South African Sign Language
School of Literature, Language and Media
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An Exploratory Description of Classifiers in South African Sign Language

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Abstract

This dissertation explores the phenomenon of classifiers in South African Sign Language (SASL). In sign language research, the term classifier has been used to refer to linguistic expressions that describe the specific appearance, movement or location of objects or people (e.g. CAR-TRAVELS-ALONG-A-WINDING-ROAD). Due to their highly complex nature, classifiers pose a challenge for categorising them according to existing lexical categories (such as nouns, verbs, adjectives, and so on).

Building on Schembri's seminal work on classifiers - polycomponential verbs (2003) - this research attempts to offer insight into the correlation between some of the formational features of classifiers in SASL and the three concept classes identified by Meir (2012) – *Entity*, *Event* and *Property*. They roughly correspond to noun, verb, and adjective, respectively, but the use of concept classes is preferred in order to avoid the transfer of pre-existing grammatical categories identified in spoken languages to sign languages.

I collected an overall of 50 classifiers from five SASL signers who are native or near native in their language competency. These classifiers are divided into three groups – one-handed classifiers (Group A), two-handed-classifiers with one referent (Group B) and two-handed classifiers with two referents (Group C). I used the Berkley Transcription System (BTS) to transcribe the data. The properties I have chosen to look at are: handshape, eyegaze focus, face and mouth actions, and movement. I also looked at three traditional categories of classifiers (handling, entity and SASS).

The research was two-fold: to provide detailed description of the formational features of classifiers in SASL, and to examine them in terms of three concept classes. Although this study is small-scaled and does not comply with criteria for inferential purposes, it suggests that it is possible to distinguish the three concept classes of classifiers based on some of their formational features. The features which seem to contribute most are eyegaze focus and face and mouth actions. Some face and mouth actions only occur in one particular concept class – such as the combination of 'blowing gently' and 'squint' only appear in *Entity* (for classifiers indicating quantity and extent) and 'expel air' can only be seen in *Event*.

This research also highlights some of the issues and challenges posed by the BTS. BTS follows a semantic approach, making provision for meaning components. However, some of their descriptions of handshape are phonologically based, and this inconsistency impacted on the identification of concept classes in my data. Based on this experience, I suggest the importance of maintaining the integrity of the BTS by using semantically based symbols for all handshapes.

DECLARATION

To whom it may concern

I, Naomi Janse van Vuuren, declare that this dissertation is my own work. It is being submitted for the degree of Master of Arts (by research) in the field of South African Sign Language at the University of the Witwatersrand, Johannesburg. To the best of my knowledge, it has not been submitted before in part or in full for any degree or examination at this or any other university.

____

29 November 2017

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Chapter 1 – Introduction

1.1. Introduction

This research presents an exploratory description of classifiers in South African Sign Language (SASL). It aims to provide a description of the features of classifiers in SASL in relation to the concept classes *Property*, *Event* and *Entity*. The main research question is whether or not the formational features of SASL classifiers could potentially form the bases for differentiating between the three concept classes. Before elaborating on the research question, I will explain the notion of classifiers in sign languages.

It should be noted here that although the use of the term 'classifier' in the context of sign languages has been restricted to informal contexts by some linguistics, it is still used by a number of sign linguists. The use of different terms will be discussed briefly later in this chapter.

In sign languages, the term 'classifier' is used for signs that describe the appearance, movement or location of objects or people. For example, a classifier can indicate the particular movement of a particular kind of vehicle. The English sentence 'The car drives slowly up the hill' can be expressed with one SASL sign, using a particular handshape (representing the vehicle), the kind of movement (slow), movement path (uphill), and facial expression (indicating difficulty or the relaxed state of the driver, etc.). Classifiers are also used to express visual-geometric descriptions, for example the thickness of a book or the way in which objects are handled, or placing a cup on a shelf.

Classifiers form an important part of the productive lexicon of the majority of sign languages studied thus far. Sign languages tend to have a relatively small established lexicon (i.e. lexical items one would find in a dictionary), and a larger productive lexicon, i.e. new combinations are constantly created in different contexts. Brentari defines the native lexicon of American Sign Language (ASL) as “the part whose forms (1) are monomorphemic and (2) show no synchronic traces of elements borrowed from English through fingerspelling.” She claims that the lexicon expands through components that are excluded by this definition of the native lexicon, amongst others “concatenating classifier forms and movement roots” (1998: 81-82).

Johnston and Schembri, using different terms, subdivide the native lexicon of Australian Sign Language (Auslan) into “core and non-core components”. The core (established) native lexicon is described as representing “the heart of the lexicon in Auslan, and [it] forms the basis of the vocabulary listed in dictionaries of Auslan” (2007: 158-159). They also identify a non-core lexicon (i.e. productive lexicon) of which the most important types are classifiers (what they call ‘depicting’ signs) and pointing signs. “Depicting signs [classifiers] differ from lexicalized signs because the former are traditionally considered to be actively created by signers from combinations of meaningful units” (2007: 164). Figure 1-1 below illustrates Johnston and Schembri’s model of the Auslan lexicon (2007: 158).

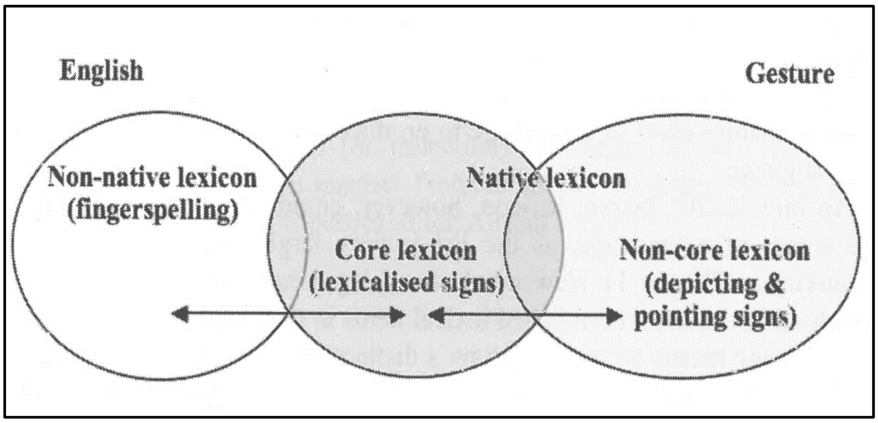


FIGURE 1-1 JOHNSTON AND SCHEMBRI'S MODEL OF THE AUSLAN LEXICON

Cormier et al. present an extended model of sign language lexicons as illustrated in Figure 1-2 below (2012: 344). They argue that handling and entity constructions could be either lexicalised (i.e. part of the core lexicon) or de-lexicalised (i.e. part of the non-core lexicon). "When working with sign language data, a particular token of an entity construction or handling construction may be fully lexicalised, not at all lexicalised, or somewhere in between" (2012: 345).

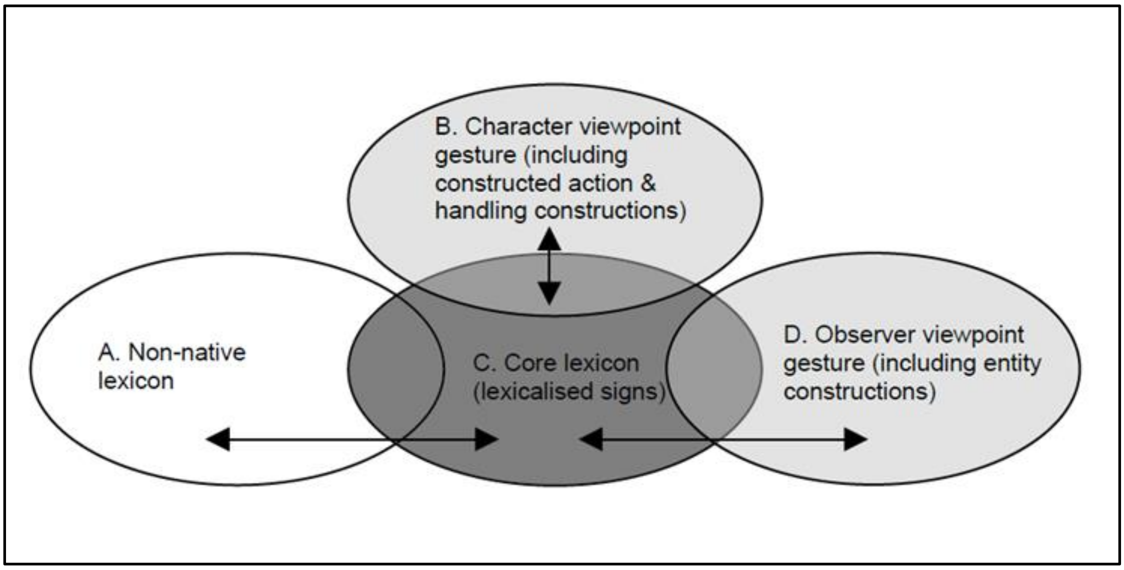


FIGURE 1-2 REVISED MODEL OF THE SIGN LANGUAGE LEXICON MODEL

In line with the model of the Auslan lexicon in Figure 1.1 above, Aronoff et al. state that "the different classifiers, relative locations, and array of movement patterns productively enter into a potentially vast number of constructions" (2005: 23). Johnston and Schembri claim that the productive lexicon is very prevalent in everyday sign usage. According to Brennan (1992: 46) there are "a significant number of signs, which have been created or re-created on the spot, as required by the topic or context of the discussion."

These creative signs do not form a stable system, exactly because they are created based on what the signer needs to communicate. There are no citation forms for creative signs, i.e. they will not be found in any dictionary. According to Wallin (1990, cited in Dye, 2012) even when signers create new signs, these signs will be understood by other signers with relative ease. This does not necessarily mean that classifiers constitute the larger part of all sign language lexicons. According to De Beuzeville et al. (2009), out of 8,642 sign tokens, only 9% were depicting verbs, i.e. classifiers.

According to Valli and Lucas "… it [classifier] is a symbol for a class of objects…. A classifier in ASL is a handshape that is combined with location, orientation, movement and non-manual signals to form a predicate" (2000: 79). Sutton-Spence and Woll support the following set of criteria for classifiers in sign languages traditionally subscribed to by sign language researchers (1999: 48):

1) Their referents must form a group that shares some common features (e.g. in SASL the B-handshape is generally used for ‘flat objects’ such as a stack of paper or a book.
2) They are ‘proforms’ (i.e. they must have a referent that has already been identified in the discourse).
3) “They occur in verbs of motion or location.”

In order to contextualise the development of research on sign language classifiers, it may be useful to provide some general information about the history of sign language research. The tendency from the 1960s -80s was that researchers focused on legitimising sign languages as equal to spoken languages. Stokoe used the term *cheremes* to compare the visual elements of signs to phonemes in spoken languages (cf. Stokoe, 1960). After Stokoe’s identification of cheremes, supported by Battison (cf. 1980, reprinted in Valli & Lucas, 2000), later researchers developed a different phonology model – the Hold-Movement Model (cf. Liddell & Johnson, 1989). In these early stages of sign language phonology research, it was claimed that phonemes and minimal pairs in sign languages mirror the segmental structures of their spoken language counterparts. There are, in fact, some examples of such ‘mirrored’ phonological structures, i.e. signs which differ segmentally similar to spoken language minimal pairs (see Table 1-1 below, adapted from Valli & Lucas, 2000: 273). The majority of examples of minimal pairs in sign languages (based on parameter differences) do not seem to conform to the spoken language norms for the identification of minimal pairs through segmental structure analysis. This is the result of the visual and simultaneous nature of sign languages.

