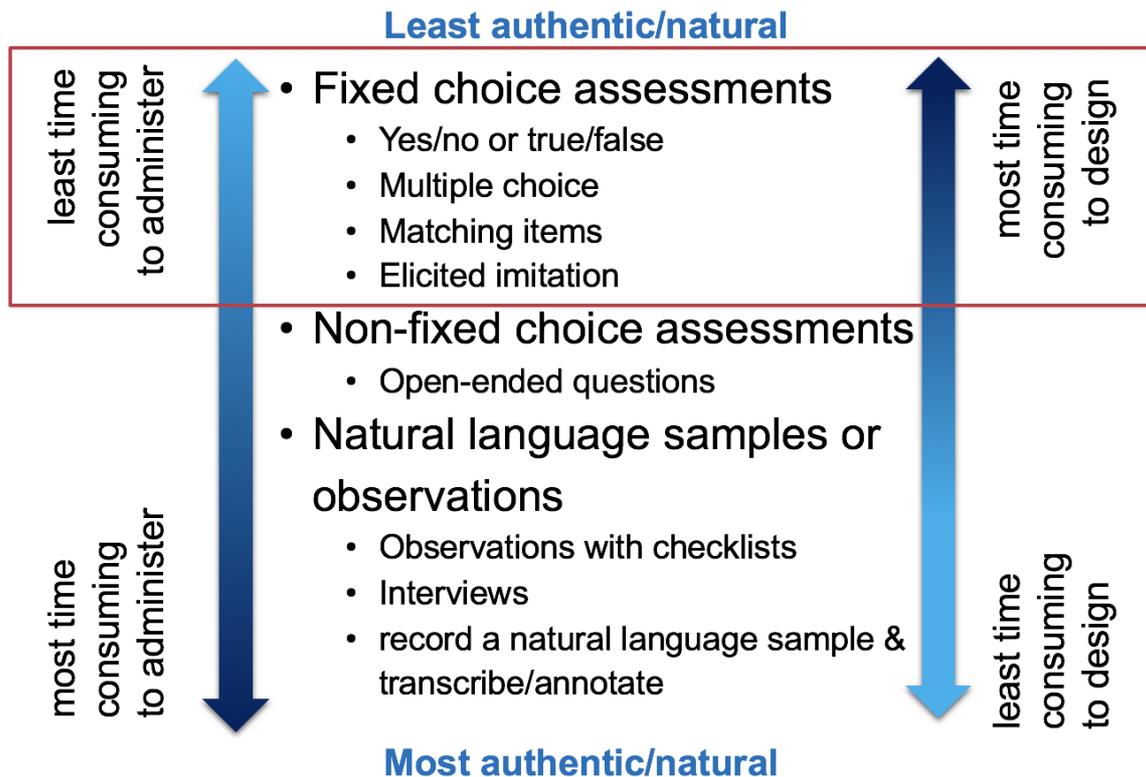


Figure 4.3 Methods of language assessments and features of each

In creating a tool that would be practical to administer, the language data collected becomes less authentic and contextualised, and that targets very specific structures. The decision was made to have all test items (questions) consist of fixed choice answers, or very short constructed answers. What was lost in “naturalness” of language was gained in ease of use and ability to be scored by a wider range of professionals. This means that the items need to be much more finely specified. This also meant decisions would have to be made on the range of answers a child could give, adding an extra step to the design process. The answers would have to come from a pilot group’s answers, as well as previous research where re-using elicitation materials.

The other advantage of having fixed-choice items is that the test administrator has far less opportunity to interact with the child. The “Observer’s Paradox”<sup>5</sup> is a well-known issue in the elicitation of language. Labov (1972)—who coined the term—explained that the “aim of the linguistic research in the community must be to find out how people talk when they are not being systematically observed; yet we can only obtain these data by systematic observation” (p209). Since the test administrator is very likely to be a hearing person, who has lower signing skill than the child and certainly lower than a native language user, there is a real risk of the child unconsciously code switching and using a more English-like style of signing and maybe even some spoken voice. This is fine if we are assessing what they do bimodally, but that is not the purpose of this test. In order to evaluate their best and most natural performance in Auslan, they need the input they see to be from a native signer, and therefore from the computer application. This will minimise the test administrator having an effect on the child but cannot completely remove it.

As a linguist moving back to teaching, one of the issues the author has been keenly aware of is the lack of understanding of how English or European-language-centric many assessments are. Australia is a country where most practitioners are not bilingual (unlike the majority of the world) and this creates an unconscious belief that how things are in English is how they are in other languages<sup>6</sup>. There is a tendency to think that each word, phrase, or sentence can be translated, and the same type of structure will result.

Relying on tests designed for English, even if they are “translated” into Auslan, has serious flaws. The ways in which different languages describe putting on clothing will now be shown as just one example of the many examples of how languages differ in fundamental ways. Bowerman (2005) has studied early verbs of dressing cross-linguistically and found large differences in the way people unconsciously categorise actions. In English, the phrase “put on” is seen by English speakers to be a single concept as we have a single word, regardless of which item of clothing or accessory is being talked about. However, speakers of Yoruba have one verb for putting clothing on your head, and another for the rest of the body. Tswana speakers similarly have 2 words:

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<sup>5</sup> this is not to be confused with the Observer Effect from the field of Physics.

<sup>6</sup> In its worst form this bias is more conscious and a belief that the English way is superior and other linguistic forms are somehow less capable of expression: a common view that comes out when discussing Auslan with teachers or therapists who do not sign.

one for the torso and one for extremities (all non-torso clothing). Korean and Japanese each have 3 different verbs. See the diagram below from Bowerman (2005).

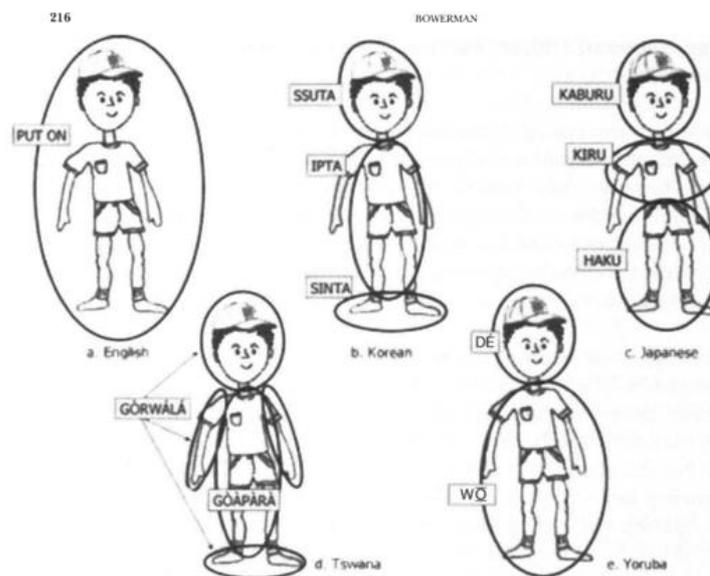


FIG. 9.1. Categorization of acts of putting on clothing in several languages.

Figure 4.4 Bowerman’s figure for conceptualising “putting on” clothing in 5 different languages.

Auslan is most like Korean in terms of verbs to describe putting on clothes: there are 3 ways one can sign putting on hats depending on the type of hat, a verb that means put on a top or dress, another that means put on pants, another for gloves, another for shoes. Thus, any assessment items using the phrase “put on” would not get the same result in Auslan and without being validated, we cannot know if it results in an item that is easier or harder for a child than the equivalent in English. This is but one example of a multitude; the majority of items are problematic for translation.

It is therefore crucial that the language and structures chosen for inclusion in the assessment was based on Auslan. This was harder than it seems. There were times when the author would spend some time trying to work out *how* something could be signed and assessed until one of my native-signer informants<sup>7</sup> would remind me that it simply cannot as that was not a structure used in Auslan. Where possible, keeping the concepts to be assessed similar to those in English was a good thing, as it allows for comparisons. However, nothing was chosen for inclusion if it was not something native

<sup>7</sup> An informant is a term linguists use for native users of a language who act as a reference.

signers felt was natural to sign or which was not shown in searches of the Auslan corpus (see the second on Construction Grammar).

The areas that were chosen for inclusion were based on surveying the literature, tools for assessing English and talking with mentors and native signers. These areas were then divided into 3 main subsections: one for the grammar (or form) of Auslan; one for basic relational terms; and a final one for semantic relations. The report now turns to the conceptualisation of each of these in turn.

### Conceptualisation of the grammar subsection

It would be impossible in any assessment to design items to test every construction or feature of the morphosyntax of a language. Part of deciding what must be measured involves decisions on the structure of language, and this must reflect current research (Bryen & Gallagher, 1991), so the design phase necessarily involved an extensive search of the literature on the structure of Auslan.

In recent years, language teaching and assessment has made great strides in sourcing and using authentic data through the use of corpora. This is particularly so for spoken languages which can be automatically tagged and also have a written form. In the analysis of signed languages, such corpora have only very recently been created as each and every sign must be manually tagged in order for searches of features to be possible.

As noted by Cushing (2017), analyses of corpus data are essential in all stages of design and validation of assessments in order to:

- allow detailed examinations of linguistic features;
- check intuitions against empirical data;
- decide which features are important or frequent; and
- create authentic language examples and distractors.

Thus, some information on structures has been sought by analysing the raw data from the Auslan Corpus<sup>8</sup>. This allows us to set realistic targets for the child's responses to grammar items, even if we do not yet know at what age a child will master the structure.

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<sup>8</sup> This is a large collection of videos of native signers of Auslan, linked with machine-readable linguistic annotation files (Johnston, 2008). Hans Rausing Endangered Languages Documentation Program (SOAS, University of London) language documentation project awarded to Trevor Johnston — #MDP0088.

However, the use of corpus data is not without issues. Egbert (2017) discusses some of these issues, including that corpus data is at the very naturalistic end of a continuum of language use whereas most assessments (and particularly, the style of assessment we are creating) are less naturalistic.

In recent years, Trevor Johnston and colleagues in Australia have led the field in corpus research into adult native signers (de Beuzeville et al, 2009; McKee et al, 2011; Hodge & Johnston, 2014; Johnston et al, 2015). As such, there is now a large amount of the corpus data available that has been tagged, as well as papers written on various features of Auslan grammar.

Appendix F shows all papers published on the Auslan corpus relating to the structure of Auslan. Decisions made after reading the papers were to include the areas of:

- Depicting signs (divided into 3 categories, entity, handling and SASS)
- Use of space for establishing and maintaining referents in discourse
- Use of constructed action
- Non-manual features for indicating manner – in particular mouth patterns
- As well as items to assess a child's understanding of sign order.

