

Summary

A summary, in plain English, of the programme's achievements, including a list of the programme's key findings.

The project was the first study of sociolinguistic variation in New Zealand Sign Language and one of few quantitative investigations of variation in signed languages internationally. All stages of the project were successfully executed, and further publications from the project are planned for completion after the grant period. Findings of the project confirm that variation in phonological, syntactic and lexical features of NZSL is patterned in regular ways by both factors linked to the social history of the language community (principally age and region, and to a lesser extent, gender and ethnicity) and by internal linguistic factors. Comparison of our results to those of parallel studies of American and Australian Sign Languages (upon which this project was modelled) reveals strong consistencies in the ways that linguistic variation manifests across these languages. The study thus contributes to an emerging understanding of sociolinguistic processes of variation and change in signed languages. Additionally, the project has resulted in creation of a digital (video) corpus of natural NZSL used by a cross-section of signers, which will be a valuable data resource for future analysis and historical preservation purposes.

Three proposed sub-studies within the project were completed as follows:

- 1) Variation in the location parameter ('lowering') of signs formed at the forehead, (a feature of phonological variation).
- 2) Variation in 80 target concepts and numerals 1-20, (lexical variation).
- 3) Variable subject presence (or pronoun deletion) in verb clauses, (a feature of syntactic variation).

Key findings of each of the three sub-studies are reported in the Progress section.

Introduction

Outline of the goals/aims of the research programme and relevant background information.

Theoretical Aims

Moving beyond first generation description of the language of the NZ Deaf community (Collins-Ahlgren 1989; Kennedy 1996, 1999; McKee & McKee 2002), this project focused on the relationship between NZSL and its social context by investigating the variable use of NZSL across the community. The project aimed to identify patterns of linguistic variation in NZSL in features of phonology (component parts of signs), lexicon (vocabulary) and syntax (sentence structure), and to analyse correlations between the use of linguistic variants and social factors of age, region, gender, and ethnicity of signers. Investigating diachronic variation between older and younger generations of signers aimed to clarify understanding of historical change in NZSL. Change through time and stylistic variation between social groups (such as women and men) are characteristics of all languages, and examining sociolinguistic variation in NZSL contributes to a richer account of how and why such processes form a systematic part of human language capacity, regardless of modality – visual or spoken (Shuy 2001). The project also aimed to provide evidence on the question of whether variation in signed languages exhibits features or patterns not found in spoken languages, adding to an emerging

body of research based largely on American Sign Language (as reviewed in Lucas, Bayley & Valli 2001).

Applied aims

Identifying sociolinguistic variation in the lexicon informs the making of dictionaries, which should represent and explain linguistic diversity (Wilcox 2003). This is particularly important for non-written languages without a 'standardised' form, such as NZSL. The Deaf Studies Research Unit maintains an electronic database of a Dictionary of NZSL¹; the project aimed to generate sociolinguistic information about lexicon which will be used in the enhancement of this and the production of future dictionaries.

Growth in the teaching of NZSL as a foreign language since the 1990s has revealed the scarcity of empirical information available to underpin teaching and assessment, and has highlighted the challenge of explaining variation systematically to learners. The project aimed to strengthen the empirical basis for future development of NZSL teaching and assessment tools needed by students, teachers and interpreters.

Investigating sociolinguistic aspects of NZSL was timely in light of government recognition of NZSL as an official language in 2006. Future provision of accessible services and public information in NZSL for the Deaf community will increase the prospect of debate about standardisation, as has been the case with official recognition of Maori language and signed languages in other countries, (eg. the Netherlands, Schermer 2003).