Apart from this, Brentari (1998) points out that if ASL were to have pairs of signs that differ because of the different value of only one feature, the language would have 299 phonemes. She also points out that "not all features in this model are established by the diagnostic of lexical contrast, since it is obviously very difficult to hold 298 features constant and vary just one (1998: 85).

	THANK-YOU		
	first part	*middle part*	*last part*
movement	hold	move out	hold
location	chin	transitional	out from chin
orientation	palm to chin	transitional	palm to chin
hand configuration	B	transitional	B
		BULLSHIT	
movement	hold	move out	hold
location	chin	transitional	out from chin
orientation	palm to chin	transitional	palm to chin
hand configuration	B	transitional	S

TABLE 1-1 SEQUENTIAL CONTRAST BETWEEN THE MINIMAL PAIR BULLSHIT AND THANK-YOU

Schembri (2003: 10) calls the trend of sign linguists applying spoken language research and terminology to sign language research the "transfer and test approach". The reason for the transfer and test approach in sign language research is that historically sign languages have been seen as gesture or mime, and as incapable of expressing abstract thought. Compared to the 'norm' (i.e. spoken language structure) sign languages were seen as a) lacking proper structure, and b) simplified, concrete versions of spoken languages.

Lane et al. (1996) identify and refute the following misconceptions about [A]SL: Sign languages are pictorial, universal, concrete (and therefore primitive) and they constitute [spoken] English expressed on the hands. The transfer and test approach was useful in refuting these misconceptions as it was easier for the majority of people to relate to spoken language frameworks and terminology. The spoken language terminology 'legitimised' sign language research at the time.

The initial identification and linguistic description of classifiers in sign languages conformed to the tendency at the time to equate sign language structures to spoken language structures (cf. Supalla, 1986). Early research on classifiers in sign languages originates from a publication on classifiers in spoken languages, written by Keith Allan in 1977. I will discuss the notion of spoken language classifiers as well as classifiers in sign languages in Chapter 2.

Over the last three decades a different awareness about sign languages has been established, namely that they are languages in their own right, and do not need to conform to spoken language structures in order to be recognised as natural languages. As a result of this, a number of researchers started questioning the use of the term 'classifiers' in the context of sign languages, given the fact that it was based on some incorrect assumptions about spoken language classifiers published by Allan in 1977. However, the term classifier seems to be firmly entrenched in sign language literature, Deaf communities and educational institutions, despite attempts to introduce other terms. I will therefore continue using this term throughout the dissertation.

Johnston and Schembri (1999) use the term ‘classifier’ in inverted commas “to underline the fact that there is a degree of analytical uncertainty in this area, even though this terminology has been used for some time in the analysis of some of these types of handshapes” (1999: 122).

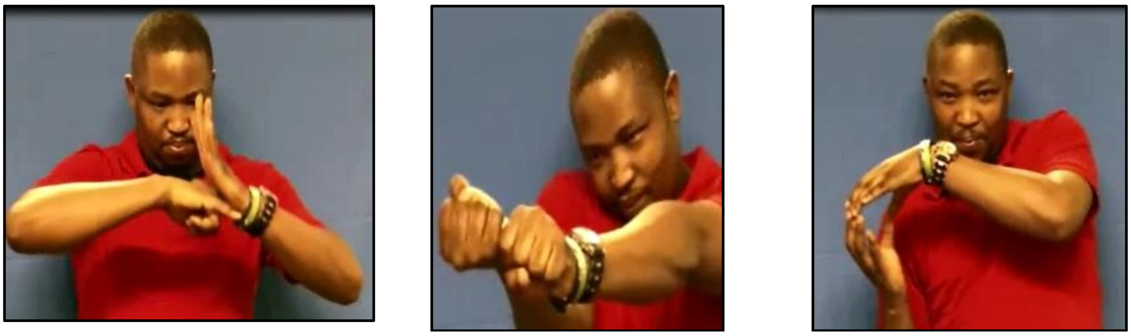
Recently other sign linguists have used terms such as *classifier form*, *classifier constructions*, *classifier handshapes* and *small-animal-classifier* (Goldin-Meadow & Brentari, 2017), *classifiers*; *classifier constructions* (Lepica et al., 2016) *classifier*; *depicting constructions* (Fenlon et al., 2015; Cormier et al., 2015), *classifiers*, *classifier handshapes*, *handle classifiers* and *entity classifiers* (Baker et al., 2016), depicting *signs also known as classifier signs* (Johnston et al., 2015), *depicting handshapes* (Engberg-Pedersen, 2015) and *classifiers, currently also called ‘depicting handshapes’* (Zwitserlood, 2012).

Although the issue of terminology has become controversial, at least there seems to be consensus about the three traditional main categories of classifiers in sign languages which originated from Supalla’s seminal work published in 1986 - *The Classifier System in American Sign Language*. For the current study I have adapted the three main categories identified by Johnston and Schembri (2007: 168-170). As can be seen below in Table 1-2, they use the term “handshape” whereas I chose to use the term classifier.

Entity handshapes	"The handshapes used as entity classifiers often resemble the shape of the object, or some part of the object they represent"
Handling handshapes	" … imitate the hands interacting with an object … how a human or animal handles some referent and what happens to it as a result of this handling"
Size and Shape Specifier handshapes (SASSes)	" … classifier handshapes used to describe the referent object by outlining its shape and size"

TABLE 1-2 JOHNSTON AND SCHEMBRI'S DESCRIPTION OF THE THREE CLASSIFIER CATEGORIES

The descriptions of the three main categories of classifiers in Table 1-2 above will be used to identify the same categories in SASL. Figures 1-3(a)-(c) below provide some SASL examples of each of the three categories of classifiers mentioned in Table 1-2. These examples were obtained from the SASL Department's teaching material archive. The signer in these images is also one of the research participants in this study.



a) Entity handshapes AEROPLANE-CRASH-IN-SEA

b) Handling Classifier HOLD-BASEBALL-BAT

c) SASS PIPE-MEDIUM-DIAMETER

FIGURE 1-3 SASL EXAMPLES OF THE THREE CLASSIFIER CATEGORIES

1.2. Research question

The aim of this study is to provide an exploratory description of the formational features of classifiers in SASL in relation to the three concept classes of *Property*, *Event* and *Entity* against the background of research in other sign languages. In order to avoid the transfer of spoken language word class categorisations to the SASL data in this study, I decided to use the three concept classes, in particular because they are semantic in nature. Meir (2012: 96) provides a summary of the diagnostics for word classes in sign languages in table format. Table 1-3 below – adapted from Meir 2012 - illustrates that the word class of 'verbs' corresponds to the concept class *Event*, the word class of 'nouns' to the concept class *Entity* and the word class of 'adjectives' to the concept class *Property*.

		Nouns	**Verbs**	**Adjectives**
semantic	Concept class	Entity	Event	Property

TABLE 1-3 MEIR'S CORRESPONDING WORD CLASSES AND CONCEPT CLASSES

Some researchers, amongst others Schembri (2003) and Valli et al. (2011), support the claim that all three categories of classifiers fall into the lexical category of verbs. Their descriptions of these verbs are presented below. The point of this comparison is to show that they group all classifiers together under the concept class *Event*. What Schembri and Valli et al. have in common, is that they categorise shape and size specifiers as verbs.

Schembri chooses to use the term ‘polycomponential’ verbs and identifies three categories of these verbs: verbs of motion and location, verbs of handling and predicates of visual-geometric description. Valli et al. chooses to use the term ‘depicting’ verbs and also identifies three categories of these verbs. The first type shows where something is in space, the second type shows what something looks like, how it is shaped or how objects are arranged and the third type shows movement or actions including “signs depicting people holding and using objects, such as drinking from a teacup …” (Valli et al., 2011: 142).

Valli et al. provide a brief overview of the controversy surrounding the term ‘classifier predicates’ and they equate the following terms – polycomponential verbs, polymorphemic verbs and depicting verbs. Despite this ‘equation’ of terms, the sub-categories they propose for their choice of term – ‘depicting verbs’ – differ extensively from Schembri’s sub-groups. They do not name the three sub-categories they identify. Their category for showing movements and actions includes Schembri’s category of verbs of handling, but excludes ‘location’ (which they separate as a category on its own).

The main research question is as follows: Are there any formational features of classifiers in SASL which could form the basis for differentiating between the concept classes *Event*, *Entity* and *Property*?

The focus of this dissertation therefore is two-fold:

a) It will provide an overview of the history of research and terminology relating to classifiers in sign languages.
b) It will provide a detailed description of classifiers in SASL in the following way:
    i. A description of selected formational properties of classifiers in SASL (in this case, handshapes, eye gaze, mouth and face actions and movement)
    ii. The potential relation between the above-mentioned formational properties and the concept classes

1.3. Reasons for undertaking the study

At this point in time, there is a dearth of research in the field of SASL. Although quite a number of articles about language policy has been published and a few about sociolinguistic phenomena, there are very few publications about the linguistic structures of SASL (apart from recent postgraduate research reports and MA dissertations).

A large number of research articles about classifiers in sign languages have been published since the 1980s, representing a number of sign languages, e.g. ASL, British Sign Language (BSL), Turkish Sign Language (TID), the Sign Language of the Netherlands (NGT – Nederlandse Gebarentaal), Indo-Pakistani Sign Language (IPSL), to mention a few. All sign languages studied thus far have been found to make use of the three traditional categories of classifiers mentioned earlier. To date, only one exception has been found - Adamorobe Sign Language (AdaSL) from Ghana (cf. Nyst, 2007).

Classifier constructions in sign languages have attracted attention from many researchers in the field for a number of reasons, explained below. Due to the visual and simultaneous nature of sign languages, classifiers in sign languages are likely to be a unique phenomenon. The literature review provides detailed information about the differences and / or similarities between classifiers in spoken languages and classifiers in sign languages.

There are only two academic publications on classifiers in SASL: *The interaction of classifiers and syntax in South African Sign Language* - Aarons, D. & Morgan, R. (2000) – and *Classifier Predicates and the Creation of Multiple Perspectives in South African Sign Language* - Aarons, D. & Morgan, R. (2003).

The 2000-publication focuses on the interaction between classifiers and syntax. This publication does not investigate the formational features of classifiers in SASL as such. The later publication focuses more on the role of classifiers in creating multiple perspectives. Although the role of eyegaze is discussed in this article, it relates to discourse rather than formational features of classifiers. This is the first thorough investigation of formational features of classifiers in SASL, which is an understudied sign language.

The simultaneous use of different units in sign languages poses some very interesting categorisation challenges. Apart from the morphemic use of the parameters (i.e. the different meanings represented by handshape, orientation, movement, location and nonmanual features in a classifier), there are also adverbial modifications that can be articulated simultaneously. Schembri uses the example [TREE] VERY-THICK-TRUNK to illustrate that adverbial modification of adjectives can be articulated simultaneously (Schembri, 2001: 30). In English, for example, separate adverbs modify adjectives, i.e. separate lexical items. Not all sign languages make use of such lexical items. In SASL, for example, there is no separate sign for VERY (unless people use signed English). The meaning is embedded within the relevant sign by intensifying the nonmanual features and / or the manual sign.