Another task that was carried out during the conceptualisation phase was surveying the literature for articles on the acquisition of any signed languages worldwide with the following criteria:

- there were at least 3 native-signing children in the study; and
- it was published in a peer reviewed journal or conference proceedings, or
- it was an unpublished dissertation.

Some areas required a wider search of the literature as no studies fit these criteria, but there were papers with single children studied so these were included but cited to show that. In all, about 150 studies were found and were read (or re-read in the case of about half of the papers).

All of the papers were annotated in a matrix in excel recording any information given of what children could do at particular ages. In addition, in the reference list I recorded notes on methodology, number of participants in the study (and whether they were the same group of children as other studies, which often happens in the field) and what basic area the paper looked at. This allows me to cross check papers if there were contradictory findings (on the few areas where there have been more than one study).

The Auslan Developmental Expectations and Goals Matrix is a good overall view of all areas of grammar studied. Appendix G is a sample from the matrix as it currently looks<sup>9</sup>. This will be polished and released in full with the assessment tool. Each column represents an age range, and each row is a different area of development.

These rows, or developmental sequences were then operationalised into 5 arbitrary levels in order to decide on linguistic behaviours that could be observed to show a child was at that stage. The behaviours were then used to design items for the assessment, as well as goals to move the child on a stage. Below is an example of the types of behaviours and goals. All cells will be re-written eliminating as much jargon as possible to be clear to a wider audience.

	1	2	3	4	5
what child does		<ul style="list-style-type: none"> <li>understands basic manipulative handling DSs for single person, single handshape</li> </ul>	<ul style="list-style-type: none"> <li>Can choose which object is being talking about in a handling DS based on the handshape for commonly shaped objects</li> <li>simple transfer DSs: 1 person, 1hs/object</li> </ul>	<ul style="list-style-type: none"> <li>Can choose which object is being talking about in a handling DS based on handshape for less commonly shaped objects</li> </ul>	<ul style="list-style-type: none"> <li>understands to whom an object is being transferred, based on the direction of a handling DS &amp; what obj even in complex Vs</li> </ul>
next receptive goal	<ul style="list-style-type: none"> <li>mov manip - understand basic manipulative handling DSs based on mov't: single person, single handshape</li> </ul>	<ul style="list-style-type: none"> <li>understand what object is being handled from what handshape is shown for common handshapes</li> <li>understand where in simple handling DSs of transfer (1 person, 1h)</li> </ul>	<ul style="list-style-type: none"> <li>understand what object is being handled from the handshape for less common handshapes</li> <li>understand who an object is transferred to in simple handling DSs</li> </ul>	<ul style="list-style-type: none"> <li>understand what object is being transferred based on hs with complex 2 person transfer Vs</li> </ul>	<ul style="list-style-type: none"> <li>understand who to based on the mov for plurals</li> </ul>

Table 1: an example of the operationalising of acquisition data into testable stages

### Conceptualisation of the basic relational terms & semantic relations subsections

From the survey of tools used by speech therapists for English language speakers, and from the author's experience teaching in a unit for students with a Specific Language Impairment<sup>10</sup>, it was deemed necessary to include items that covered a wider area than the form or grammar of a language.

<sup>9</sup> Although I have already shared the matrix widely in various forms, before making the final version shown here public, there needs to be a full tidy and check of references etc.

<sup>10</sup> This was the term current at the turn of the century when the author taught there, but has now been replaced with the label Language Disorder.

## ***Relational language***

In order to discuss this section, it is necessary to define it, which is a difficult task. This area of development has been variously called: basic concepts, relational terms, relational terms, spatio-temporal terms and other phrases, but it is a rarely defined and somewhat amorphous concept that is often confounded with English grammatical categories (prepositions and adjectives). Generally, it is “agreed that these terms do not themselves refer to entities, states, or situations; and they express a relation between various entities, states, situations, or linguistic units” (French, 2014).

What is clear is that such language is not basic, and the purpose of this assessment is to assess the student’s comprehension and production of the language used for the concepts, not the concepts themselves. Therefore, in this assessment tool the term “relational language<sup>11</sup>” will be used to describe these terms.

Which terms are included in this type of language varies among researchers and teachers, as does their categorisation. A database was created of all of the terms included in this type of language in all of the assessment tools surveyed (for English).

These were then sorted into 4 main categories:

- Qualitative terms such as big, medium, small, new, old, heavy or light
- Quantitative terms such as all, some, none, full or empty
- Spatial terms such as in, on, under, through or between
- Temporal terms such as before, after, sometimes, or soon.

The author then went through each term and considered it for inclusion. For this and all checking of individual signs, and meanings, the author never relied on her own knowledge, as she is a second language user of Auslan. Instead constant reference was made to the Auslan Signbank (<http://www.auslan.org.au>), and discussions had with the native-signer consultants. Words that had a fairly direct 1:1 translation equivalent and were considered to be used frequently in Auslan by native signers were an easy inclusion in the assessment, such as OLD<sup>12</sup>.

In general, the qualitative terms were fairly consistent with English, some quantitative and temporal terms were, while others differed, and the spatial terms often have

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<sup>11</sup> Despite not feeling comfortable with the term, in previous reports this was called “basic concepts.”

<sup>12</sup> Because there is no written form of Auslan, signs are represented by an English gloss; this does not mean the terms are equivalent, but that the meaning is similar, and it is an appropriate tag for a sign so that data can be machine-readable.

translation equivalents but that have very different functions and uses to the words in English (to be discussed below.)

Once this list of signs was compiled, data was analysed from the Auslan corpus for the Auslan lexical signs, for example those represented by words such as BIG, MANY or ALWAYS, as well as for those words in the English translations of the Auslan to see what was signed when interpreters used those English words. Also available was the raw data of children's acquisition of some of the terms from American and British Sign Language from Wordbank<sup>13</sup>.

A review of the literature on the acquisition of relational terms cross-linguistically was also carried out to record any ages mentioned, as well as the hierarchical ordering of any features of the terms, such as children learning big before small or long, long before short and so on. These orders or ages are not black and white. Decisions over whether a child has "acquired" something depend on how that is defined: receptive or expressive use? 50% use in environments requiring it or 80? Some senses understood or all? Although this allowed the terms to be sequenced by potential age of acquisition, such a sequence is not yet being assumed; the data collected over the next few years will guide whether the order will be taken as valid.

Appendix H shows the full list of terms that were originally considered for inclusion in the assessment. Some terms were eliminated as they were deemed less frequent in Auslan than English, and a few were eliminated because they were difficult to elicit in the format of test being designed here (for example, eliciting the production of SINCE or WHILE.)

### ***Semantic relations***

There is strong evidence that semantic knowledge is organized categorically and functionally and there are neural networks between words depending on these categories and function words (Rhodes & Donaldson, 2008). However, semantic organisation has been shown to be impaired for children who are deaf or have a language disorder and to correlate with language skill in general, and also reading (Marshark et al, 2004; Mayberry, 2002, 2006; Chamberlain & Mayberry, 2008; Mann & Marshall, 2012). Assessing this area will assist in identifying students who are struggling so that the skills can be addressed more explicitly by teachers.

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<sup>13</sup> downloaded from <http://wordbank.stanford.edu/>

According to Richard & Hanner (1995), there is a hierarchy of skills in these semantic relation tasks, although it isn't clear where the data for the proposed hierarchy comes from. It was decided, as with relational language, to order the items according to the proposed hierarchy, but not to assume it is correct until data in Auslan has been collected.

### Final structural conceptualisations

From the above areas of investigation, as well as consulting the literature on methods of language assessment (Bachman & Palmer, 1996; Bracken, 2004; Capone, 2010; Coaley, 2014; Cohen et al, 1996; Fulcher & Davidson, 2007; Geisinger et al, 2013) final decisions were made on test conceptualisation as follows.

#### ***What will be measured and how?***

After looking at all potential structures, surveying the literature and corpus data, and having formal and informal discussions with native-signers, consideration was made as to which structures would be easily elicited and scored within the test design requirements. The test will have 3 subsections:

- Grammar;
- relational language (qualitative, quantitative, spatial and temporal terms); and
- semantic relations.

Appendix I shows the table for the subsections as well as an earlier conceptualisation of sections.

Testing will be via fixed answer items presented on a computer screen. In order to cue the child in to the types of structures being elicited, items will alternate between receptive and expressive (so the child first sees a similar structure). This means children will be using their hands to sign throughout the test, and thus they must be free. The test standardisation will include instructions that the child must use a laptop or table with a touch screen for their part of the assessment.

Originally, it was hoped the tool could be dynamic, so that a basal and a ceiling could be adjusted as a student took the assessment. However, in discussing issues with designing a sentence imitation tool in Italian Sign Language, Rinaldi et al (2018, p12) warn: "We believe that when dealing with a signed language that is analogous to types of "oral" minority languages with wide variability among users and a low level of standardization, it is very difficult to trace "a priori" norms and establish the level of difficulty of specific

items. When the linguistic aspects to be assessed are distributed across items, it is therefore preferable to administer the entire test (given the test duration is not too long) rather than to establish start and end thresholds.” In consultation with the European mentors it was agreed that at this stage all students would complete all questions at least for two years. If, after that time, it’s found that children are stable with their answers, the assessment tool will adapt to each child’s previous responses and responses as they do the assessment so that they only need to complete the items at their level.

### ***Who will administer the assessment and to whom?***

The test should be able to be administered by any professional working with the deaf students. Although it is preferable that they are tested by a deaf person, particularly one fluent in Auslan, recognition is given to the fact that this is not always possible.

The test is being designed for children for whom Auslan is a first or primary language. Whilst there is no problem with someone creating a separate platform to modify the test for hearing children, in order to keep data collection simple, teachers will have to register to ensure the assessment as programmed by us is only being used for deaf children.

### ***For what purpose***

The purposes are many:

- To identify the skills a child has in Auslan, and what they should learn next
- To track their development over time
- To collect data so that in the future they can be compared to “norms”

During the conceptualisation and construction of the tool it became clear that the developmental path being assumed were based solely on the acquisition of children learning the language from birth. This is appropriate to set age goals, because we should aim for all deaf children to learn language at the appropriate time for their age. However, it doesn’t mean they will follow the same order, since later learners have more developed cognition and gross motor skills than babies and toddlers. Thus, data needs to be collected and “norms” created to compare children to others of a similar age and stage of language learning, and also to provide sequences of development that are valid for that population.