Progress

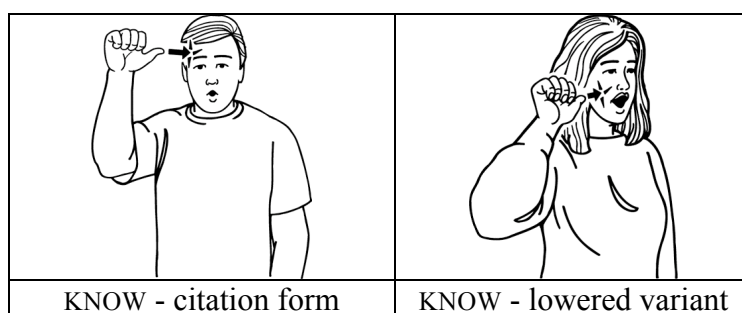
Progress of the programme's research with respect to the achievement of the objectives listed in the contract, commenting separately on each objective. Where relevant, use figures to illustrate text.

Key objectives of the original project plan were set out chronologically by year, covering steps in the project plan - including literature review, methodology planning, development and trialling of research instruments, training research assistants, data collection, transcription and coding of data, statistical analysis and dissemination of results. As these specific yearly objectives have been reported on in previous annual reports, and all steps were successfully completed, this section will focus on reporting findings of the sub-studies that were undertaken (as listed above in Summary section).

Sub-study (1) investigated a feature of *phonological variation* in the articulation of signs. Signs can be analysed phonologically as composed of three main formational elements: a handshape, a location, and a movement. These features are analogous to the phonemes (sound segments) that make up spoken words. In this sub-study, we examined variation in the use of signs that are canonically articulated at the forehead location. In spontaneous discourse such signs are often dropped to a lower point of articulation (eg. the cheekbone or jaw area), as illustrated in Figure 1.

¹ <http://homepages.mcs.vuw.ac.nz/~pondy/projects/signlang.shtml>

Figure 1. Lowering of location in the sign KNOW



Our analysis showed that of the 2,096 instances of ‘forehead location’ signs that occurred in our conversational data, 43% were lowered variants. Lowering correlated most strongly with the gender and region of signers: signers from Auckland and Christchurch (large urban Deaf communities) are more likely to lower these signs than others, and women favour lowering more than men. Pakeha are slightly more likely to lower signs than Maori. Analysis of linguistic environment factors showed that highly frequent verbs are lowered more than other word classes (eg, adjectives, nouns), and that two phonological environment factors promote lowering: a pause (in which the hands are lowered) or a sign articulated at a lower body location immediately following the target sign.


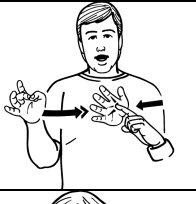


Sub-study (2) investigated the correlation of social factors with *lexical variation*. Using flashcards of a picture or word, we elicited signs for 80 concepts from each of 138 participants. The target concepts included high frequency words for semantic sets such as colours, family members, time signs, numbers, and various nouns, verbs and conjunctions. Each participant produced one sign per concept. The dataset revealed 249 variants for the set of 80 concepts. Table 1 shows that most concepts have two to three alternate forms, and some have four or five variants. It is interesting to note that only one of the 80 concepts was expressed by all signers using the same form.

Table 1: Number of lexical variants per concept

| | |
|------------------------------|-----------|
| Concepts with One variant | 1 |
| Concepts with Two variants | 29 |
| Concepts with Three variants | 28 |
| Concepts with Four variants | 14 |
| Concepts with Five variants | 6 |
| Concepts with Six variants | 2 |
| <i>Total concepts</i> | <i>80</i> |

Within these 249 distinct forms, there was also finer phonological variation - that is, two signs that are basically similar but differing in just one formational parameter such as handshape or movement (eg, Variants 1 and 1a in Figure 2 below). Including these phonological variants, there were a total of 550 recognisable forms for the 80 concepts. Multivariate analysis showed that age group of the signer is by far the strongest determinant of lexical choice, followed by region (with north, south, central distinctions.)

Figure 2. Variants of IMPORTANT as used by all signers

| | Lexical variants of IMPORTANT | Use by percentage of all signers |
|---|--|---|
| Variant 1 |  | 32% |
| Variant 1a (phonologically related to V1) |  | 19% |
| Variant 2 |  | 23% |
| Variant 3 |  | 6% |

Age-related variation point to generational change in the lexicon. In the case of the sign IMPORTANT, Variants 2 and 3 (in figure 2) are used by a small number of signers overall, and these are mainly in the oldest age group. This suggests eventual replacement of this sign in the NZSL lexicon by Variants 1 and 1a.