The misconceptions about ASL mentioned earlier apply to sign languages in general and have hindered the official and legal recognition of sign languages. This includes a lack of corpus planning (i.e. lexical creation and expansion, standardisation and text book production). If a language is not codified (e.g. the absence of textbooks or online dictionaries and so on), the development of curricula for teaching such a language becomes problematic. I will elaborate on this in the following paragraphs.

In South Africa, 'Sign Language' was officially recognised as the language of the Deaf community of South Africa for the first time in the *SA Constitution* (1996a)and also as an 'official language' only for purposes of education in the *SA Schools Act* (1996b). Despite official and legal recognition, implementation remained a problem.

Due to the outcome of a court case against the Department of Education as well as continuous lobbying efforts by the Deaf Federation of South Africa (DeafSA), SASL has been implemented as a school subject for Deaf learners in 2015 (Springate & Others vs the Minister of Education and Others, Case no 4846/2009). SASL as a school subject is a new development and there is an urgent need for data on the linguistic structures of the language a) to substantiate the curriculum and b) to enable the development of materials required for teaching. Naturally, research across all levels of linguistic enquiry is necessary (i.e. phonology, morphology, syntax, discourse, sociolinguistics, etc.).

Currently there are three tertiary institutions offering SASL on both undergraduate and postgraduate levels – University of the Witwatersrand (Johannesburg), University of the Free State (Bloemfontein) and the University of Stellenbosch (Stellenbosch). Northwest University (Thlokwe) is in the process of phasing in SASL as a major course for undergraduate studies. These four institutions are distributed across South Africa, which means that there is potential for corpus building in different geographical locations where Deaf people may use different varieties of SASL. The point here is that this particular study could be replicated in other institutions. This could contribute to an academic body of literature about the language, which in turn would feed into curricula and text books, including the field of interpreting studies.

In light of the points made above, it would seem that studying SASL classifiers is a natural choice. This kind of research could contribute to the formal SASL school curriculum and also to the codification of SASL, including the development of text books and curricula for public schools and tertiary institutions. Furthermore, the data will be archived electronically for purposes of academic teaching in the SASL Department at the University of the Witwatersrand.

I organised the dissertation as follows: Chapter 2 provides a basic introduction to the notion of classifiers in sign and spoken languages, an overview of classifier research in spoken and sign languages, word classes in sign languages, mouth and face actions, as well as eyegaze.

Chapter 3 describes the data collection process, the metadata of the participants, ethical considerations, the Berkeley Transcription System (abbreviated as BTS, see Slobin et al., 2001), the organisation of ELAN tiers as well as detailed descriptions and explanations of all tiers. In this chapter, I included relevant examples from the SASL data collected for this study to illustrate all explanations. I also explain the method of description / analysis that I used.

I present the data in detail in Chapter 4 which is followed by a detailed discussion in Chapter 5, including a discussion of the BTS. Finally, in Chapter 6, I discuss the limitations of this study as well as further research that could be undertaken on the basis of the data discussion.

Chapter 2 - Literature Review

2.1. Introduction

This research provides a description of a selection of formational properties of classifiers in SASL in relation to the three concept classes as mentioned in Chapter 1. As explained in Chapter 1, SASL is an understudied sign language, and for this reason I start the literature review with some information about the social context of SASL.

The literature review is divided into five parts: the social context of SASL, a basic introduction to the notion of classifiers in sign and spoken languages, classifier research in sign languages, mouth and face actions and eyegaze function and focal points.

2.2. The social context of SASL

The most recent census in South Africa reports that the number of signing Deaf South Africans is 234 655 as is evident in Table 2-1 below. Over the years, the number of signing Deaf South Africans has 'varied' between 500 000 to 1 6837 in different documents and policies. In a memorandum submitted to the South African Parliament in 2007, the Deaf Federation of South Africa (DeafSA) estimates the number of Deaf South Africans as one million. Table 2-1 is from the 2011 census in South Africa (2012: 23). Table 2-2 below is from Heap (2003: 12), who quotes the Central Statistics Service mid-year estimates from 1994, estimating the number of signers at 1 609 386. Heap and

Morgans (2006) confirm the various estimates described above, indicating that 1.5 million is a more likely number.

First Language	WC	EC	NC	FS	KZN	NW	GP	MP	LP	SA
Afrikaans	2 820 643	683 410	606 225	340 490	161 876	309 867	1 502 940	289 446	140 185	**6 855 082**
English	1 149 049	362 502	37 842	78 782	1 337 606	120 041	1 603 464	124 646	78 692	**4 892 623**
IsiNdebele	15 238	14 854	6 023	10 008	111 657	43 988	380 494	403 678	104 283	**1 090 223**
IsiXhosa	1 403 233	5 092 152	60 187	201 145	340 832	190 601	796 841	48 993	20 275	**8 154 258**
IsiZulu	24 634	31 634	8 501	118 126	7 901 932	84 835	2 390 036	965 253	62 424	**11 587 374**
Sepedi	8 144	14 299	2 431	7 395	20 555	83 999	1 282 896	372 392	2 826 464	**4 618 576**
Sesotho	64 066	158 964	14 136	1 717 881	79 416	201 153	1 395 089	138 559	80 299	**3 849 563**
Setswana	24 534	12 607	373 086	140 228	52 229	2 191 230	1 094 599	71 713	107 021	**4 067 248**
Sign language	22 172	42 235	3 933	32 910	48 575	14 924	52 744	8 932	8 230	**234 655**
SiSwati	3 208	2 020	648	2 246	8 347	12 091	136 550	1 106 588	25 346	**1 297 046**
Tshivenda	4 415	3 663	1 083	2 592	4 309	16 255	272 122	12 140	892 809	**1 209 388**
Xitsonga	9 152	3 092	1 201	8 039	8 936	127 146	796 511	416 746	906 325	**2 277 148**
Other	127 117	36 893	12 385	15 935	77 519	60 872	371 575	39 639	86 322	**828 258**
Total	**5 675 604**	**6 458 325**	**1 127 683**	**2 675 777**	**10 153 789**	**3 457 004**	**12 075 861**	**3 998 726**	**5 338 675**	**50 961 443**

TABLE 2-1 THE NUMBER OF SIGNING DEAF SOUTH AFRICANS IN THE 2011 CENSUS

Province	Total population	Profoundly deaf (1%)	Extremely hard of hearing (3%)	Hard of hearing (6%)	Total
Western Cape	3 633 077	36 331	108 992	217 985	363 308
Eastern Cape	6 436 790	64 368	193 104	386 207	643 679
Northern Cape	737 306	7 373	22 119	44 239	73 731
Kwazulu Natal	8 505 338	85 054	255 160	510 320	850 534
Free State	2 726 840	27 268	81 805	163 610	272 683
North West	3 252 991	32 530	97 590	195 179	325 299
Northern Transvaal	5 201 630	52 016	156 049	312 098	520 163
Mpumalanga	2 921 559	29 216	87 647	175 294	292 157
Gauteng	6 869 103	68 691	206 073	412 146	686 910
Total I	40 284 634	402 847	1 208 539	2 417 078	4 028 464
Estimated number: Signing as first language		**1 609 386**			
Source: Statistics correlated with prevalence figures researched by the SANCD [South African National Council for the Deaf, now Deafsa] Clinical Service Division Presented: Workshop on Prevention of Hearing Impairment in Africa: 24-27 October 1995, Nairobi, Kenya.					

TABLE 2-2 THE ESTIMATED NUMBER OF SIGNING DEAF SOUTH AFRICANS IN 1994

Recent literature indicates the current prevalence of dialect levelling in some sign languages (Stamp et al., 2015, Eichmann & Rosenstock, 2014, McKee & McKee, 2011, and Stamp et al., 2014). These sign languages include BSL, New Zealand Sign Language (NZSL) and Deutsche Gebärdensprache (DGS - German Sign Language). However, there is still lexical variation in SASL despite anecdotal observations of lexical adaptation and potential dialect levelling. Schermer (2016) confirms the general observation that variation in sign languages is usually evident in the lexicon. As is the case with most documented sign languages, there are a number of social factors causing lexical variation and these factors cannot really be separated from each other.

The extensive lexical variation previously observed in many sign languages has generally been attributed to the existence of separate schools for Deaf children (Aarons & Akach, 2002, Quinn, 2010 and McKee & McKee, 2011). The social factors for the variation were not always the same but invariably the different schools for Deaf children in the relevant country played an important role. This phenomenon seems to have been universal for most sign languages. However, according to Stamp et al. (2015), the closure of schools for Deaf children resulted in Deaf children not being exposed mainly to the lexical items associated with particular schools and this could possibly explain the reduction of lexical variation in BSL.

Factors causing lexical variation in documented sign languages seem to be applicable to SASL as well, such as the hearing status of parents, region (the location of schools in particular), founders of schools, race, ethnicity, age, religion, gender, sexual orientation, identity, education, language policy and class (Schermer, 2016). As in other countries (where there are still schools for Deaf children) schools have been the 'language acquisition agents' where young signers learn from older signers, Deaf teachers and hearing teachers with varying levels of proficiency in SASL (Quinn, 2010). For this reason, the focus of this section will be on the history of schools for Deaf learners.

In South Africa, schools for Deaf children were founded mainly by various religious denominations between 1863 -1963. Prior to 1900, the state did not make any provision for the education of children with disabilities, including Deaf children (Naicker, 1999). The Catholic Church was the first to provide education for Deaf children in South Africa. Different orders from the Catholic Church founded a number of schools for children with disabilities in South Africa from 1874 - 1976, including schools for Deaf children (Schäffler, 2002). The Dutch Reformed Church, the Anglican Church and the Dutch Reformed Mission Church followed suit.

The South African government only became involved in the mission schools for white disabled children in 1900, and in 1928 introduced *The Special Education Act*, which made provision for vocational training and so-called 'special schools' for white disabled children. In 1937 *The Special Schools Amendment Act* was passed, which made provision for hostels in special schools for white children. This act signaled the end of multi-racial missionary schools (Naicker, 1999).

During the apartheid era, the regime did not only segregate black and white people (i.e. racial segregation) but actually created so-called Bantustans for different ethnic groups. This determined the region where a school for Deaf children was founded and also had an impact on language policy and language use. This 'education separation' was implemented in 1953 with the *Bantu Education Act*. Furthermore, black Deaf children did not receive education on the same level as white Deaf children as long as apartheid lasted.

Schools founded by the Catholic Church

Most literature reports the date of the founding of Dominican Grimley (the first school for Deaf children in South Africa) as 1863. However, according to Boner (2000, cited in Heap, 2003), the first school for Deaf children was founded in 1874 by the Dominican Orders of Cabra. St Joseph's School, later known as Dominican Grimley, was located in Cape Town and was multi-racial until 1937, when black and coloured Deaf children were separated from the white Deaf children.

The reason for this separation was *The Special Schools Amendment Act* which made provision for hostels in special schools for white children. The implication of this act was that Grimley could no longer accommodate 'non-white' children. In order to accommodate, coloured and black Deaf children the Dominican Order then founded another school in Cape Town in 1937, called Dominican Wittebome, which became strictly 'coloured' after the *Group Areas Act* of 1951. As a result of this, the Dominican Order founded a school for black Deaf children in Hammanskraal in 1962.