## 4.2 Construction

### Vocabulary decisions

All vocabulary used in the grammar section had to be simple enough to be known and used by the youngest children, since the purpose of the assessment is the grammatical structures, not vocabulary knowledge. In addition, attempts were made to limit vocabulary items with consistent dialectal differences to minimise how many versions of items would need to be filmed<sup>14</sup>. It was also important that the signs used were frequently used to children, so that they were likely to have acquired them earlier. Data on frequency and age of acquisition came from various sources including:

- a BSL norming study (Vinson, Cormier, Denmark, Schembri & Viglococco 2008)
- lexical frequency in Auslan as found by Johnston (2011)
- subjective frequency ratings of signs from ASL (Mayberry et al, 2014)
- Age of acquisition ratings across 25 languages (Magdalena et al, 2016)
- Author's experience teaching students of this age group and signs they know, and
- Various standardised lists of early vocabulary for hearing children, such as the Macarthur Bates Communicative Development Inventory

One further issue with vocabulary was iconicity. Some signs bear a physical resemblance to the object or action they refer to. These are called iconic signs. For items where a child had to simply recognise a label, it was important to make sure they were not simply matching the shape of the sign rather than knowing it. Hermans et al (2010) came up with two methods to avoid this. Firstly, the picture chosen that is the target should be presented in such a way as to not match the signs. Secondly, distractors should also match the sign form. So, for example, below is the sign for rabbit, along with pictures of: a rabbit but not presented with ears up, a donkey that *is* presented with ears up, and two more animals matching either the perspective (side vs front on) or the ear position (up vs down).

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<sup>14</sup> There are big dialectal differences in Auslan due to the geographic differences and importantly, the first school for the deaf being set up in Sydney by a deaf Scottish man, and shortly after in Melbourne by a deaf man from London. Terms that differ are colours, some numbers, and many other signs.

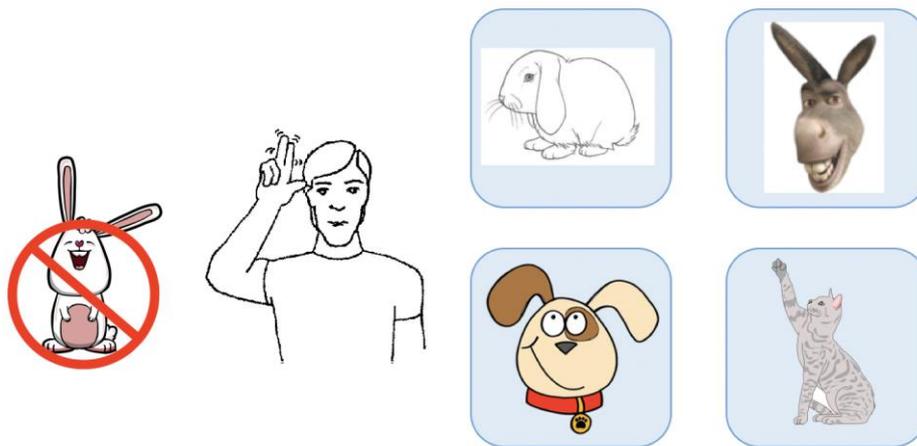


Figure 4.5 The sign for rabbit, and item responses avoiding the issue of iconicity

Another issue was the frequent existence of two signs for the one concept where one sign shows an action using an object or performed on an object, and the other shows perceptual features of the object. For example:

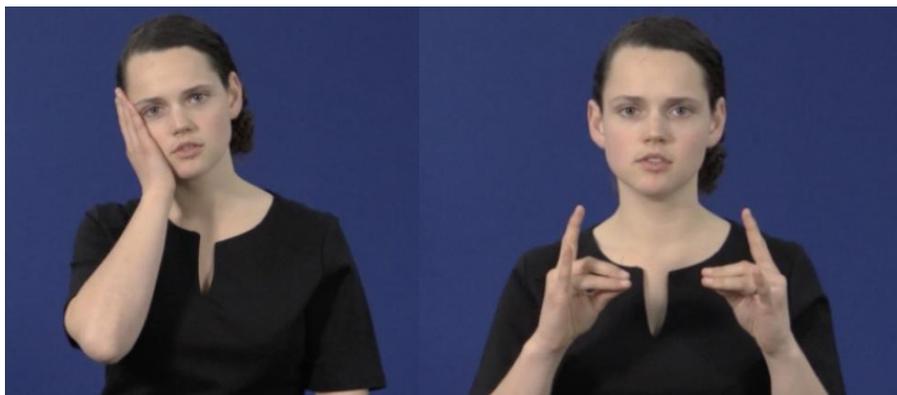


Figure 4.6 two variants for bed: the first shows the action of sleeping, the second the form of a bed<sup>15</sup>.

Ortega et al (2017) analysed signs that had these two types of variants and found that young children favoured the action-based signs, while adults favoured those showing perceptual features. Adults communicating with young children increased the proportion of action-based signs. Given that the assessment will cover a large age range from 4 upwards, where iconicity wasn't an issue, the decision was made to use the action-based variants. However, if the form of the sign would aid the child such that they would be able to use its features to work out an answer then the perceptual-based sign was used.

<sup>15</sup> Still taken from Auslan SignBank ([www.auslan.org.au](http://www.auslan.org.au))

### Construction of the grammar items

The design of the actual items was a very time-consuming and challenging task. Each and every item had to test exactly one skill or grammatical feature and no other, so the language used had to be very carefully designed. It also had to seem natural, despite consisting only of short phrases (with as many items as there are, there couldn't be long passages per item).

Transfer and adaptation of existing tools has been shown to be effective as long as it is not done uncritically (Mann & Haug, 2015). Consequently, ideas were gathered from the Assessment Instrument for Sign Language of the Netherlands, and a few other research elicitation tools, in particular the pictures used to elicit depicting signs from deaf children in Schick (1987, 1990), particularly since these have already been used on Auslan-signing children in de Beuzeville (2006).

Clause ideas for items also came from searching the Auslan corpus, as well as the BSL corpus (Schembri et al, 2017). All clauses from the corpus had vocabulary changes to better match the vocabulary and topics of young children. Other clauses were designed by the author and then checked and modified by native-signer informants or a native-signer informant thought of a phrase.

In trying to find ways to elicit some structures it became apparent that several grammatical features could be merged into two sections in the grammar part of the test. Firstly, it was clear that it would be difficult to assess constructed action in a valid way in the confines of the text structure. As such some skills were merged with the section on establishing and maintaining referents in discourse, and others were eliminated.

Additionally, non-manual features and sign order was merged into a section on the comprehension and production of single clauses that would include:

- use of the sign finish as a perfective,
- some verbs showing for aspectual modification,
- some non-manual features that can be modified to show manner and also
- some items assessing word order.

It was also necessary to design 4 potential answers for each expressive item the child responded to, since the teachers were only choosing from a fixed set. For some areas, namely the 3 types of depicting signs, this was able to be done as de Beuzeville (2006)

had got responses from a large number of children already and items to replicate were intentionally chosen that had only a small amount of variation. For other parts of the test, at this stage it has been based on the intuitions of native-signers and the author, and piloting the test will help refine these possibilities.

### Construction of the basic relational terms and semantic relations subsections

The initial analysis of assessments for spoken languages was at a broad level. In constructing these subsections, a more detailed survey was carried out on these tools to get ideas for eliciting various features of language. There were few which could translate well or at all, but it was still a worthwhile process to see the types of items used on younger children.

As was the process for the grammar items, the Auslan corpus was consulted, this time for use of quantifiers and temporal terms, and native signer informants checked all items.

### Design for software development and illustrators

It was crucial that time is spent during this phase designing a test that is easy to administer, and that will not require a great deal of training to score. In hindsight should have worked closer with digital innovation team earlier to ensure what I designed was programmable as it took some time to find a developer who was able to synch the teacher and child screens in the way that was necessary for this tool to work<sup>16</sup>.

Most recently the author has been working closely with the graphic designers and web developers at RIDBC on question logic (see Appendix J for an example) and working out a structure for the whole platform and databases for storage.

It was envisaged that our design team would be producing most of the visuals, however due to the enormous number of illustrations needed, the funding for travelling interstate to pilot the test has been redirected to hire an illustrator to produce these<sup>17</sup>.

In consultation with the digital innovation team at RIDBC, the plan for an app has been changed to a responsive web application. This means only one set of programming

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<sup>16</sup> I'd like to acknowledge Sailor Studios here for working out a solution at their own cost and time before accepting the job.

<sup>17</sup> Free clipart cannot be used because the pictures are being designed so that they are suitable to use with students with a vision impairment (something that cooccurs with deafness for some syndromes).

needs to occur, rather than for iOS and Android. It is also more stable as software updates do not need to occur as often. The website will look like an app for the student with the iPad, and for the teacher on the other side.

The test administrator (that is, the teacher) will control all screen changes in the test. Items will alternate between receptive and expressive. For receptive items, the student will see a screen with 4 pictures, then watch someone signing, then see the 4 pictures again and they have to choose one of them. The teacher sees the child's response and then presses an arrow to advance to the next screen. This will be an expressive item. Here, the child sees the deaf person on the screen asking a question or telling them something. They then give a response. The teacher, being opposite, sees that response and then classifies it as one of 4 options that only they see. They then advance again. Figure 4.7 shows an example of a receptive screen, and 4.8 an expressive.



Figure 4.7 A mockup of a receptive question for the student – the question is signed and then they see the 4 options

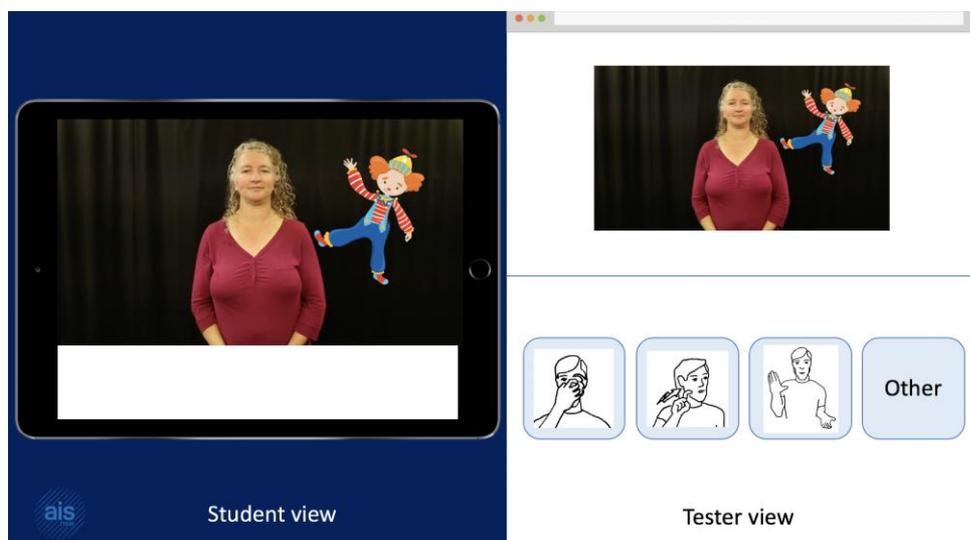


Figure 4.8 A mockup of an expressive question – the student's view and the tester's view

### 4.3 Pilot, analysis, and revision

The plan was to have finished the pilot and analysis by the end of 2018. However, due to adding extra sections, and underestimating some of the tasks, the piloting will be carried out at the start of 2019. Some work of the pilot has begun in so far as the items—as the visuals become available—are being trialled on native-signing adults and older students who will not be in the actual tool use and data collection stage of the pilot. This preliminary testing is being carried out to ensure the items and materials elicit the target structure and also to check the range responses given.