Age-related and regional variation in signs for HOSPITAL is shown in Figures 3 and 4 below. Figure 3 shows that Variant 1 (top) is favoured by older and middle age groups (ie, signers over 40 years old), and is used relatively less by younger signers. The pattern for Variant 2 (bottom) is the reverse. This suggests a change in progress towards Variant 2 by younger generations. However the results shown in Figure 4 show that region also plays a role in the variable use of signs.

Figure 3. Variants of HOPSITAL by age-group


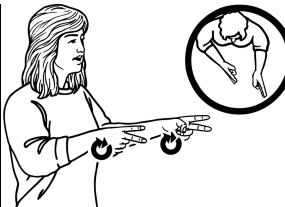
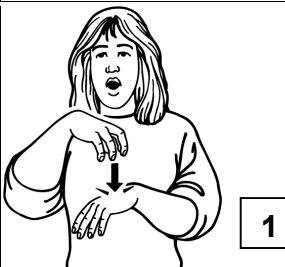
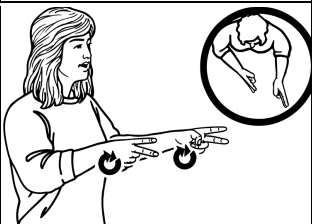
| HOSPITAL variants | AGE | | |
|---|-----|--------|-------|
| | old | middle | young |
|  | 75% | 59% | 42% |
|  | 8% | 35% | 55% |

Figure 4. Variants of HOPSITAL by regional use

| HOSPITAL variants | REGION | | |
|---|---------|-------|-------|
| | Central | North | South |
|  | 56% | 27% | 94% |
|  | 32% | 68% | 3% |

Results in figure 4 indicate that region interacts with age as a factor in variation. As well as older signers generally, all signers in south and central regions favour Variant 1, (an ‘early’ sign). Correspondingly, younger signers generally, and signers in the north favour Variant 2 (a more recently introduced sign). A pattern of overlap between the lexical preference of southern and older signers, and younger and northern signers recurred in the findings. This suggests that signers in the south are maintaining the use of ‘early’ variants, while signers in the north favour use of newer lexical variants.

The effect of age in lexical variation reflects historical change in the use and sources of sign language in deaf education and the community over the past century. Many of the 'early' signs used by signers over the age of 65 years were not produced at all by the youngest group of signers (under 40 years), indicating that these signs will disappear from the language after the lifetimes of the current middle (40 – 65) generation of signers. Generational differences in the lexical data also show a strong trend towards more standardisation in the NZSL lexicon among the younger generation of signers – ie, there is more internal variation within the middle and older groups than within the youngest group.

Factors of gender and ethnicity were found to have a relatively minor effect on lexical variation in the overall data.

Sub-study (3) investigated *syntactic variation*: the variable deletion of an overt subject (pronoun or noun) in verb clauses, and the effects of social and linguistic factors on this variation. We analysed 1175 such clauses from a stratified sample of signers in the data, and found that Pakeha and middle aged signers show a greater tendency to use a null subject form than Maori, or older and younger signers. Gender and region had no significant effect on variation in subject presence. Several linguistic environment factors significantly influence the presence or absence of a subject in a verb clause; these included, (i) the type of verb, (ii) whether the clause is in the form of 'constructed action' in which the signer assumes or enacts the perspective of a subject to directly report their speech and action, and (iii) whether the referent (subject) of the clause is the same or different from the preceding clause. Findings about the effects of these linguistic variables are summarised and explained below:

- i. Signed languages utilise space and movement to package meaning; accordingly, some types of verbs have the capacity to inflect their movement and direction path to 'agree' with the subject /object, agent/recipient, or origin/ destination of an action. For example, the verb 'ask' can be moved from a first person (signer) locus towards a third person locus in space (away from the body) to mean 'I ask him', or conversely, the movement path can be reversed toward the signer to mean 'he asks me'. Spatial verbs of motion such as 'fly-to' or 'put' can similarly be inflected in space to incorporate the point of origin and destination of the action (such as, 'fly-from-here-to-there', or 'put-up-on-shelf'). In such inflecting verbs, the use of an overt (lexical) subject or object in the clause is optional, since the information is also carried in the direction of the verb's movement. Our analysis showed that deletion of an overt subject (ie, a 'null subject' verb clause) is more likely to occur firstly with spatial verbs that indicate location or direction (such as 'put', 'throw'), and secondly with agreement verbs that inflect for person arguments (such as 'ask', 'teach'). Other kinds of ('plain') verbs disfavour subject deletion.
- ii. Null subjects are more frequent in clauses of constructed action, in which the signer 'enacts' the subject of a verb in reported speech, through the use of eye gaze direction, posture and manner.
- iii. Null subjects are more frequent in clauses that refer to the same subject as the preceding clause – ie, when a subject is continuous in the discourse, it is assumed in consecutive clauses without explicit repetition.

In sum, findings from the project confirm our hypothesis that internal variation in NZSL is patterned by both social and linguistic factors. The findings are largely consistent with the types and distribution of variation identified in other signed languages and are analogous with processes of sociolinguistic variation described in spoken languages. The project provides evidence about natural processes of change within a sign language, and helps to account for the impact of social-historical context on the variable use of sign language in a Deaf community.

Two MA students completed research dissertations related to the project. Ten research assistants were trained and employed for various tasks on the project. All but one of these were members of the NZSL community, and two were post-graduate students at VUW.

Details of project outputs (publications and presentations) are supplied in the online report. Further publications are planned, reporting on the lexical and syntactic sub-studies.

Other beneficial outcomes of the project

Executing this project has developed new methodological knowledge and skills within our research team. Transcription and coding of the video-recorded data was a major phase of work in the project, and comprised an important part of the analysis. In this process we learned to use ELAN, a linguistic transcription software that is multi-tiered (like a musical staff), enabling time-aligned transcription of many layers of information, such as: right hand gloss, left hand gloss, mouthing, facial expression, word class, translation, etc. Because sign language is produced in three-dimensional space, simultaneous units of meaning can be expressed simultaneously (eg, on each of two hands), so this tiered transcription tool is perfect for capturing the necessary level of detail. The transcript is also time-linked to a video file displayed in the window, so that glosses within it can be immediately located within the video clip. ELAN is a state-of-the-art tool for sign language research, and one that we now have the skills to continue to use productively. We also learned to use VARBRUL, a statistical package for multivariate analysis of linguistic variation that will be applicable to future analyses of other features of variation in the dataset.

Collection of the sociolinguistic variation data corpus has created a valuable archive of approximately 150 hours of spontaneous (unobserved) NZSL discourse generated by a wide cross-section of signers. The Deaf Studies Research Unit has formal ethics permission from project participants to continue to use this data for future linguistic research, and we envisage that it will be utilised for a multitude of purposes by staff and post-graduate students. Additionally, the corpus captured a snapshot of the language use of all generations of signers – from teenagers to the most senior members of the Deaf community. As project findings demonstrate, NZSL has changed markedly between the oldest and youngest generations of signers and many earlier signs are on the way to disappearing; the corpus thus represents an historical record of the language and the content of older NZSL users' conversations. We are grateful to the Marsden Fund for the opportunity afforded by this project to develop such a rich resource for ongoing investigation and preservation of NZSL.

Additional work

Related work, funded by the Marsden contract, which is in addition to the defined objectives.