The medium of instruction in all three schools was Irish Sign Language. Dominican Grimley gradually started to adhere to oralism in 1920**.** In contrast, Wittebome and

Hammanskraal tolerated the use of sign language and did not practise forced oralism (Aarons & Akach, 2002). It is noteworthy that members of the Deaf community in Gauteng have reported many similarities between the lexical items used by older Deaf people at Hammanskraal by and Wittebome, although geographically the distance between the two schools is 1, 552 km. This phenomenon serves as an example of the influence of religious denomination (Irish Catholicism) in a racially segregated environment.

At the time, the education of white Deaf children focused on the acquisition of speech skills, and signing was prohibited. Black Deaf learners, however, were allowed to use SASL freely, even though their teachers used an apparent hybrid signing system in an attempt to achieve speech and lip-reading skills (Nieder-Heitmann: 1980, 229). Here we can see that race, ethnicity, language policy, geographical location, age and religion intersect as social factors causing lexical variation in SASL.

According to Schäffler (2002), the Dominican Order of the Sisters of St Catharine of Siena arrived in King William's Town in 1877. They founded The King William's Town Convent School for the Education of the Deaf in 1888. The school moved to Johannesburg in 1933 and was then re-opened as St Vincent School in 1934. The principal of St Vincent came from a British Sign Language background. The same order founded St Thomas School for Deaf Xhosa children in Woodlands near King William's Town in 1961. A teacher from St Vincent School became the principal of this school. By 1961, oralism, as well as institutionalised apartheid was firmly entrenched in the education of Deaf children, and the extent of lexical similarities (if any) between St Vincent and St Thomas has not been established.

Schools founded by the Dutch Reformed Church (DRC)

The Dutch Reformed Church founded a number of schools across South Africa – mainly schools for Black Deaf learners through its 'mission' branch. It is in particular famous for founding De la Bat School in the Western Cape, which was the first Protestant school for Deaf children in South Africa. De la Bat School was founded in 1881 in reaction to the founding of Dominican Grimley (which was Catholic). It catered strictly for white Deaf children from Afrikaans families and provided education solely from a Protestant perspective (Die Instituut vir Dowes[1], 1981).

The first teacher (and principal) of the school grew up with a Deaf brother and could sign. Before starting to teach, he went for training in Groningen in the Netherlands, an institution which initially used sign language in education (Die Instituut vir Dowes, 1981: 8). At De la Bat signing was allowed initially, yet it also became strictly oral as the aftermath of the 1880 Milan Congress spread globally and the use of sign languages in education was banned.

[1] The Institute for the Deaf

Based on personal conversations with members of the white Deaf community in Worcester during my time as a teacher at De la Bat School (1992-2000), the initial variation in SASL at De la Bat School was the result of the intersection of four social factors – religious denomination of the founders, race and language policy. 'Sign-supported Afrikaans' was allowed as from the mid-1980s which means that the children were allowed to sign, but had to do so while speaking the 'white' variety of Afrikaans. However, the change in racial profile of the school since 1992 again resulted in variation as a result of race, not because of apartheid in this case but because of the heterogeneous community in the same school environment. Another reason for this variation has been the gradual change in language policy.

Currently the use of SASL is encouraged in the school and SASL is an official language subject. Furthermore, the school is no longer accommodating children only from a Protestant background or a particular racial group – children from diverse religious and cultural backgrounds attend the school. If one were to compare the SASL used by a white Deaf signer over the age of 45 and the SASL used by a white Deaf signer under the age of 25, it is likely that lexical variation based on age would be evident. Given the background previously explained, religion, race, region and language policy are inseparable from age in this particular context.

Nuwe Hoop is another school for Deaf children in Worcester, founded by the Dutch Reformed Mission Church in 1933 in order to provide Protestant education for coloured Deaf children. Similar to De la Bat, some signing was allowed along with spoken Afrikaans. Although the distance between the schools is no more than 3km, there is extensive lexical variation between Nuwe Hoop and De la Bat. The social factors playing a role here are ethnicity and the founders of the two schools against the background of apartheid - the Mission Church only accommodated 'non-whites'. Both schools have boarding facilities.

Apart from De la Bat School, the DRC founded one other school for white Deaf children in Pretoria in 1954 – Transoranje School. Based on personal conversations with children who attended this school in 2001-2003 (when I was a teacher there), lexical variation existed between the two schools although there were no racial, religious, denominational or language policy differences. In this particular case, it would seem that the physical geographical location is the only factor involved in variation.

The Catholic Church and the DRC were the main founders of schools for Deaf children in South Africa. The Anglican Church founded Fulton School in Durban in 1958. This school made provision for white Deaf children from an English background. If we compare De la Bat School and Fulton School, there is also a high level of lexical variation. The social factors at the time would have been religious denomination of the founders and white English vs. a white Afrikaans cultural background (Aarons & Akach, 2002).

The history of schools for Deaf children in the context of the country's social context, results in a richness of lexical variation which is an open invitation for corpus building and related research projects. Apart from this, as from 2003, the Deaf Federation of South Africa (DeafSA) has been lobbying for the use of SASL in schools for Deaf children as both a language of learning and teaching and as a school subject. The organisation has also been lobbying for SASL as the 12th official language of South Africa. On 17 February 2017, DeafSA submitted a petition to the Constitutional Review Committee for accepting SASL as South Africa's 12th official language – see Figure 2-1 below.

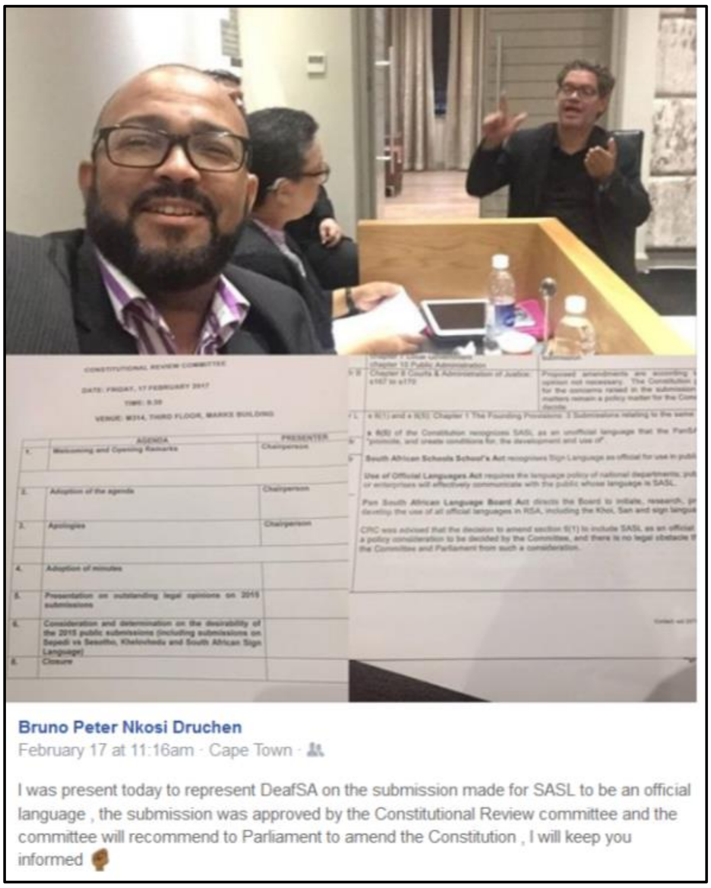


FIGURE 2-1 THE SUBMISSION FOR PARLIAMENT'S AMENDMENT OF THE SA CONSTITUTION COMMUNICATED VIA SOCIAL MEDIA

Social media also contributes to data collection, albeit informal – see Figure 2-2 below, which is an example of the De la Bat School network, nominating their friends, and even hearing teachers, to sign their three favourite signs from the time they were in school.

Translation of text: Now I nominate … to do the same. Good luck and enjoy it!

FIGURE 2-2 INFORMAL CORPUS BUILDING ON SOCIAL MEDIA (SASL)

2.3. Classifiers - Introduction

In 2003, Adam Schembri published a seminal book chapter, *Rethinking "Classifiers" in Signed Languages*. In this article, Schembri provides a thorough overview of classifier research conducted across sign languages. He contextualises the overview and the discussion by identifying the problems relating to characteristics and terminology relating to classifiers in spoken languages and sign languages. He also explains how the subsequent 'transfer' of these problems from spoken language research classifiers in sign languages created certain problems in the description and analysis of sign language classifiers.

There are three main categories of classifiers evident in most literature about classifiers. At this point it is useful to explain which terms Schembri uses to describe the three traditional main categories of classifiers in sign languages. He uses the term *polycomponential verbs* to include the categories listed below.

1) Handling classifiers — "verbs of handling"
2) Entity classifiers – "verbs of motion and location"
3) Size and shape specifiers (SASSes) — "verbs of visual geometric description"

(Schembri, 2003: 5 & Johnston & Schembri, 2007)

Before discussing Schembri's arguments more in depth, an explanation of the term 'classifier' in the context of spoken languages is required. The reason for this is that the notion of 'classifier predicates' in sign languages stems from Allan's 1977 typology of classifiers in spoken languages.

Allan identifies two criteria for spoken language classifiers: a) they occur as morphemes and b) they have meaning because they denote some characteristic of the referent (1977: 285). He identifies four different types of classifiers namely numeral classifiers, concordial classifiers, predicate classifiers and intralocative classifiers. The focus here will remain on predicate classifiers because sign language researchers initially applied this particular type of spoken language classifier to classifiers in sign languages. His notion of predicate classifiers – illustrated in Table 2-3 below - is based on insufficient data from a language called Navajo (1977: 287).

In each case the classifier examples appear in the first row. It is clear that the only difference between these three phrases / sentences is the hyphenated suffix that appears at the end of each. In this particular case, 'á', 'níl' and 'łtsóóz' **seem** to be classifiers and it also seems that the classifier morphemes are overt. However, Schembri points out that the "so-called single solid roundish object stem **ą́** is also used for referring to stories, songs, and business propositions, and the slender flexible object stem **-łtsooz** is used for plural masses of objects, as well as objects of unknown class (2001: 127).

béésǫ sí-ʔ$\boxed{\text{á}}$	**béésǫ sí-$\boxed{\text{níl}}$**	**béésǫ sí-$\boxed{\text{łtsóóz}}$**
money perfect-lie (of round entity)	money perfect-lie (of collection)	money perfect-lie (of flat-flexible entity)
A coin is lying there.	Some money (small change) is lying there	A note is lying there
ą́ = solid roundish object, e.g bottle, ball, boot, box	**-nil** plural objects 1, e.g. eggs, balls, animals, coins	**-łtsooz** = flat flexible object, e.g. blanket, coat, sack of groceries,

TABLE 2-3 PREDICATE CLASSIFIERS FROM NAJAVO

As Schembri points out, in the context of spoken languages Allan's definition of classifiers is problematic because he does not explain clearly why he refers to classifiers as *morphemes* and also because not all the data he refers to is sufficient to substantiate all categories of classifiers (2003: 13). Although Allan's work provided an important basis for research in spoken languages, later researchers such as Grinevald (1996; 2002) and Aikhenvald (2003) provided more clarity on the nature of classifiers in spoken languages and came to different conclusions than Allan.