Individuals have been identified for the pilot which will run when the software development is complete. In order to test ground and ceiling effects of items and usability issues, children will be selected for a wide range of ages (preschool to early high school) and language skill levels (native signers, early signers and late signers). A number of students will also be assessed from rural NSW or Queensland in order to test that the tool can be reliably scored by teachers in more remote locations who haven't had access to professional development on the structure of Auslan and who are less fluent users of the language.

#### Data analysis

A range of measures will be used to test for reliability, validity, and standardisation. Individual item responses will be analysed using SPSS for difficulty, discrimination, effectiveness of distractors. During the analysis of the children's results it may be necessary to change or remove some items and problems with scoring will be encountered. The children's results will be analysed to eliminate items that:

- are too easy for the youngest children or too hard for the most advanced;
- are considered problematic by adult native signers;
- allow too wide a variance for answers for the expressive part;
- do not reliably elicit the target structure; or
- were considered too hard to score.
- Any visuals – especially foils – that were not chosen by anyone may be adapted.
- Analysis of the constructed answers will be important to document the variability that may occur in responses in order to pilot and document scoring procedures.

The test results will also be analysed for evidence of homogeneity and reliability. For reliability a test-retest to show a correlation will be used and/or a split-half analysis. For

inter-rater reliability we will analyse the scoring agreement between a video of the child being scored after the assessment and the live scores.

At its simplest, validity can be said to be a measure of how appropriate and useful an assessment is for a particular purpose. Rather than the test being validated, it is the scores and use of them that must be (Sireci & Sukin, 2013). Part of content validity is editorial item review (Wendler & Burras, 2013). This requires that each item is reviewed; in the case of this assessment each item was reviewed by a native signer, experts on signed language acquisition and assessment (the European mentors) and the author.

For criterion validity arguments, the scores of the pilot group of students will be compared to those taken concurrently from the “Assessing Auslan Development” tool (VDEI, 2015) to provide evidence of relations to an external variable. Additionally, since the VDEI tool does not cover all of the same areas, teachers at Thomas Pattison School will be given a subjective rating scale to complete on their students to compare with the results.

After the piloting and item analysis, the assessment tool will have final revisions made and be adapted to run on the internet so that data can be collected for future norms.

## 5. Where to next

The next stages of are:

- Finalising the visuals with the illustrator
- Working with the software developer to trial the test and work on the user interface
- trialling the items on native signing adults to a) get some targets and b) assess the success of the items in eliciting the structure.
- writing testing procedures in order to ensure reliability.
- Piloting the tool.

It is anticipated that by the mid-late 2019, final revisions will have been made and information can be provided to teachers of the deaf so that the tool would be available for use by other schools not involved in the piloting and data can begin being collected for norms.

## 6. Conclusion

This project has largely met the aim of creating a valid and practical formative assessment tool. The majority had to be created from scratch due to the design making most items on other tests unsuitable. Piloting and reliability studies have not yet been completed but will be in 2019. A process and platform has been created to store results long-term and the software development will continue over the next few months. It will, however, take a number of years to collect a sufficient amount of data to provide norms.

This tool will be significant for the education of children using Auslan as a first or primary language. It will allow staff to explicitly target specific goals, use appropriate language to talk about a student's development. It is hoped that this will lead to the creation of resources to meet particular targets.

## 7. Research to practice impact

The style of project here was not as open to involving staff as would be preferred, not just by AISNSW. As a former, and sometimes current, academic I am a very firm proponent of evidence-based practice, not just as a catch-phrase but a reality. I have long shared research with colleagues and encouraged us to look to and engage in research. There were three reasons this was quite a solitary project. The first was the skill set needed to design psychometrically valid and reliable tools. The second was the fact that I initially wanted to investigate the teacher's ability to score which meant that giving too much information about the test wasn't possible. The third reason was a practical one: with a staff of 5-6 full-time teachers, and very few casuals we can call on who are able to sign Auslan, we are not afforded many opportunities to work together in-depth on any project.

However, the tool itself will revolutionise our staff practices with regards to data collection and tracking. For the first time, staff will be able to assess their own children, rather than relying on me or the one other staff member I have accredited in the Development of Auslan Assessment Tool (VDEI). This gives them far greater ownership and understanding of their students' data. They will receive clear goals from the test reports which they can then target and see measurable improvements. It is my firm hope that this will lead in to research partnerships on the data we collect over the coming years.

As for dissemination, it is clear from teacher surveys and discussions that this will happen even if I do nothing! The field has been without a clear, comprehensive developmental sequence of skills in Auslan, let alone an assessment to place them on the continuum. We expect the tool will be used in most areas of Australia, but especially in locations where there are no trained assessors for the Development of Auslan Assessment Tool.

## 8. Appendices

### 8.1 Appendix A Biographies

#### Dr Louise de Beuzeville – Project Lead

*Educational Researcher and Teacher of the Deaf, Thomas Pattison School; Conjoint Lecturer, Renwick Centre/Macquarie University*

Lou has extensive training and qualifications as a linguist, including a PhD awarded for a dissertation on the acquisition of Auslan. She has also been a teacher of deaf children for many years. She brings over 20 years of theoretical knowledge and practical experience of the needs of educators and students. The last few years she has also been involved in several projects creating Auslan resources, so was ideally placed to work on resource design and creation to create a tool that meets the needs of teachers and therapists.

#### Professor Dr Tobias Haug – Critical friend & mentor

*Founder, owner & Director, Sign Language Assessment Services; Head of Sign Language Interpreting Course, Intercantonal School of Special Education (Zurich); Director of Sign Language Interpreting, Zurich Centre for Linguistics, University of Zurich.*

Tobias is a leader in the field of sign language assessment; he founded and maintains a website with a comprehensive list of all tools internationally. One of his main research interests is sign language test research, especially focusing at the use of computer-/mobile-assisted (sign) language testing for different groups of learners (L1, L2) but also researches in the field of sign language interpreting. He is currently involved in different Swiss, European/international research projects, and is founder and owner of the company "Sign Language Assessment Services" that provides an online portal for signed language assessments ([www.slas.ch](http://www.slas.ch)). At the University of Applied Sciences of Special Needs Education Zurich (HfH) he is in charge of the training of sign language interpreters in Swiss-German, together with a team of deaf and hearing colleagues.

#### Dr Daan Hermans – Critical friend & mentor

*Senior Researcher, Kentalis Academy at Royal Dutch Kentalis*

Daan has been working at Kentalis Academy since 2000 when he finished his Ph.D in Applied Linguistics at the University in Nijmegen. At Kentalis, he works on special projects, most of them with deaf or hard-of-hearing children in primary education. His

areas of interest are: sign language assessment, the executive functioning of DHH children and children with primary language impairment, quality of instruction in educational programs for DHH children, and bimodal and unimodal bilingualism.

#### **Dr Natasha Todorov – Mentor**

*Lecturer, Department of Psychology, Macquarie University*

In private practice Natasha has worked in educational assessment. Her experiences at Macquarie have ventured into a variety of areas, supervising students in the Psychology Clinic in educational assessment and teaching a variety of units in Psychological Assessment, developmental psychology and cognition. She currently teaches the honours unit in Assessment and provides some lectures for third year Assessment. Her research interests include: Psychological Assessment; cognitive assessment; and forgiveness and its role in building resilience against negative life events eg bullying in both children and adults.

#### **Prof. Greg Leigh AO – Mentor**

*Director, Renwick Centre; Conjoint Professor of Educational Studies, Macquarie University*

Greg Leigh began his career in education of the deaf at the Queensland School for the Deaf in Brisbane in 1979. He holds degrees in Special Education from Griffith University; a Master of Science (Speech and Hearing) degree from Washington University (Central Institute for the Deaf) in the USA; and a PhD in Special Education from Monash University. In 2001, he was made a Fellow of the Australian College of Educators and in 2014 he was invested as an Officer in the Order of Australia (AO) “for distinguished service to the deaf and hard of hearing community, particularly children, through education, research, public policy development and specialist services”.

Professor Leigh held a variety of positions in the education of deaf children in Queensland before entering academia. He was co-ordinator of the program in education of the deaf at Deakin University from 1987 until taking up the position of Senior Lecturer and foundation Head of Renwick College in 1993. In 2003, he was International Visiting Scholar at the National Technical Institute for the Deaf (Rochester Institute of Technology), New York. As Director of RIDBC Renwick Centre, he is a member of the Senior Leadership Team of the Royal Institute for Deaf and Blind Children.

Professor Leigh is active in research and has published widely on aspects of education of deaf children and related areas. He is a member of the Editorial Boards of *The Journal of Deaf Studies and Deaf Education*, *Deafness and Education International*, and *Phonetics and Speech Sciences* and is Deputy Director of The Centre for Special Education and Disability Studies at the University of Newcastle. He has served on several Australian Government consultative committees including the New South Wales Ministerial Standing Committee on Hearing and the National Neonatal Hearing Screening Working Party. He is currently Chairman of the Australasian Newborn Hearing Screening Committee. He is a former National President of the Education Commission for the World Congress of the World Federation of the Deaf and is Chair of the International Steering Committees of both the Asia-Pacific Congress on Deafness (APCD) and the International Congress on Education of the Deaf (ICED).

#### Dr Breda Carty – Mentor

*Lecturer, Renwick Centre; Conjoint Lecturer, Macquarie University*

Breda is a respected member of the Deaf community. She was one of the first deaf teachers of deaf children in Australia and one of the first Deaf people to gain a PhD (on the history of the Deaf community). She has many years' experience as an educator in schools and universities. Before working at the Renwick Centre, Breda was a Research Fellow at Griffith University for 12 years, and a teacher of the deaf in Victoria and the United States. She has had many years' experience developing Deaf Studies workshops for the Deaf community, and as a consultant with a variety of educational and community-based groups. She has co-authored a widely-used Deaf Studies Program for schools and a variety of other educational materials.

Breda has had extensive involvement in Deaf community organizations and is currently a member of the Editorial Board of the *Journal of Deaf Studies and Deaf Education*, and Editor of the Deaf History International newsletter. Her book *Managing their own affairs: The Australian Deaf community in the 1920s and 1930s* was published by Gallaudet University Press in 2018. Her research interests include: Deaf history, culture and community; the learning styles of Deaf people; and Auslan/English bilingualism in children and adults.