In addition to the three planned sub-studies we also completed smaller-scale analyses of two other variable features of NZSL:

- (i) *Variation in use of fingerspelling* - use of a manual alphabet to spell or initialise English words within NZSL discourse. Fingerspelling is a component of many signed languages, but varies in its prevalence between languages; these differences are related to the historical use (or non-use) of a manual alphabet in deaf education, and to literacy in the deaf community. Anecdotally, it is known that the use of fingerspelling is a relatively recent phenomenon in NZSL, and forms only a small part of the lexicon. Its use however is potentially important for borrowing new meanings into the language, especially now that NZSL is increasingly being used in educational and professional/technical contexts. We decided to interrogate the project corpus to determine frequency and types of fingerspelling, and to correlate these with age, region, gender and ethnicity of signers. Results showed that on average, only 3% of NZSL conversational discourse is comprised of fingerspelled word forms (which is considerably less than some other sign languages), and that its use varies somewhat by gender, region and ethnicity: women, northern, and Pakeha signers use fingerspelling slightly more than men, southern, and Maori signers. The use of fingerspelling decreases sharply by rising age - older signers use almost none, and younger signers fingerspell the most frequently. Age-related differences directly reflect the introduction of fingerspelling into deaf education from 1979. This study was completed as an MA research dissertation by Sara Pivac Alexander, supervised by the PIs.

- (ii) *Variation in use of mouthing* - the unvoiced articulation of English word patterns on the mouth simultaneously with manual signs. Sign linguists have noted that mouthing in signed languages has several functions, such as borrowing word forms from a spoken language, disambiguating signs with multiple meanings, and extending the range of meanings that can be expressed by an existing sign (for example mouthing the word 'global' with the sign WORLD, to express a technical meaning). The study analysed a stratified sample of the data to examine firstly, how mouthing is distributed across word classes (nouns, verbs, functors, etc), and secondly, to identify variation in the ratio of mouthing to signs according to the age and gender of signers. It was found that on average, both men and women accompany 73% of their signs with mouthing. Nouns are invariably (100%) accompanied by mouthing, as are most adjectives. Other word classes such as verbs and pronouns have lower rates of mouthing. These findings are consistent with studies of the coordination of manual and mouth components in British and German signed languages. In relation to age, older signers generally mouth more than younger signers, which reflects the emphasis on the articulation of speech (and proscription of signing) during their schooling, whereas younger signers have been more exposed to sign language during formative years, and in general have a more positive attitude towards expressing themselves through manual signs. Table 2 shows results of frequency of mouthing by age, and its distribution by word class.

Table 2. Percentage of signs accompanied by mouthing, by age group and word class

| | <i>Overall</i> | <i>Nouns</i> | <i>Adjectives</i> | <i>Verbs</i> | <i>Pronouns</i> |
|------------------|----------------|--------------|-------------------|--------------|-----------------|
| Old 65+yrs | 85 % | 100 | 100 | 83 | 34 |
| Middle 40-64 yrs | 79 % | 100 | 98 | 67 | 19 |
| Young 15-39 yrs | 70 % | 100 | 76 | 71 | 14 |

Future research

Possible future research directions and proposals arising from the programme.

The DSRU has secured a three-year grant (2008-2011) from the Tertiary Education Commission to develop an Online Multi-media Dictionary of NZSL. Findings from the lexical variation sub-study of this project will be added to that database, to provide sociolinguistic information about sign usage (eg, region and age-group). In addition, the archived variation corpus will be used as a primary source of usage examples (ie, showing signs used in actual, natural sentences) for lexical items in the Online Dictionary. In short, the corpus of variation data will be utilised in various ways in future lexicographical and grammatical description of NZSL.

In the medium term future, we intend to further investigate differences in older and younger, and male and female varieties of NZSL – in linguistic features such as the use of classifier constructions for describing objects and actions, the use of inflectional verb morphology, lexical differences, and conversational strategies.

A current study is being undertaken by R. McKee on the representation of gender and deaf aspects of identity in the conversational narratives of men and women recorded in the variation corpus. A paper on this will be presented at the NZ Language and Society conference in November 2008, to be followed by a journal article.

In 2009, we will have two post-graduate students who intend to undertake research projects on aspects of NZSL discourse markers, based on the variation data corpus.

During the project we consulted with researchers working on similar projects in the UK, Australia and USA. Two joint publications (an article and a book chapter) are now in press, and we hope to collaborate on further cross-linguistic comparison of our findings, including exploring historical relationships between British, NZ and Australian sign languages through comparative data on lexical variation.