According to Aikhenvald (2003: 87), classifiers are "***overt*** morphemes that constitute a ***grammatical system*** and serve to arrange nominal referents into ***semantically defined*** classes" (my emphasis). Overt means that classifiers can be separated from other words / morphemes in a sentence and that they are clearly identifiable as separate units.

Grinevald (2002: 262) identifies four types of major classifier systems of which three occur within the noun phrase and one within the verb phrase – noun classifiers, numeral classifiers, genitive classifiers and verbal classifiers. Drawing on a number of resources, I use the examples below to illustrate and explain the classifiers systems identified by Grinevald.

2.3.1. Noun classifiers

Noun classifiers are "always free lexical items that occur in the same noun phrase as the noun they qualify." This means they occur before the noun, and that they are separate from the noun. According to Craig, *noun* classifiers in Jacaltec "classify concrete objects of the world and spiritual entities into twenty four classes" which include, amongst others, male / female deity, animal, plant, water, fire etc. (Craig, 1986b: 245). Table 2-4 below illustrates examples of such noun classifiers from Jacaltec, a language of the Mayan family which is spoken mainly in Guatemala (Craig, 1986a: 264 and 1986b: 255).

xil $\boxed{\textit{naj}}$ **xuwan** $\boxed{\textit{no?}}$ **laba**	**xcám hin** $\boxed{\textit{no?}}$ **wácax**
saw CL: <u>male</u> John CL: <u>animal</u> snake	Died my ***CL: <u>animal</u>*** cow
'John saw the snake.'	'My cow died.'

TABLE 2-4 EXAMPLES OF NOUN CLASSIFIERS IN JACALTEC

As can be seen in Table 2-4 above, the noun classifier for 'male' (***naj***) appears as a separate morpheme before the noun 'John' ('xuwan'), and the noun classifier for 'animal' (***no?***) appears as a separate morpheme before the noun 'snake' ('laba'). The same applies to the classifier for 'animal' - it appears before the noun for 'cow'.

2.3.2. Numeral classifiers

According to Aikhenvald (2006: 466), "numeral classifiers are morphemes that only appear next to a numeral, or a quantifier; they may categorize the referent of a noun in terms of its animacy, shape, and other inherent properties". According to Senft (2007: 681), the obligatory numerals concatenate with the classifier and "this morpheme [classifier] classifies or quantifies the respective nominal referent according to semantic criteria."

Aikhenvald (2006: 466) lists a number of semantic parameters for numeral classifiers, amongst others animacy, physical properties and functional properties. It is obligatory for the appropriate classifier to combine with a number. The examples in Table 2-5 below are examples of numeral classifiers in Japanese (directly quoted from http://en.wikipedia.org/wiki/Classifier_(linguistics), retrieved on 29 March 2014). Note that a native Japanese speaker verified these examples. Here the classifier morphemes are clearly discernable as such, and in each case they are attached to quantifier.

子供四人 kodomo ***yo***—***nin***	鶏三羽 niwatori ***san***—***ba***
child ***four***—***people things***	chicken ***three***—***bird things***
'four children'	'three chickens'

Table 2-5 Examples of numeral classifiers in Japanese

2.3.3. Genitive classifiers

Genitive classifiers are bound morphemes that classify the 'possessed' noun. Grinevald (2000: 66) includes all classifiers used in possessive constructions in this particular group According to Grinevald and Goldwasser (2012: 46), genitive classifiers relate to functional categories, e.g. "his-[DRINKABLE] potion; their-[TRANSPORT] canoe." These classifiers are bound morphemes. They are bound to the mark of the possessor [i.e. 'my'] whilst semantically classifying the possessed [i.e. the noun]" (Senft, 2007: 683).

Aikhenvald identifies three types of classifiers within the group of genitive classifiers – relational, possessed classifiers and generic possessed classifiers. The explanations and examples below – including Table 2-6 below are paraphrased and/or quoted from Aikhenvald (2006: 467).

a) The identification of 'relational classifiers' as such is based on the functional interaction between possessor and possessed. These classifiers "categorize the ways in which noun referents relate to, or can be manipulated by, the possessor – whether they are to be eaten, drunk, worn …"
b) The second type of genitive classifier – 'possessed classifiers' – "characterize a possessed noun based on the physical properties (shape, form, consistency, function) or animacy of its referent."
c) The third type of genitive classifier is called a 'generic possessed classifier' that tends to be function-based. "Uto-Aztecan languages have possessed classifiers for pets and domesticated plants."

Relational (Fijian)			**Possessed** (Panare)		**Generic possessed** (Macushi)	
na	**me-qu**	**yaqona**	**y-uku-n**	**wane**	**u-yekkari**	**ma"pıˆya**
ARTICLE	CL:DRINKABLE-my	Kava	1sg-CL:LIQUID-GENITIVE	honey	1sg-CL:FRUIT.FOOD	papaya
'my kava (which I intend to drink)'			'my honey (mixed with water for drinking)'		'my papaya'	

TABLE 2-6 EXAMPLES OF DIFFERENT TYPES OF GENITIVE CLASSIFIERS

In the above examples, it is clear that the classifiers are overt morphemes. They provide additional information about the nouns 'kava' and 'honey' and 'papaya'.

2.3.4. Verbal classifiers

According to Drapeau & Lambert-Bretiere, verbal classifiers are "elements on the verb that categorise one of the arguments [nouns] in terms of shape, substance, or both" (2011: 293). This means that a classifier is affixed to the verb in order to give information about the argument that follows the verb.

There are two types of verbal classifiers – classificatory verbal incorporation and classificatory noun incorporation. Table 2-7 below illustrates classificatory verbal incorporation classifiers in Diegueño. These examples are from Langdon, (1970) and Fedden, (2002b), cited in Senft (2007: 684).

tu-mil	'to hang (a small round object)'	**a**-mil	'to hang (a long object)
tu-ul	'to put on (a small round object)'	**a**-ul	''to lay (a long object) on top of
tu-mar	'to cover over (a small round object)'	**a**-mar	'to cover (a long object), to bury someone'

TABLE 2-7 EXAMPLES OF CLASSIFICATORY VERBAL INCORPORATION

In Table 2-7 above, it is evident that the difference in meaning between ‘tu-mil’ and ‘a-mil’, ‘tu-ul’ and ‘a-ul’ and ‘tu-mar’ and ‘a-mar’ can be attributed to the two prefixes to the verb – ‘tu’ and ‘a’. As with the three previous types of classifiers, these two prefixes can be distinguished from the verb as overt morphemes. According to Senft “a- usually indicates that the theme or the instrument of an action denoted by the verb root is a long object, … and the prefix tu- classifies the theme or the instrument of an action as a small, round object” (2007: 684).

Table 2-8 below illustrates the second type of verbal classifiers — classificatory noun incorporation. In these examples from Cayuga, the noun classifier carries a more specific meaning. In the first example, the noun ‘dog’ is classified by adding the classifier ‘domestic animal’ to the verb ‘have’. In the second example, the noun ‘skidoo’ is classified by adding the classifier ‘vehicle’ to the verb ‘have’. (Senft, 2000: 14). The examples below are from Mithun (1986: 387-388).

so:wá:s	ake’náhskwaę	skitu	ake‘trehtaę
dog	I-CL: domestic animal-have	skidoo	I-CL: vehicle-have
‘I have a (pet)dog’		‘I have a skidoo’	

TABLE 2-8 EXAMPLES OF CLASSIFICATORY NOUN INCORPORATION

Table 2-9 below reflects Grinevald and Goldwasser’s clear and succinct summary of what she calls “semantic profiles of the classifier systems of nouns” (2012: 46). The order of classifiers below is different from the order I used previously because it is a direct quotation from Grinevald.

Numeral classifiers (physical categories)	▪ two-[ROUND] oranges ▪ three-[LONG RIGID] pencils
Genitive classifiers (functional categories)	▪ his-[DRINKABLE] potion ▪ their-[TRANSPORT] canoe
Noun classifiers (material/essence categories)	▪ an [ANIMAL] deer ▪ the [ROCK] cave ▪ [MAN] John
Verbal classifiers (several types of profiles possible)	▪ I-[LONG RIGID]-put the knife on the table (physical category) ▪ you-[DOMESTIC PET]-have a dog (functional category) ▪ he-[POTATO]-ate a rotten potato (material category)

TABLE 2-9 GRINEVALD'S SUMMARY OF CLASSIFIER TYPES

2.4. Classifier research in sign languages

Many studies on classifiers have been conducted in other sign languages, prior to and after the 2003 publication of Schembri's seminal work. These publications represent a number of different sign languages, including Swedish Sign Language (SSL), Thai Sign Language (MSTSL – Modern Standard Thai Sign Language), NGT, Israeli Sign Language (ISL), Venezuelan Sign Language (LSV - Lengua de Señas Venezolan), AdaSL and Inuit Sign Language (IUR), amongst others.

As mentioned in the introductory part, classifier research in sign languages has been conducted based on Allan's predicate classifiers. The problems with Allan's typology and the general acceptance of Grinevald's later work in the context of spoken languages, is the reason why Schembri chooses to use Grinevald's typology for a critical discussion of classifier research in sign languages.

He uses the following criteria for classifiers (applicable to spoken languages) as described by Grinevald (2000) as a basis for discussing research in sign languages (2003:15):

1) Classifiers are **overt** morphemes.
2) They constitute a morphosyntactic subsystem.
3) They are semantically motivated systems of classification that do not classify all nouns.
4) They are subject to discourse-pragmatic conditions of use.

I will now proceed to discuss each of the above criteria in the context of classifier research in sign languages.

2.4.1. Classifiers - overt morphemes

Exploring the existence of morphemes forms a central part of research in the area of classifiers in sign languages. As mentioned previously, in sign languages particular handshape units in combination with other formational features have been seen to be parallel to classifiers in spoken languages. Schembri uses the term "homogeneous model" of sign language morphology, which underlies the view of some researchers that all the formational features of signs are seen as morphemes (Schembri, 2001: 30). The overview of literature relating to the morphological status of classifiers, which follows below, indicates that researchers have not reached consensus on this issue.

As mentioned in Chapter 1, the first seminal work about classifiers in a sign language was written by Supalla in 1986. He argues that "the classifier system in ASL is strikingly similar to classifiers in spoken languages", although the morphemes are articulated simultaneously rather than sequentially (1986: 181-182). He identifies three *root morphemes* and a number of classifier handshapes that are used in combination with these root morphemes. His main argument is that in classifier constructions, each of the formational features is a morpheme.

Supalla identifies and describes five different types of classifiers in ASL. These five groups of classifiers have remained the basis for describing classifier types and over time mutated to the three main categories mentioned in the introductory chapter. See Table 2-10 below for a summary of Supalla's descriptions (1986: 184-185).

SASSes	"the handshape represents the size and shape of the object …"
semantic classifiers	"the hand articulator represents the semantic category of the referent object"
body classifiers	Body as articulator "to refer to animate objects having bodies and legs"
body part classifiers	hand or some other part of the signer's body represents a body part in the referent
Instrument classifier	"a hand or mechanical instrument which acts on the object"

TABLE 2-10 SUPALLA'S CLASSIFIER CATEGORIES

Johnston (1989: 148) states that “Auslan allows for the accumulation of large numbers of morphemes in a single sign …” Although he does not refer to classifiers in particular, he does acknowledge that one sign can contain a large number of meaningful components. Brentari categorises classifier predicates as polymorphemic forms and states that one sign, using bent V—handshape with forward movement, contains nine morphemes (1998: 21).