## **Nikhil D'Souza – RIDBC Digital Designer**

*Digital Designer, RIDBC*

Nik works with academics, therapists and special education consultants to develop educational resources for DHH people or people with a vision impairment or other disabilities. He has had training in design methodology and UX as well as a wealth of experience in designing accessible digital assets including websites, mobile apps, 3D-models, video & animation. Nik has been instrumental in designing the question logic and flow of the platform as well as in the creation of all videos.

## **Sam Boswell – Digital Media Producer**

*Digital Media Producer, RIDBC*

Sam has over 15 years' experience in design and communication, in particular design for app development, web and online, 3D printing, print production, and illustration including brand identity. He has video production skills and experience which is used to create many of RIDBC's Auslan resources. Sam has been instrumental in designing the question logic and flow of the platform as well as in the creation of all videos.

## **Jean-Paul Venevongsos – Lead Software Architect**

*Lead Software Architect, RIDBC*

JP has worked for RIDBC for over 10 years as a software architect. He has been an essential part of the media team and responsible for the builds of all RIDBC iOS apps and many RIDBC website builds. He has applied this knowledge and experience to assist Lou in planning and documenting her designs in a way that software developer working on the tool gets the information required in a clear format. He will also help with the platform backend once it is up and running.

## **Darlene Thornton – Native-signer informant and consultant**

*Consultant and Trainer, self-employed*

Darlene is a third-generation Deaf Australian who has been involved with teaching, training, researching and writing on Auslan, Auslan linguistics, Sign Language interpreting, and Australian Deaf History for over 20 years. Darlene has been teaching on the Post Graduate Degree Interpreter programme at Macquarie University for over ten years. Her focus for the interpreting and translation students is on discourses and how to work with different types of texts. Darlene has been a native signer consultant and model for the signed items.

**Della Goswell – Native-signer informant and consultant**

*Lecturer, Department of Linguistics, Macquarie University*

Della is an interpreter, interpreter educator and researcher based in Sydney. She is a native signer, has been accredited as a professional level Auslan-English interpreter since 1987, and has been involved in interpreter training since 1990. Della is convenor of the Graduate Diploma in Auslan-English Interpreting at Macquarie University, and has a Masters in Adult Education and in Translation and Interpreting. She is currently enrolled as a Linguistics PhD student at Macquarie University, investigating the challenges for interpreters in legal settings. Della was an invaluable resource as a native user of both languages who also works in the field of linguistics.

## 8.2 Appendix B: Summary of the tools available internationally for assessing the morpho-syntactic development of signed languages (Haug, 2009, 2016)

Tool	Description	Practical Issues
BSL Receptive Skills Test – adapted into Auslan, German, Italian, ASL	<ul style="list-style-type: none"> <li>Assesses the receptive morpho-syntactic skills of deaf children aged 3-13 years.</li> <li>Psychometrically evaluated.</li> <li>norms provided, mixed native and non-native signers.<sup>18</sup></li> </ul>	<ul style="list-style-type: none"> <li>Although there's a standard score, there is no description of when intervention is required</li> <li>The assessment covers only a limited range of grammatical features, and some features do not have many items assessing them.</li> <li>The results do not clearly show teachers what a child can or cannot do, and therefore there is limited guidance on goals for intervention.<sup>19</sup></li> <li>Is paper and pen based, so is time consuming to administer and analyse</li> </ul>
Assessment of BSL Development: Production Test – adapted into Auslan	<ul style="list-style-type: none"> <li>Production of the content, structure and grammatical features in a narrative for children aged 4-11 years.</li> <li>Psychometrically evaluated.</li> <li>norms provided, mixed native and non-native signers.</li> </ul>	<ul style="list-style-type: none"> <li>Has little discriminatory power. Norms are from children in 2-year age groups and there is enough variation that at the scores for an older group are, in one example, lower than a younger group.</li> <li>Results only give the child's rough percentile (10<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup> or 90<sup>th</sup>).</li> <li>Scoring is time-intensive and can only be done by those who have passed a 3-day course and assessment of their ability to score<sup>20</sup>.</li> <li>Is complex to score, requiring several days of training with only a few trainers available in Australia (the author of this grant application as one of them).</li> <li>There is no information yielded that can provide goals or guidance for intervention.</li> <li>Extensive contact with the authors of this assessment tool has confirmed that there can be inconsistencies in the interpretation of the test items and test manual among various testers. Therefore, there are real concerns with reliability of the results and the ability to use the test norms as a basis for determining the age appropriateness of the Auslan skills of children who are assessed using the instrument.</li> </ul>

<sup>18</sup> Many of the children in mixed norm samples did not learn sign language from birth, and thus may skew the results when compared to a group of all native signers.

<sup>19</sup> The assessment authors have attempted to group errors into grammatical features on the front page.

<sup>20</sup> As one of the trainers of assessors for this tool in Australia, I am all too aware of how hard it is for some teachers to grasp the concepts and skills in this short time, especially if only using the assessment once or twice a year.

Computer Test for German SL	<ul style="list-style-type: none"> <li>• Comprehension of reference in isolated phrases and longer discourse in German Sign Language for deaf children aged 6-18 years.</li> </ul>	<ul style="list-style-type: none"> <li>• no evaluation of psychometric properties</li> <li>• no norms provided</li> <li>• only assesses one small feature</li> <li>• cannot use with younger children</li> </ul>
The Test of ASL – adapted into Swiss-French, Catalan and Swedish Sign Languages	<ul style="list-style-type: none"> <li>• comprehensive analysis of receptive and expressive skills of narratives and depicting signs<sup>21</sup></li> <li>• and comprehension of time and space marking</li> <li>• for deaf children aged 8-17 years.</li> </ul>	<ul style="list-style-type: none"> <li>• no evaluation of psychometric properties</li> <li>• no norms provided</li> <li>• not yet commercially available</li> <li>• very time consuming to score</li> <li>• aimed more at research than education</li> </ul>
American Sign Language Proficiency Assessment	<ul style="list-style-type: none"> <li>• a screen for children aged 6-12 years</li> <li>• not comprehensive</li> </ul>	<ul style="list-style-type: none"> <li>• no evaluation of psychometric properties</li> <li>• no norms provided</li> <li>• not enough coverage of grammatical areas</li> </ul>
Assessment Instrument for Sign Language of the Netherlands	<ul style="list-style-type: none"> <li>• comprehension and production of a wide range of grammatical features for deaf children aged 4-12.</li> <li>• norms provided, mixed native and non-native signers</li> </ul>	<ul style="list-style-type: none"> <li>• computer administered</li> <li>• robust psychometric properties reported</li> <li>• excellent solution to the problems of how to assess when signs are iconic<sup>22</sup></li> <li>• includes a high number of items of various grammatical features, allowing confidence in the score</li> </ul>

<sup>21</sup> depicting signs are complex visual representations used in signed languages and an important measure of language development in a deaf child.

<sup>22</sup> That is, when the sign looks like the thing it represents, taking that into account and being sure the child actually understands the language feature

8.3 Appendix C: Overview of language assessments commonly used with D/HH students by area

Vocabulary & Basic Relational Concepts

	Test	potential languages/modalities			Age range	Rec/exp	Norming sample <sup>23</sup>	Sub areas or notes	
		Eng sp /lit	SE/bi-modal	Natural Sign Lang.					
vocab	Standardised, norm-ref, formal Vocab only	PPVT Peabody	sp, lit	x	x	2;6-90	R	H	
		EVT 2 Peabody	sp, lit	x	x	2;6-90	E	H	
		ROWPVT-4 Rec 1-Word Pic Vocab Test	sp, lit	SE, bi	x	2-80+	R	H	
		EOWPVT-4 Exp 1-Word Pic Vocab Test	sp, lit	SE	?	2-80+	E	H	name objects, actions, concepts
		CREVT3 Comprehensive Rec & Exp Vocab Test	sp	?	x	4 – 89;11	R & E	H	forms A/B
		CPVT Carolina Picture Vocabulary Test		SE	NSL	4;0-11;6	R	HH, Deaf	Iconicity could be an issue
	Standardised, norm-ref, formal, includes vocab	PLS-5	sp	x	x	0 – 7;11	R & E	H	basic vocab, name/describe objects (clothes, numbers etc), express quantity
		CELF-P2	sp	?	x	3;0 - 6;11	R & E	H	
		TACL-4	sp	?	x	3 – 12;11	R	H	
		CASL-2 Comprehensive Assessment of Spoken Language	sp	?x	x	3;0 – 21;0	R & E	H	Lexical/Semantic Tests: words & word combinations, Basic Concepts, Antonyms, Synonyms, Sentence Completion, and Idiomatic Language
	Standardised Norm-Ref, Parent/Provider Completed	REEL-3	sp	?	x	0 – 3;0	R & E	H	
		MacArthur-Bates CDI: BSL version	sp	x	BSL, ASL	0;8 – 3;1	?	Deaf US/UK	home, people, actions, descriptions, pronouns, prepositions
	Criterion ref scales	CID Early Childhood Vocab	sp	?	x	0 – 5;0	R & E	no	Functional> first 100> basic> theme> presc
		SKI-HI – some vocabulary	sp	SE	x	0 - ?3	R & E	no	the translation to sign has created items not developmentally appropriate or infrequent items in a signed language
		Rossetti	sp	?x	?	0-3	R & E	no	
		CASLLS	sp	SE, bi	x	0 – 8;0	E	no	
Basic concepts	Standardised, norm-ref, formal some criterion referenced	BTBC 3 Boehm Test of Basic Concepts, preschool or school	sp	?	x	3-5;11 K-2	R	H	comparison, direction, position, quantity, time. Also, criterion ref
		CELF-P2	sp	?x	x	3-6;11	R & E	H	
		Bracken 3 Bracken Basic Concept Scale 3	sp	?	x	3;0 – 6;11	R & E	H	colors, letters, numbers, counting, sizes, comparisons, shapes, quantity, texture/materials, self/social awareness, direction/position, time/sequence
		TOLD-P Test of Oral Language Development	sp, ?lit	?x	x	4 – 8;11	R & E	H	vocab concepts subtest
		PLS-5	sp	x	x	0 – 7;11	R & E	H	Qualitative, Quantitative, Spatial Concepts, & Time/Sequence Concepts
		BAYLEY-III	sp	?	x	1-3;7			
		Brigance IED-III	sp	?	x	0-7	R & E		
		PELI	sp	?	x				
	Criterion ref scales	CDI Preschool Development	sp	?	?	1;3-6	R & E	H	
Battelle		sp	?	?	0-7;11	R & E	H		

<sup>23</sup> hearing H, deaf D, hard of hearing HH

		Test	potential languages/modalities			Age range	Rec/exp	Norming sample	Sub areas or notes
			Eng sp /lit	SE/bi-modal	Natural Sign Lang.				
semantic relations	Standardised, norm-ref, formal	CELF	sp	?	x	6-21	R & E	H	Semantic Relationships, Word Associations
		PLS-5	sp	x	x	0 - 7;11	R & E	H	analogies
		TOSS-P Test of Semantic Skills – Primary	sp	?	x	4;0 – 8;11	R & E	H	Semantic skills
		TOPEL	sp	?	x	3-5;11	E	H	describe an important feature of various objects
Pragmatics	Standardised, norm-ref, formal	PLS-5 - Also vocab, eg clothes, numbers	sp, lit	x		0 - 7;11	R & E	H	
		PLAI							
		CELF-P2	sp	?x		3-6;11	R & E	H	
		OWLS-2	sp, lit	?	?	3;0 – 21;0	R & E		rec: picture pointing, Exp: qu answers, sentence completion, lit: use of conventions, syntactical forms, ability to communicate meaningfully
	Standardised, Norm-Ref, Parent/Provider-Completed	CSBS Communication & Symbolic Behavior Scales	sp	?x	?	0;8 – 6 (lg lvl< 2)			communicative, social-affective, and symbolic abilities. 7 language predictors: emotion & eye gaze, communication, gestures, sounds, words, understanding, & object use; 1p Infant-Toddler Checklist, 4-page follow-up Caregiver Questionnaire, & Behavior Sample, taken while the child interacts with a parent present
		REEL-3	sp	?	x	0 – 3;0	R & E	H	
	Criterion ref scales	Rossetti	sp	?x	?	0-3	R & E	no	good potential for translation
		CASSLLS social interaction, conversation, discourse							
		LL&T Integrated Scales							
		Pragmatics Checklist (Goberis, Yoshinaga-Itano)							
		CID Pragmatics				3;0 – 5;0			
memory	Standardised, norm-ref, formal	?CELF							Recalling Sentences, Rapid, Automated Naming
		CELF-P2	Sp	?x	no	3-6;11	R & E	H	recall of sp lg
cognition	Standardised, norm-ref, formal	TOPS 2 Test of Problem Solving				HS			critical thinking abilities based on std's language strategies using logic & experience – inference, cause, neg why, prob solving
		TOPS 3 Test of Problem Solving				primary			ability to integrate semantic & linguistic knowledge w/ reasoning ability by way of picture stimuli & verbal resps
General	Criterion ref scales	Rossetti	sp	?x	?	0-3	R & E	no	
		TAPS Test of Auditory Processing Difficulties	sp	?					

## Morpho-syntax, pragmatics & assorted other areas

		Test	potential lgs/ modalities			Age range	Rec/exp	Normed D, H	Sub areas or notes
structure	Standardised, norm-ref, formal	PLS-5	sp, lit	x		0 - 7;11	R & E	H	grammatical markers, comparisons, inferences, complex sentences, word segmentation
		CELF	sp, lit	x	-	6-21	R & E	H	English morpho-syntax Sentence & word Structure, Word Classes, Formulated Sentences, Sentence Assembly
		OWLS-II Oral & Written Lg Scales	sp, lit	?x		3;0-21	R & E	H	English morpho-syntax
		CELF-P2	sp, lit	?x	-	3-6;11	R & E	H	Word meanings, word & sentence structure and recall of sp lg
		CASL-2 Comprehensive Assess. of Spoken Lg	sp, lit	?x		3;0 - 21;0	R & E	H	Lexical, semantic, supralx & pragmatic & criterion ref
		OWLS-2	sp, lit	?	?	3;0 - 21;0	R & E		rec: picture pointing, Exp: qu answers, sentence completion, lit: use of conventions, syntactical forms, ability to communicate meaningfully - & criterion referenced
		GAEL Grammatical Assess't of Elicited Lg	sp, ?lit	?x		5;0-9;0 ?3-6?	?E	H & oral D/HoH	English morpho-syntax, 2 hrs to score, manipulables & interaction
		RITLS Rhode Island Test of Lg Structure	sp, ?lit	?x		3;0-20;0	R	H & Deaf/HoH	English morpho-syntax, choice of 3 pics
		TSA Test of Syntactic Abilities	lit			10-18;11	?Exp sort of	?	English morpho-syntax, Comprehensive, objective but long, multiple choice, order the words
		TOLD-P Test of Oral Language Dev't	sp, ?lit	?x	x	4 - 8;11	R & E	H	Morphosyntax, vocab concepts, 9 subtests
		MSEI Maryland Syntax Evaluation Instrument	lit			6 to 18;11	E	D/HH	English morpho-syntax, English sentences to 10 pictures
		TACL-4	sp	?		3 - 12;11	R	H	
	TELD-3 Test of Early Language Dev't	sp	?x		2;0-7;11	R & E	H		
	Standardised, NR, survey	REEL-3	sp	?	x	0 - 3;0	R & E	H	Looks great
	Criterion ref scales	Rossetti	sp	?x	?	0-3	R & E	no	
		TAGS Teacher Assess't of Gramm'l Structures	sp, lit	SE	x		E		English morpho-syntax
CASLLS Cottage Scales for Listening, Lg & Speech		Sp	?x	x	Birth and up			English morpho-syntax	
TASL				x				English morpho-syntax	
LL&T Integrated Scales				x					
SKI-HI - some		sp	SE	no	0 - ?3	R & E	no	not appropriate for signing kids	
Lg sample	SAWL Structural Assessment of Written Lg	lit			Any age	E	none	T-Units per 100 words (TU/100), Words/ morph/ clauses per T-Unit (WTU), & the Word Efficiency Ratio (WER)	

## 8.4 Appendix D: Survey on the assessment of Auslan for school students

This is a judgement-free survey! The purpose is to gather information on what teachers or therapists want and need in a new online Auslan assessment tool (to be released 2019).

How is Auslan assessed for your students? Tick all that apply.

- informal observations
- language sampling (video samples)
- using the Assessing Auslan Development – Receptive Skills
- using the Assessing Auslan Development – Narrative Production
- using a checklist (if so, which one?)\_\_\_\_\_
- Auslan isn't assessed for my students
- Other (please specify)\_\_\_\_\_

How frequently are the student's Auslan skills assessed? Circle the best answer.

every month      every term      every semester      every year      every two years      never

In your opinion, which factors have the biggest impact on the school's decision about when and how to assess Auslan? Rank from most impact to least impact.

- The skills or knowledge of the person assessing the student
- The time taken to test and analyse the results
- The usability of the results
- availability of appropriate tests

How confident are you that you could recognise the following features of Auslan if analysing a child's signing? That means, you would be able to say that is what they were doing and also if it was signed appropriately. Tick the right box

	I can't	With help	Mostly	I can
depicting signs (classifiers)				
constructed action (role shift)				
verb modification for who or where (eg HE TOOK <sub>-from left</sub> VS HE TOOK <sub>-from-front</sub> )				
verb modification for how (eg READ <sub>-for-a-long-time</sub> VS READ)				

The following are four reasons to assess Auslan. Please number them 1 to 4 with 1 being the most important reason you would assess the child's Auslan.

- to track a student's development over time (Are they progressing?)
- to give a teacher information on goal setting and lesson planning (What can they do? What is the next thing to teach?)
- to see if a student has age-appropriate language (Is there a problem with their level of development?)
- to compare language strengths in English and Auslan children
- other (specify) \_\_\_\_\_

The following is a list of things that formal language assessments often test. Please choose the features you would most like to see in an online Auslan assessment tool. Number from 1 to 7 and/or add your own suggestion.

- the student's vocabulary
- the grammatical structure of Auslan, such as depicting signs or use of space
- short-term or working memory
- higher order skills such as inferencing, cause and effect, or problem solving
- semantic relations between words: synonyms, antonyms, categories, words associated with a theme, functions of objects etc
- comprehension of short signed videos
- describing things or understanding descriptions (so attributes of objects)
- your own idea/s \_\_\_\_\_

What other parts of a student's language development you'd like to see assessed? space allowed

What is your role in Deaf education? Circle the best answer.

- |  |  |
|--|--|
| <input type="checkbox"/> Teacher of the Deaf with Deaf class         | <input type="checkbox"/> Teacher Aid                                   |
| <input type="checkbox"/> Teacher of the Deaf in a mainstream setting | <input type="checkbox"/> A visiting teacher/itinerant teacher/RASO etc |
| <input type="checkbox"/> Early Intervention/Early Childhood Teacher  | <input type="checkbox"/> other (specify) _____                         |

Do you have any other comments or questions? space allowed

## 8.5 Appendix E: other comments from survey – identifying information removed

### All comments grouped by similarities:

- Manual clarity
  - *manual needs to be better and clearer than others*
  - *Need better teacher guide book on what is "acceptable" and what is "not acceptable" signs for Auslan production tests.*
  
- Age range:
  - *I guess we need an assessment tool that covers the age range 3/4-18 years as we have very little for older children that we can use that is valid.*
  - *A tool that is age appropriate for different ages (hard to do)*
  - *I would like an assessment tool to use with 0-5yrs!!!! Is there any other Auslan assessment tools for 0-5 years??*
  
- Interventions:
  - *Some intervention or teaching strategies that might help people provide ideas for teachers to implement from the assessment might be helpful (but not sure if this is in your scope).*
  - *I would love training for me to improve my skills in Auslan so better able to assess and plan lessons to best suit individual needs*
  - *I would like to see the results show where they sit developmentally so programing can be based on the next logical developmental step rather than just a list of what they can and can't do.*
  - *maybe short clip videos related to St Gab's targeted language for 0-5years. e.g. verbs, nouns, adjectives, adverbs in questions etc. [presumably if this replaces St Gabs<sup>24</sup> then won't need it to match that one.]*
  
- Content of test
  - *doesn't just rely on one story that kids get sick of watching!!*
  - *Difficult to number desired features in an assessment tool - would it just be a receptive language test if done on-line? All items important, and my priorities would change with individual students to some degree.*
  - *Variety of expression videos. They know what they'll watch a year later. Videos can get out-dated and not be suitable for older kids.*
  - *A narrative (retell or spontaneous), perhaps a conversation with another partner (for pragmatic and social cognition understanding);*
  - **I would like to see some inclusion of fingerspelling production.**
  - *pragmatics- do they know how to be 'polite' across hearing & Deaf signing worlds*
  - *wh- questions*
  - *eye contact, turn-taking, touch/attention*

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<sup>24</sup> St Gabs refers to an unpublished, widely used criterion referenced tool for English development in deaf children that various people have “translated” into Auslan however it is not clear if there has been any reference to the acquisition literature in doing so, making it unclear to what extent the inferences on order of acquisition are valid.