Aarons and Morgan explore the interaction between classifiers and syntax in SASL, focusing on “what may and may not appear in topic positions in these constructions (and whether or not these restrictions are determined by thematic roles)” (2000: 1). They provide a number of different examples from SASL and note that “in each case the handshape takes the form that represents the theme argument. Note also that the theme argument occurs as a full lexical NP. Strictly speaking then, we should say not that the theme argument has been incorporated, but that a **morpheme** (my emphasis) representing the theme has been incorporated” (2000: 8).

According to Emmorey et al. (2002: 813) “classifier predicates are complex forms in which the handshape is a morpheme that encodes information about object type.” Hong (2003) uses a similar approach to Supalla’s when studying ‘animal classifiers’ in Korean Sign Language (KSL). Miljan notes that in Estonian Sign Language (ESL) “… classifiers provide information not only about number, but also about shape, location, orientation, movement” (2003: 218).

Slobin et al. use the term polycomponential, and not polymorphemic, to discuss classifiers because they argue that the linguistic status of the various components (manual and non-manual) cannot be determined (2003: 3). Zeshan, discussing TID, refers to classifiers as "multimorphemic constructions" (2003: 64). Liddell uses the term depicting verbs when referring to classifiers but he acknowledges that these verbs can contain more than two morphemes (2003: 274).

Schembri (2003) explores the difficulties posed by the segmentation (or not) of the handshape unit in sign languages into different *overt morphemes* (as is the case with spoken language classifiers). For example, if one depicts a car accident, the handshape may be modified to express different meanings, e.g. CAR—FRONT—CRUMPLED as opposed to CAR—SLOWLY—DRIVE—INTO—WALL. In this case, variants of the same handshape representing the car may have different morphemic meanings. He argues that if one ascribes multimorphemic status to the handshape unit, it would problematic to identify precisely which part of the handshape represents which part of the object.

On the other hand, he refers to Wallin's example of spatial relations in SSL. The handshape representing 'car' can indicate spatial relations, such as 'in front of' or 'behind', by using a second handshape (2003: 18). If the handshape unit is regarded as a single morpheme, it would be problematic to explain these various spatial relations.

Chang et al. state that spatial verbs (which they equate to verbs of motion and location) contain "multiple morphemes" (2005: 250). Aronoff et al. also support the view that classifiers are multimorphemic in nature: "In these structures, the hand configuration represents an independent *classifier* morpheme and it attaches to locations and movements that also have morphological status. In this sense, classifier constructions differ markedly from other signs, in which each category has phonological status but no meaning" (2005: 12).

Milkovic et al. define a classifier predicate as "a morphemic handshape combined with other morphemic information…" (2006: 184). Benedicto et al. (2007: 1202) define *classifier predicates* as "morphologically complex verbal forms, with at least two morphemes: the movement of the sign, which denotes the eventuality of the predicate, and the handshape of the sign …" Pfau and Steinbach (2006: 136) argue that "due to the possibility of organising morphological information simultaneously, a sign that consists only of a location-movement-location sequence combined with a particular handshape and a mouth gesture may express a highly complex meaning." Grose et al. (2007) also support the argument for multiple classifier morphemes.

Zwitserlood states that "sign components and combinations of sign components themselves can be morphemic (as in classifier predicates and location agreement verbs)" (2008: 255). According to Zwitserlood, "currently, classifiers are generally considered to be meaningful elements in morphologically complex structures, even though the complexity of these structures is not yet clear, and there is much controversy about the way in which they should be analysed" (2012: 159).

Tai and Su provides examples from Taiwan Sign Language (TSL) and although they do not explicitly argue for the existence of morphemes, they note that “the handshape, movement, location and arrangement of both hands in the classifier predicate of TSL are all meaningful” (2013: 90).

2.4.2. Classifiers - a morphosyntactic subsystem

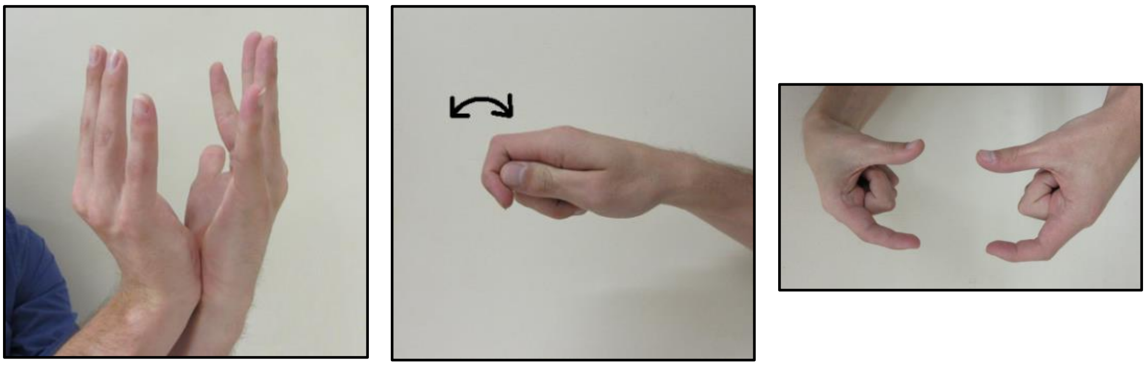
The term morphosyntactic subsystem refers to morphological elements, which are relevant for syntactic purposes. The examples of the different types of classifiers in spoken languages are illustrative of this term, e.g. the use of numeral classifiers in Japanese. This means these constructions form part of the grammar of Japanese and cannot be left out of a sentence.

Schembri agrees that handshape units in sign language classifiers “form part of a morphosyntactic system in signed languages” in relation to the lexicon (2003: 20). He acknowledges that applying this criterion to sign languages is not clear cut. He claims that class terms in spoken languages (Grinevald, 2000) is a more applicable category for a comparison with classifier handshapes.

Grinevald explains class terms as follows: “[They] are lexical in the sense that they operate on derivational or compounding morphology at word level" (2000: 58). They do not have the same function of spoken language classifiers as described earlier, but they are important for lexicogenesis within a language. Schembri uses the example of frozen

/ lexicalised / grammaticised classifier handshapes in comparison to class term morphemes in English such as '-berry' and derivational morphemes such as '–er' (manag**er**) and '-ism' (skeptic**ism**). In terms of sign languages, some classifiers become part of the lexicon (i.e. they are no longer creative signs which are context-bound). In this way they are similar to class terms.

The examples below in Figures 2-3 (a)-(c) are SASL examples of frozen classifiers: MEETING (from the category entity classifiers), KEY / LOCK (from the category handling classifiers) and RECEIPT (from the category SASS). Schembri points out that although the class term comparison is more valid, classifiers in spoken language do not play a major role in lexicogenesis. This conclusion seems to indicate that Grinevald's 'morphosyntactic subsystem' is not really applicable to sign language classifiers.



a) MEETING b) KEY c) RECEIPT

FIGURE 2-3 EXAMPLES OF FROZEN CLASSIFIERS IN SASL

In light of the above, the criterion of 'morphosyntactic subsystem' seems to be irrelevant for sign languages. However, Schembri offers the potential solution by pointing out that sign languages may display a **unique** morphosyntactic subsystem which has no equal in spoken languages, "… unique in its fusion of linguistic and visuospatial properties" (2003: 21).

Schwager and Zeshan state that "the morphology of (these) sign languages is largely simultaneous rather than sequential, and involves modulations in signing space typical of the sign language modality" (2008: 535). Although they do not discuss classifiers in particular, they tabled a number of morphological criteria observed in three sign languages they studied.

In this table, they identify "class agreement" as a grammatical category under "event concept class" and the morphological process related to this as *affixation*. They explain this as follows: "… the handshape representing the referent class, such as the human and vehicle referents … is a bound morpheme that is combined with morphemes of location and movement in an affixation process, whereby a complex multimorphemic sign is created" (2008: 538-539).

The use of classifiers in sign languages does not constitute such a highly grammaticalised system as, for example, in Japanese. They behave differently from spoken language classifiers. However, in the context of sign languages, they do occur on a highly frequent basis, displaying similar characteristics across different sign languages.

2.4.3. Classifiers - semantically motivated systems of classification that do not classify all nouns

In relation to the third criterion, Schembri raises the question of what exactly is classified by handshape units in sign languages. According to him, the general understanding of spoken language classifiers is that "a classifier classifies in the sense that it denotes some salient or perceived characteristic of the referent represented by an associated noun" (2003: 21). This means that they are semantically motivated. This seems to be the basis for part of Sutton-Spence and Woll's criteria for sign language classifiers mentioned earlier (1999), as well as Valli and Lucas' definition (2000).

It is possible that the use of classifiers in sign languages does not actually fully conform to the above characteristics. Engberg-Pedersen (1993: 246), uses the term polymorphemic verbs for classifiers in sign languages and argues that although polymorphemic verbs in Danish Sign Language distinguish between animate and inanimate, the "sheer number of handshape units that can be used in polymorphemic verbs of human beings is evidence that the handshape units have more than classificatory meaning." She also claims that the qualities of the referent are not the only factors that determine the choice of handshape. Movement and handshape are mutually interdependent, and for this reason, the argument that handshape units are classifiers cannot be justified.

It would seem that not all sign language linguists agree on the point of classifiers representing salient characteristics. For example, Aronoff et al. state that "entity classifiers, **classifying referents according to semantic category** (my emphasis), such as upright human, seated human, vehicle, and so on, also enter into complex constructions, by combining with other classifiers (signed by the other hand) as well as with different movement roots indicating path shapes and manners of movement" (2005: 23).

Zwitserlood et al. offer the following explanation of classifiers: "Classifier predicates are morphologically complex predicates in which the classifier refers to a referent. Referents are classified on the basis of salient characteristics like shape (classifiers for long and thin entities, flat entities, and round and/or cylindrical entities are found in almost all sign languages), animacy (some sign languages have special classifiers for humans and animals or for men and women) or other characteristics" (2012: 1639).

2.4.4. Classifiers - subject to discourse-pragmatic conditions of use

This criterion refers to the phenomenon that language users can make choices in terms of the use of classifiers depending on different contexts. Schembri uses the example of Burmese, where eight different classifiers can be used for the concept *river*, depending on the perspective (Schembri, 2001: 139). The different classifiers can denote a "river on a map, a river as a path to the sea, or a river as part of a general discussion …" depending on the context (Schembri, 2003: 22).

Grinevald's fourth criterion seems to be the only one unconditionally applicable to sign languages. Schembri acknowledges that there has not yet been extensive research on classifiers in spoken languages in relation to discourse-pragmatic influences (2003: 22).

He points out that in the context of sign languages it is clear that salient aspects of the referent are not the only factors playing a role in the choice of handshape unit.

He uses the three categories of polycomponential verbs (his term for classifiers as mentioned earlier) to illustrate this point. According to him there are "three major categories of these verbs (PVs): verbs of handling, verbs of visual—geometrical description and verbs of motion and location…" and only the last category of verbs seems to share commonalities with spoken language classifiers. An example of this would be using different handshapes to make a distinction between animate beings and vehicles (2003: 22). However, the choice of the lexical item for articulating these verbs is not necessarily influenced by the referent alone, but also by the kind of movement or "motion event" (2003: 24).