- Other reasons for assessing
  - Level/type of language use to match appropriate interpreter and deaf model to develop further skills.
  - To see how much Auslan grammar is used to analyse ability to learn English
  - To see how much application of Auslan exposure is carried over to receptive and productive abilities.
  - gather baseline data at the start of each year
  - for an overall picture of the student's progress
  - for research purposes
  - To determine if the student is a Key Word Signer rather than an Auslan user.
  - Is Auslan an appropriate mode of communication too for education access?
  - 6 monthly Assessment Protocols and to assist in Report writing
  - To give the student feedback
  - Support NDIS Applications
  - Tease out, with other assessments, if there are other factors influencing language development/delay progress
  - see if they have enough Auslan to do other assessments
  - to compare a student's language strengths in English and Auslan

## 8.6 Appendix F: Published studies on the structure of Auslan from corpus data by area

### Partly-lexical information

- de Beuzeville L, T Johnston & A Schembri (2009). The use of space with indicating verbs in Auslan: a corpus-based investigation. *Sign Language and Linguistics*, 12(1): 53–82.
- Gray, M. (2013). *Aspect marking in Auslan: A system of gestural verb modification*. (Doctoral dissertation), Macquarie University, Sydney.
- Hodge, G., & Johnston, T. (2014). Points, depictions, gestures and enactment: Partly lexical and non-lexical signs as core elements of single clause-like units in Auslan (Australian sign language). *Australian Journal of Linguistics*, 34(2), 262-291.
- Johnston, T. (2016). The syntactic distribution of pronoun-like pointing signs in Auslan.
- Johnston, T. (2013a). Towards a comparative semiotics of pointing actions in signed and spoken languages. *Gesture*, 13(2), 109-142. doi:10.1075/gest.13.2.01joh
- Johnston, T. (2013b). Formational and functional characteristics of pointing signs in a corpus of Auslan (Australian sign language): are the data sufficient to posit a grammatical class of ‘pronouns’ in Auslan? *Corpus Linguistics and Linguistic Theory*, 9(1), 109-159
- Johnston, T., van Roekel, J., & Schembri, A. (2016). On the conventionalization of mouth actions in Auslan (Australian Sign Language). *Language and Speech*, 59(1), 3-42. doi:10.1177/0023830915569334

### Depicting & CA in particular

- de Beuzeville, L. (2006) *Visual and linguistic representation in the acquisition of depicting verbs: a study of native signing deaf children of Auslan (Australian Sign Language)*, (Doctoral dissertation), University of Newcastle, New South Wales.
- Ferrara, L. (2012). *The grammar of depiction: Exploring gesture and language in Australian Sign Language (Auslan)*. (Doctoral dissertation), Macquarie University, Sydney.
- Ferrara, L., & Johnston, T. (2014). Elaborating who's what: A study of depiction and grammar in Auslan (Australian Sign Language). *Australian Journal of Linguistics*, 34(2), 193-215.
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## Clause-level structure information

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## 8.7 Appendix G: Sample section of the matrix of the development of signed languages and the reference list

This will be updated, polished and elaborated on with the release with the assessment.

age-->		0;6-0;9	5;0-5;11	6;0-6;11	7;0-7;11	8;0-8;11	9;0-10;0
	points & spatial gestures pronominal reference (coreference)		hearing non-signing children understand referents located in space with co-speech gestures 50% of the time <a href="#">S&amp;K14</a>	hearing non-signing children understand referents located in space with co-speech gestures 60% of the time <a href="#">S&amp;K14</a>	hearing non-signing children understand referents located in space with co-speech gestures 75% of the time <a href="#">S&amp;K14</a>		
		apparent lack of points, only reaching & grabbing <a href="#">P87</a>	By 5 being more consistent with points and roleplay locations, so creating a spatial scene <a href="#">L84</a> kids point to book or direct verb to book at least once each age group <a href="#">Riche et al 94</a>	kids point to book or direct verb to book at least once each age group <a href="#">Riche et al 94</a>	kids point to book or direct verb to book at least once each age group <a href="#">Riche et al 94</a>	correct pronoun use even in CA <a href="#">LM et al 85</a> kids point to book or direct verb to book at least once each age group <a href="#">Riche et al 94</a>	kids point to book or direct verb to book at least once each age group <a href="#">Riche et al 94</a>
Space	sign modification	rec	Comprehension of verbs modified for who did the action understood 60% if choosing a picture for intransitive & 40% if transitive. <a href="#">L-M 85</a> Non-present referent modifications understood 80% of time after 5. <a href="#">Bellugi et al 88</a>	Comprehension of modified IVs understood 90% if show with toys, 60% if show with pictures <a href="#">LM et al 85</a> comprehension via picture pointing task of transitive IVs was near adult level <a href="#">R&amp;B94</a>	Comprehension of participants in modified IVs if choosing picture 80% for intransitive 60% for transitive (blip of 60 if show with toys) <a href="#">LM et al 85</a> comprehension via picture pointing task of transitive IVs was near adult level <a href="#">R&amp;B94</a>	Comprehension of modified IVs understood 80% if show with toys, if show with pictures 90% accuracy for intransitive and about 70 for transitive <a href="#">LM et al 85</a> comprehension via picture pointing task of transitive IVs was near adult level <a href="#">R&amp;B94</a>	Comprehension of modified IVs understood over 90% if show with toys, if show with pics 80% <a href="#">LM et al 85</a> comprehension via picture pointing task of transitive IVs was near adult level <a href="#">R&amp;B94</a>
		exp	children still not producing plural directionality consistently <a href="#">Hou 13</a> using correctly within and across sentences <a href="#">Bellugi et al 90</a> some correct use of IV s for non-present referents without necessarily establishing nominal <a href="#">LM et al 85</a> Roughly 2/3 still unmodified <a href="#">G89</a> kids point to book or direct verb to book at least once each age group <a href="#">Riche et al 94</a> no kid does mental rotation when imitating. <a href="#">B et al 95</a> kids already able to imitate IV s for actor & undergoer most of the time <a href="#">Meier 87</a>	By 6 can usually produce for plural referents consistently. Initial appearance of AB verbs <a href="#">M&amp;W 02</a> Usually modify IV s correctly <a href="#">LM et al 85</a> kids point to book or direct verb to book at least once each age group <a href="#">Riche et al 94</a> sentence imitation with IV, DoD & DoH nearly same frequency of errors (about 20% accurate); no kid does mental rotation when imitating <a href="#">B et al 95</a>	continue to modify IV s correctly for non-present referents but errors when using CA as have to shift referential system <a href="#">LM et al 85</a> Roughly 2/3 still unmodified <a href="#">G89</a> kids point to book or direct verb to book at least once each age group <a href="#">Riche et al 94</a> sentence imitation with IV, DoD & DoH nearly same frequency of errors (about 20% accurate); no kid does mental rotation when imitating <a href="#">B et al 95</a> mostly children no longer do citation form instead of modified in sentence repetition <a href="#">B et al 95</a>	8-9 can imitate sentence with IV correctly ( <a href="#">Bettger et al</a> ) correct use of IV s in or out of CA <a href="#">LM et al 85</a> kids point to book or direct verb to book at least once each age group <a href="#">Riche et al 94</a> sentence imitation with IV, DoD 80% accurate, DoH only 11; no kid does mental rotation when imitating <a href="#">B et al 95</a>	80% modified for non-present <a href="#">G89</a> kids point to book or direct verb to book at least once each age group <a href="#">Riche et al 94</a> sentence imitation with IV, DoD 80% accurate, DoH only 11; no kid does mental rotation when imitating <a href="#">B et al 95</a>
	ec	only 40% of kids can choose the right picture from an AB verb <a href="#">M&amp;W 02</a>	60-80% of kids can choose the right picture from an AB verb <a href="#">M et al 02</a>	60-80% of kids can choose the right picture from an AB verb <a href="#">M et al 02</a>	60-80% of kids can choose the right picture from an AB verb <a href="#">M et al 02</a>	90% of kids can choose the right picture from an AB verb <a href="#">M et al 02</a>	

<a href="#">L-M 99</a>	mixed		Lillo-Martin, Diane (1999). Modality effects and modularity in language acquisition: The acquisition of American Sign Language. In W. Ritchie & T. Bhati (Eds.), <i>Handbook of Language Acquisition</i> , 531-567. San Diego: Academic Press.
<a href="#">L-M 00</a>	NMF constructions	17 children, 4;1-6;9, elicited production	Lillo-Martin, D. (2000). Early and late in language acquisition: Aspects of the syntax and acquisition of wh-questions in American Sign Language. <i>The signs of language revisited: An anthology to honor Ursula Bellugi and Edward Klima</i> , 71-90.
<a href="#">L-M et al 85</a>	nominal establishment verb mod &	43 children 3-10 - Comprehension: 1. 34 kids 3-10 given nominal establishment comprehension test 2. 28 kids 4-10 - show understanding of verb mod with manipulables	Lillo-Martin, Diane, Ursula Bellugi, Lucinda Struxness & Maureen O'Grady. (1985). The acquisition of spatially organized syntax. <i>Papers and Reports on Child Language Development</i> , 24. 70-78.
<a href="#">L&amp;Q95</a>	space	asking kids to tell stories, describe drawings, or retell cartoons	Loncke, F., & Quertinmont, S. (1995). Spatial structure as a syntactical or a cognitive operation: Evidence from signing and nonsigning children. <i>Syntactic Iconicity and Linguistic Freezes: The Human Dimension</i> , (9), 343.
<a href="#">L84</a>	?verb mod	1 child 3;1-4;9 ten lots of 10min narratives collected naturally - longitudinal; as well as 1 tape from each of 2 other kids supplementary data (2;11 and 4;3). <a href="#">A group subjects</a>	Loew, Ruth. 1984. Roles and reference in American Sign Language: A developmental perspective. PhD dissertation, University of Minnesota.

## 8.8 Appendix H: Basic relational terms and very preliminary age range it may be acquired

This will be updated, polished and elaborated on with the release with the assessment.