In relation to verbs of handling, he makes the point that the classifier does not necessarily reflect aspects of the referent ("patient") as a whole, but can also reflect only the part of the referent that is handled, and also the characteristics of the agent's body part that 'handles' the referent or part of the referent. He uses the examples of THROW-NETBALL and THROW-FRISBY which are self-evident (2003: 22).

According to Schembri, with verbs of visual-geometric description, the choice of handshape is based on the salient features of the referent. He furthermore points out that this kind of verb often requires a tracing movement in combination with the handshape unit, and that it does not classify the referent, but rather gives descriptive information (2003: 24). If one uses the example of MIRROR-RECTANGULAR, however, the handshape is not like to reflect the salient characteristic. In relation to this, According to Zwitserlood (1996) the “meaning and function of the handshape may be different when the tracing movement is added” (cited in Schembri, 2003: 24).

Apart from this, the same handshape can be used to denote referents with completely different meanings. Amongst others, Engberg-Pedersen provides the following examples to illustrate this point: GROUP-OF-PEOPLE-MOVING, PILLAR-FALL and HOLD-SOMETHING-MASSIVE would all be articulated using the same handshape (1993: 251). The implication of the above examples is that the handshape unit in sign languages does not act as a classifier in the same way that classifiers function in spoken languages.

2.5. Mouth and face actions in sign languages

The overview in this particular section will be organised in the following manner: a brief introduction, mouth actions in sign languages and eyegaze. The majority of sign languages documented thus far provide evidence of the grammatical role of a number of nonmanual features. The term ‘nonmanual’ refers to additional grammatical information not articulated by the hands. The following can combine to articulate nonmanual features: lips, mouth, cheeks, tongue, eyebrows, eye gaze, eye aperture, head and body. These nonmanual features function across various linguistic levels — including lexical, morphological, syntactic, semantic and pragmatic (Herrmann & Steinbach, 2011: 3).

The grammatical use of nonmanual features in sign languages is not random but systematic. Herrmann and Steinbach state that one can differentiate between linguistic and affective nonmanual features because there is evidence of systematic differences, such as scope and timing, the use of different facial muscles, and alignment or non-alignment with constituent structures (2011: 4). Pfau (2008) investigates the use of manual and nonmanual elements in sentence negation in DGS. His findings confirm that the use of negative headshake is systematic (unlike affective headshake) because there are linguistic constraints in relation to the manual sign(s) it accompanies (2008: 51). Although negative headshake *per se* is not relevant to the current study, this example serves to illustrate that the use of nonmanual features in sign languages may be systematic in other contexts as well.

Woll provides a useful schematic breakdown of nonmanual features in sign languages (Figure 2-4 below, adapted from Woll 2014: 4). The first distinction is between mouth actions, and actions of the eyes, brows, head and body. The focus in this section is on mouth actions, of which there are two major types – 'mouthings' and 'mouth gestures'. Mouthings are "loan elements" from the surrounding spoken language (Herrmann & Steinbach, 2011: 3). Mouth gestures consist of two types. The first type includes adverbials and enactions and the second type is echo phonology.

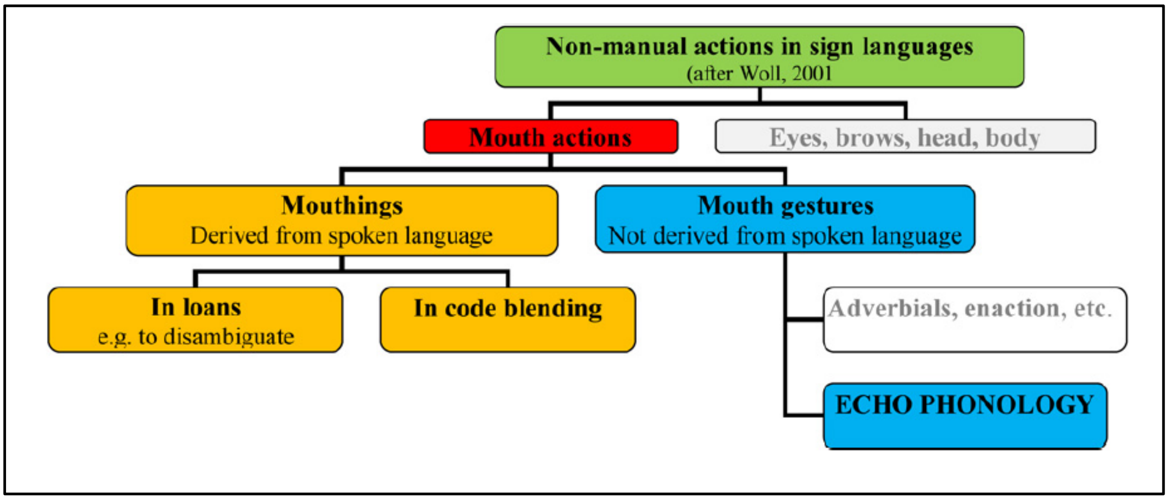


FIGURE 2-4 NONMANUAL ACTIONS IN SIGN LANGUAGES

2.5.1. Mouthings

Mouthing is a general phenomenon in sign languages. It is characterised as 'borrowing', rather than an outcome of bilingualism. According to Woll (2014), this strategy is used by signers to "disambiguate" signs which are very similar or identical. Crasborn et al. (2008: 48) claim that mouthings "possess a phonemic and lexico-morphemic function", i.e. signs that are identical in form, can be disambiguated by the mouthing. Woll (2008: 209) points out that there is evidence that even if signers do not have any knowledge of the source language used in mouthings, they manage to acquire the mouthings.

2.5.2. Mouth Gestures

Enacting

Enacting is a gestural expression, which can be used on its own or it can accompany a manual sign, e.g. YAWN. A signer can simply mime a yawn, without any manual articulation, or manually articulate the lexeme YAWN, accompanied by the enacting gesture.

Adverbials

According to Sutton-Spence and Woll (1999), oral components with an adverbial function are used in BSL to express manner and degree. For example, puffed cheeks indicate long duration, many, large or difficult (1999: 88). Woll describes these adverbials as “arrangements of the mouth which are used to signal manner and degree” (2008: 210).

Crasborn et al. (2008: 49) categorise adverbials as “’A-type mouth actions’, which are usually bound morphemes “because they productively combine with the manual components of signs.” They argue that – despite the original name ‘adverbials’ - these types of gestures are not only adverbial because they are also used for modifying nominals. Woll confirms this expansion of the term adverbials as follows: “Adverbials are arrangements of the mouth which are used to signal manner and degree (e.g., to indicate that an action is performed with difficulty or with ease; to indicate if an object is very small or very large …” (2014: 4).

Sandler (2013: 9) mentions three different mouth actions conveying adverbial or aspectual meanings. She provides the meanings and origin of some mouth gestures without describing them: ‘with relaxation and enjoyment’ (ASL), ‘for a long time’ (ISL) and ‘exactly’ (BSL).

Crasborn et al. allocate the following properties to adverbials: They have “independent meaning”, they are “not lexically associated” and they are “not borrowed from a spoken language” (2008: 50). The findings of their cross-linguistic study (comparing mouth gestures in NGT, BSL and SSL) indicate that mouthings have the highest number of instances, followed by adverbials.

Corina et al. (1999: 315) identify and describe four linguistic adverbial expressions in ASL - ‘th’, ‘mm’, ‘pursed’ and ‘pom’. They provide the meanings and descriptions of these adverbial mouth gestures. Emmorey and McCullough (2009: 127) identify six adverbial mouth gestures in ASL – ‘mm’, ‘CS’, ‘th’, ‘intense’, ‘puff’ and ‘ps’. They use still frames to illustrate these adverbials and also provide the meanings. Crasborn et al. (2008: 49) refer to ‘mm’ in BSL, providing the meaning as well as a description.

Schermer (1990, cited in Lewin and Schembri, 2011: 100) finds that there are signs in NGT with optional mouth gestures. “The mouth gesture ‘puh’ is produced when describing the size of person /object, distance between items or the speed of a movement / action… the mouth gesture ‘th’ modifies the manual sign and carries the same semantic meaning as ‘th’ in ASL” (2011: 100). Lewin and Schembri presents a list of mouth gestures in ASL, adapted from Reily (1998): ‘puff’, ‘mm’, ‘int’, ‘ps’, ‘th’, ‘cha‘, ‘pa’, ‘pow’. See Table 2-11 to Table 2-16 below for a detailed summary of literature related to adverbial mouth and face actions in sign languages.

Mouth action	Meaning	Description	Sign language
/ th/	Adverb: “inattentiveness” or “without awareness”	involves the partial protrusion of the tongue through the extended and up rounded lips	ASL
/mm/	Adverb “relaxed enjoyment” or “with pleasure.”	involves the flattened protrusion of the lips	ASL
/pursed/	“sparseness” or “thinness.”	involves the tightening of the lips with a slight opening	ASL
pom	Adverbial For emphasis		ASL

TABLE 2-11 CORINA ET AL. (1999: 315)

Mouth action	Meaning	Description	Sign language
relaxed ‘mm’	Adverbial ‘comfortably’, ‘at ease’, or ‘without obvious effort’	closed and slightly protruding lips	BSL

TABLE 2-12 CRASBORN ET AL. (2008: 49)

Mouth action	Meaning	Description		Sign language
‘th-curl’	Boring; unpleasant	Tongue protrusion with curled upper lip		BSL
‘relaxed mm’	Easy, effortless; average	Relaxed closed lips, slightly protruding		BSL

	Intense, with effort, very near in time or space	Teeth together; lips drawn back		BSL
'tense mm'	Determined, firm; exact	Tense, closed lips		BSL
puffed cheeks	Long duration, many, large; difficult			BSL
'shh'	Long duration, many, large; difficult	Rounded lips		BSL
Sucked in cheeks	Few, thin; small			BSL
'brr'	Movement, either through time or space.	Lips vibrating; The mouth configuration is the same as in 'relaxed mm'		BSL

TABLE 2-13 SUTTON-SPENCE & WOLL (1999: 86-87)

Mouth action	Meaning	Photo	Sign language
mm	effortlessly		ASL
CS	recently		ASL
th	carelessly		ASL
intense			ASL
puff	a great deal or a large amount		ASL
ps	smoothly		ASL

TABLE 2-14 EMMOREY & MCCULLOUGH (2009: 126-127)

Mouth action	Description	Meaning	Sign language
puff	puffed cheeks	large in quantity/size; too many	ASL
mm	lips pursed together; optionally the bottom lip may protrude	average/normal; pleasurable	ASL
int	teeth together with jaw clenched; lips drawn back	remarkably large; very far away in proximity	ASL
ps	lips together and drawn back; with slight opening in the centre	thin; smooth	ASL
th	tongue protrudes between teeth; jaw relaxed	careless; inattention; false, wrong	ASL
cha	clenched jaw; lips slightly parted; jaw drops opens quickly	large; comparatively big	ASL
pah	lips pursed; lips release burst of air forming "pah"	meaning still under review	ASL
pow	lips pursed; lips release burst of air forming "pow"	meaning still under review	ASL