Age ranges here refer to:

80% comprehension of term in English term (according to Kraner or to Bang)

50% comprehension or production according to data from the Macarthur CDI

Yellow – unclear where from but in several educational references for teachers

English comprehension (Hicks & Stewart, 1930; Bates, 1946; & Bates & Learned, 1948)

50% of native-signing children understand the sign in British Sign Language

QUALITATIVE					
	receptive	expressive		receptive	expressive
* comparatives	better 2;2 4-5	better 2;2 bigger 4;0 5-6	quiet	2;1	2;7, 2;1
			nice	2;2	2;2, 2;5
* superlatives	4-5	littlest 4;0	yuk	2;7	2;7
beautiful	2;9	2;11	not	2;10	3;0, 3-4
big	1;11, 2;6-3, 3-3;6	2;2	old	2;2	2;2, 2;6
small	2;2, 3;6-4 3-3;6	2;2, 2;0	new	2;2	2;2
boy	1;8		old	2;2	2;2
girl	1;10		same object	4-4;6	
broken	1;10		same	2;1, 3-3;6	2;1
dark	1;10	2;2, 2;1	different	4;6-5	
dirty	1;8	1;11, 1;7	same shape	4;6-5	
clean		1;11	different shape	5-5;6	
fast	2;2	2;2, 2;6	soft	2;2, 2;2, 2;6-3	2;11
slow	2;2	2;11	hard	2;8, 2;4, 3-3;6	2;8
fat	4-4;6		same size	4-4;6	
thin	4;6-5		different size	5-5;6	
good	1;7	2;3, 1;10	sticky	2;7	2;7
bad	2;2	2;8, 1;11	tall	4-4;6, 2;6-3	
heavy	2;2, 2;6-3	2;8, 1;11	short	4-4;6, 4-4;6	
light mass	3;6-4		cold	1;5	1;8, 1;7
hot	1;5	1;6	long	2;8	2;8
wet	1;8	1;11, 1;9	loud	2;2	2;2, 2;3

QUANTIFIERS					
	receptive	expressive		receptive	expressive
all	2;8, 3-3;6	>3, 2;2	many (a lot)	? (2;2) 2-3 (3-4)	? (2;2) 3-4 (?)
another	1-2	2;6-3	more	1;11, 5-5;6 3;6-4	1;11
any	>3	>3	less	6-6;6, 3;6-4	
both	3-4		none/nothing	2;4	2;4
each	>3, 3;6-4	>3	one	2;6-3	
empty	2;7, 3-3;6 3-3;6, 3-4	2;7	other	2;11	2;11
full	2;2, 3;6-4	2;8	same (number)	5-5;6	
(all) gone	1;2	2;11, 1;9	some	2;11	2;11
half	>6				

TEMPORAL					
	receptive	expressive		receptive	expressive
after	2;2, 5-5;6	2;2	night	2;2	2;2, 1;11
almost		4;0	not yet	2;2	2;9
before	2;11, 5-5;6	2;11, 4;0	now	2;2, 2;0	2;7, 2;0
day	2;2	3;0, 2;5	same time/while		4;0
end/finish	?/1;4	?/1;7 ?/2;5, 2;6	soon	2;0	3;0
first	2;7, ?5-5;6	2;7, 3;0	then	4-5	
hurry	2;2	2;11	time	2;7	2;7
last	2;11, 5-5;6	2;11	tmw	2;5, 5-6, 4-5	2;7, 2;6
late			tonight	2;11	2;11, 3;0
later	1;11	2;2, 3;0	up-to-now/until	>3	>3, 3;0
morning	2;8	2;8	wait	1;7, 2-3	2;2
never		4;0	y'day	2;8, 5-6, 4-5	2;11, 3;0
next		4-5	today	2;8, 5-6, 4-5	2;9, 2;0

SPATIAL			SPATIAL		
	receptive	expressive		receptive	expressive
above	2;11		in	2;2, 2-2;6	2;8, 2;6-3, 2;0
about	>3	>3	out	2;1	2;6, 2;0
ahead	5-5;6, 5-5;6		inside	2;2, 4-4;6	2;8
around	4-4;6, 3;6-4	3-4	outside	2;1	4;0
away (from)	2;2, 4-4;6 2;6-3	2;3	into	3-3;6	
toward	4-4;6, 3-3;6		out of	3-3;6, 2;6-3	
after	2;2, 5-5;6	2;2/2;11	lowest	4-4;6	
before	2;11, 5;6-6		highest	4-4;6	
between	4-4;6	4;0	middle (centre)	4-4;6	5-6
end	4;6-5		next	5-5;6	
far		4;0	next to (beside)	2;11 (2;11) 3;6-4 (4-4;6)	>3
close (near)		2;2, 4;0	off	2-2;6	1;6
farthest	5-5;6		on	2;8, 4;9, 2;6-3, 1;6	2;11, 2;6-3 1;9
nearest	5-5;6		open	2;1	2;2
first	3;6-4, 5-5;6	2;3	close	2;2	2;8
last	5-5;6, 5-5;6		over	2;8, 4-4;6	>3, 3;0
fit	2;11	2;11 3;0	under	2;8, 4-4;6 2;6-3, 3;6	2;8
forward	3-3;6, 4;0-4;6	5-6/5-6	right	>6	
backward	3-3;6, 4;0-4;6		left	>6	
back	2;6	2;11, 3;0	through	4-5	5-6
go	1;10	2;2, 1;6			
come		1;6			
high	2;7, 3;6-4	2;7, 2;3	up	1;10, 4-4;6 3-3;6	2;4, 1;6
low	4;6-5		down	1;10, 4-4;6 4-5	1;10, 1;6
in front of	4-4;6, 3;6-4	3-4	with	2;8	2;8
behind	2;6, 4-4;6; 5;6, 3;6	2;11, 4;0	here	1;9	
top	3;6-4, 3-3;6		there	2;0	
bottom	4-4;6, 4-4;6		where	2;0	
together	3;6-4, 2;6-3		to	2;0	2;0, 2;6
apart	3;6-4, 3-3;6				

## 8.9 Appendix I: Structure after test conceptualisation

### Assessment Content Subsections and ages<sup>25</sup>

area		4	5	6	7	8	9	10	11	12	13	14	15
relational terms		?	?	?	?	?	?	?	?	?	?	?	?
semantic relations		?	?	?	?	?	?	?	?	?	?	?	?
grammar	entity depicting signs	?	?	?	?	?	?	?	?	?	?	?	?
	handling depicting signs	?	?	?	?	?	?	?	?	?	?	?	?
	SASSes	?	?	?	?	?	?	?	?	?	?	?	?
	spatial reference	?	?	?	?	?	?	?	?	?	?	?	?
	clause structure	?	?	?	?	?	?	?	?	?	?	?	?
fingerspelling		?	?	?	?	?	?	?	?	?	?	?	?

<sup>25</sup> Originally it was envisioned that students would only complete subsections based on age, but it is clear that all students should do all sections until data is available to show whether there is a basal or ceiling level and what that is.

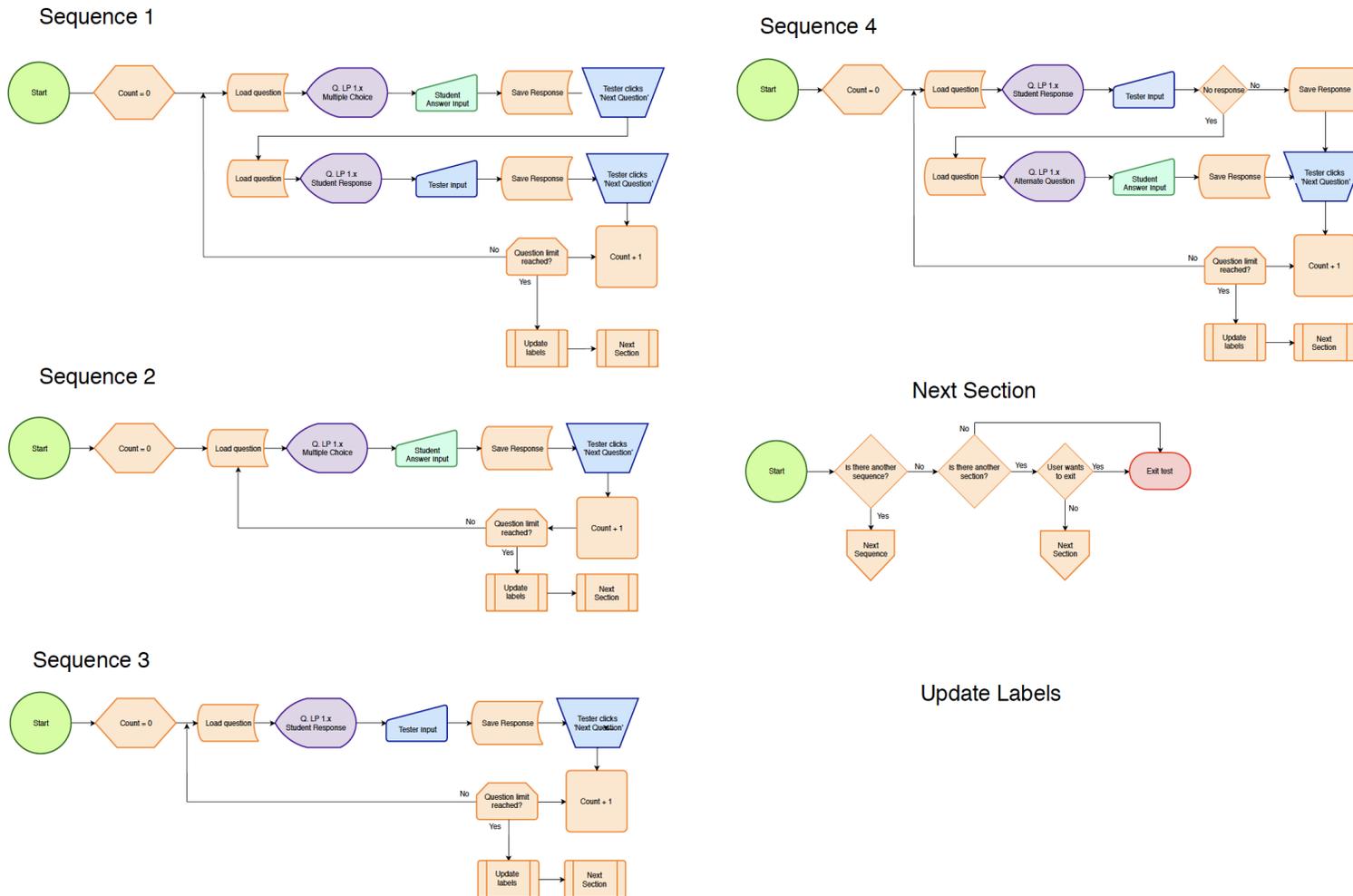
## Potential Assessment Content

### Subsections and ROUGH ages for administration

area	0-1	1-2	2	3	4	5	6	7	8	9	10	11	12	13	14	15
general communication devt including gesture																
phonology																
vocabulary																
communicative functions																
vocabulary/basic concepts - qualitative																
depicting signs incl complex (rel location)																
Temporal words/Adverbial marking/aspect?																
Indicating Verbs clause level & establishing & maintaining reference incl ??CA				?				?								
BSL vocab or adapt Dutch or make own							?	?	?	?	?	?	?	?	?	
inferencing, cause/effect, prediction																

## 8.10 Appendix J: Question logic for the semantic relations sub-section of the test

### Test Processes



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