TABLE 2-15 LEWIN & SCHEMBRI (2011: 101)

ADVERBIAL NAME	Facial actions	Meaning	Example context
PUFF	Both cheeks filled with air	Large amount, too much	WOW LOOK MAN FAT
MM	Lips protruded	Relaxed, with enjoyment, discourse marker	ME DRIVE
INT 'ee'	Lips drawn back, teeth clenched together, eyes squinting	Great magnitude or effort	CONCERT C-O-N-C-E-R-T MANY PEOPLE
PS	Lips pressed together, drawn slightly back, mouth open in centre	Very thin, just missed	JET MISS TREE HIT
TH	Jaw relaxed, lips part, tongue protruding	careless, inattention	ME WORK CARELESSLY
STA	Teeth clenched, lips open slightly, jaw open and close	hard work, too much, intensity	LAST NIGHT ME AWAKE ALL NIGHT STUDY STUDY
CHA	Lips opened, teeth clenched, jaw drops open	relatively large	P-I-Z-Z-A ME LIKE
CS	Tight lips, drawn back on one side of face, teeth clenched	recently happened, close in space or time	RECENTLY ME FINISH TEST
PAH/PU	Tightly pressed lips open to form word PAH/PU	Finally	ME WAIT WAIT FINALLY BUS ARRIVE
IS	Lips spread, teeth visible, jaw open	Close, lucky, short	YOU LUCKY
POW	Tightly pressed lips open to form word POW	Become really angry	MOM POW

TABLE 2-16 DENMARK (2011: 241)

Echo phonology (EP)

Woll (2014) explains that the reason for the use of the term 'echo phonology' in certain signs is that the mouth gestures copy the manual movements of such signs, therefore the use of the term 'echo'. Emmorey (2002: 40) states that "the term echo phonology has been used to refer to those gestures in which the mouth articulation parallels the manual movement, that is, opening mouth movements accompany hand opening or movement away from the body, … whereas closing mouth movements accompany hand closing or movement toward the body." Crasborn et al. point out that Woll's analysis of these signs is based on the fact that "movements of the mouth parallel (and never oppose) the movements of the hands" (2008: 49).

Crasborn et al. categorise mouth gestures belonging to echo phonology as "E-type mouth actions" because they are "semantically empty" (2008: 49). Woll (2008: 203) characterises echo phonology as "a repertoire of mouth actions which are not derived from spoken language, which form an obligatory accompaniment to some manual signs in a range of sign languages, and which are characterised by 'echoing' on the mouth certain of the articulatory actions of the hands."

Lewin and Schembri (2011: 96) state that in echo phonology, "the mouth mirrors aspects of the movement of the manual sign." Woll (2014: 4) mentions that echo phonology refers to "a class of mouth actions that are obligatory in the citation forms of lexical signs" and confirms that these mouth actions have no semantic meaning. She also reiterates the core meaning of the term echo phonology - "… the mouth action is a visual and motoric “echo” of the hand action in a number of respects: onset and offset, dynamic characteristics (speed and acceleration) and type of movement (e.g., opening or closing of the hand, wiggling of the fingers).”

According to Lewin and Schembri their findings related to tongue protrusion indicate that it “occurs as part of the phonological formation of lexical signs … as well as a separate meaningful unit that co-occurs (sometimes as part of constructed action) with classifier constructions and lexical verb signs”. Adverbial mouth gestures, on the other hand, co-occur with verbal manual signs and carry “additional meaning not present in the manual signs” (2011: 94-95).

The results of their study indicate that tongue protrusion occurs in BSL in four different categories – echo phonology, enaction (in constructed action), and as adverbial (including both the ASL and the BSL meanings). They acknowledge that there are subtle differences between instances of tongue protrusion and that categorising all types of tongue protrusion remains a challenge (2011: 112).

2.6. Eyegaze

The importance of eyegaze focus is based on Woll and Sutton-Spence's observation – in relation to BSL - that eye gaze follows the movement of the handshape of referents if the movement represents the motion of the referent. When the movement of the hand(s) does not represent the motion of a referent, eye gaze does not follow the movement (1999: 95).

Thompson (2008) finds that in relation to agreement verbs, eye gaze accompanying these verbs was most frequently in the direction of the location of the syntactic object (2008: 130). Although he does not refer to classifiers in particular, it is possible that a similar phenomenon may present in the data, which potentially can contribute to the characteristics of the concept classes of classifiers for the purposes of this study.

Hosemann (2011) reports evidence indicating that there is a correlation between eye gaze in German Sign Language (DGS) and manual verb agreement, although it is not as systematic as eye gaze in ASL (2011: 91).

Eyegaze in the context of sign languages serves various purposes. Kaneko and Mesch (2013) provide a detailed overview of the functions of eyegaze in sign language poetry. Their discussion is quite useful for classifiers – although classifiers are not the same as 'created' poems, they do constitute creative signing, as does poetry. They claim that lexical items (when used in a poem) do not have to be emphasised because they are "conventionalized signs". They state that this "is in contrast to productive signs, whose forms (which are highly visual and creative) are often highlighted by a gaze at the hands" (2013: 387).

According to Kaneko and Mesch, "eye gaze is one of the very few ways to physically refer to remote referents without creating "visual noise," which, by moving and extending other body parts, would be a problem. When the poet looks away from the immediate surroundings, that gaze can extend the poetic scene. This helps to lay out a broad, open space in front of the poet" (2013: 378).

According to Engberg-Pedersen "in signed narratives, perspective depends on the orientation of the hands and the direction of their movement in relation to the signer's body and on the direction of the signer's gaze" (2016: 413). Engberg-Pedersen also points out that the signer often imitates the referent's gaze if the signer's locus represents this particular referent. Cormier et al. (2015: 690) report that a shift in eyegaze alone has been suggested as a possible marker of constructed action by many researchers.

It is also well-known that constructed action tends to 'elicit' classifiers. Aarons and Morgan (2003) conclude that in SASL "signers invariably use constructed action in conjunction with classifier predicates to create simultaneous multiple perspectives on an event" (2003: 153). Their data presentation indicates a high overlap of the use of classifiers and constructed action.

CHAPTER 3 – METHODOLOGY

3.1. Introduction

The focus of this chapter is to discuss the process of data collection, ethical considerations relating to participants as well as the Deaf community, detail of the formational features under investigation, the choice of transcription system, the creation of ELAN tiers and the data analysis method.

As mentioned in the introductory chapter, the main objective of this research is to provide an exploratory description of classifiers in SASL and to establish the potential relationship between a selection of formational features and the concept classes *Property*, *Event* and *Entity*[2]. During the course of the study a secondary focus developed as well, i.e. the need to reflect on the application of and challenges related to the use of the BTS. I will elaborate on this issue in Chapter 5.

[2] Note that the concept classes are capitalised and written in italics to prevent confusion with the category of 'entity classifiers'.

3.2. Data collection

3.2.1. Participants

Five Deaf signers from the Deaf community in Johannesburg/Tshwane (Gauteng) participated in this research. I know all the participants well and therefore did not include questions about school attended, involvement in the local Deaf community and daily use of SASL in the participant consent form. All the participants are involved in the teaching of SASL. The reason for choosing signers who teach SASL is that I did not want to influence participants' signing by having to explain what classifiers are, potentially causing the 'artificial' use of classifiers. As teachers of SASL, all participants had the basic understanding of classifiers prior to taking part in this research.

Interestingly enough, Oyserman (2012: 25) excluded Deaf teachers as participants: "… no deaf teachers of sign language were selected. This decision was based on the argument that becoming a teacher of sign language in an educational program negatively influences one's original sign language."

See Table 3-1 below for participant metadata. Note that the number allocated to each participant in Table 3-1 (P1-P5) does not correlate with the numbers of the video clips (1-5). The reason for this is that if the participant number allocated here corresponds with the video clip numbers, this metadata would not remain confidential.

	P1	P2	P3	P4	P5
Age	33	34	35	43	39
Born deaf	√		√		√
Deaf at age of		6		9	
Daily use of SASL	√	√	√	√	√
Involvement in the Deaf community	√	√	√	√	√

TABLE 3-1 METADATA OF PARTICIPANTS

The scope of this study does not allow for the ideal profile, of which race and ethnicity is particularly relevant in the South African context, as illustrated in Chapter 2. Ideally, the participants should be representative in terms of race, ethnicity, location and founders of school attended, language policy of the school at time of attendance, level of education attained, literacy skills in English or Afrikaans and socio-economic status.

Other aspects of the ideal profile applicable to Deaf communities in general would include gender, age, audiological status of parents, age at which SASL was acquired, daily use of SASL and involvement in the local Deaf community.

Van Herreweghe and Vermeerbergen (2012: 1037) confirm the more general aspects of the ideal profile mentioned above (i.e. applicable to Deaf communities in general):

"Such criteria often include:

- early onset of sign language acquisition; often the age of three is mentioned here, but sometimes also six or seven;
- education in a school for the deaf, sometimes stipulating that this should be a residential school;

- daily use of the sign language under investigation (e.g. with a deaf signing partner and/or in a deaf working environment);
- prolonged membership of the Deaf community."

The current estimate is that 90–95% of Deaf children have hearing parents which means that the percentage of so-called 'native' signers is very low. Johnston and Schembri confirm a similar trait in Australia (2007: 29). Mitchell and Karchmer (2004) found that in the USA only 4% of Deaf and hard-of-hearing children have Deaf parents.

Therefore, inevitably, the general norm in sign language research is to use informants who started acquiring their local sign language between the ages of three to seven years of age. With the exception of one participant, all participants in this study complied with all of the above criteria. Participant 5 started acquiring SASL at the age of 9. The reason for including this participant is that I could only find four participants who acquired SASL before the age of seven and Participant no 5 was the next best choice. No native signers participated in this study.

3.2.2. Elicitation materials

There are a number of techniques and materials that can be used for elicitation of data in sign languages. A popular method of data elicitation is the re-telling of stories in sign language. The narrative can be presented to signers in various ways, amongst others "film story retelling" (Van Herreweghe and Vermeerbergen, 2012: 1028). I chose a *Tom*

& Jerry video clip of 2:45 minutes – see Figure 3-1 below. There is no verbal dialogue in the cartoon and no subtitles either, thus minimising interference from the signers' knowledge of written or spoken language.

FIGURE 3-1 SCREENSHOT – *TOM & JERRY*

Furthermore, the use of animated video clips is likely to cause a flowing narrative and therefore more natural use of SASL. Cartoons contain constant action and movement and therefore are particularly suitable for the elicitation of classifiers. Participants simply needed to watch a cartoon, and retell the story in SASL as they remember it. The cartoon does not contain any potentially harmful visual information (e.g. portraying violence or trauma).

3.2.3. Recording

The participants were filmed by a Deaf assistant, once again to minimise the interference of English-like structures. No hearing people were present during the filming process. It is a well-known phenomenon that Deaf signers tend to change their signing in the presence of hearing people to more spoken language-like structures. According to Baker and van den Bogaerde, "the presence of hearing people, or rather their fluency in signing, may still influence the [sign] language use" (2016: 88).

Filming took place in the Sign-lab of the SASL Department at the University of the Witwatersrand in August 2014. The background was a pale blue wall. A few 'test clips' were recorded to ensure that the lighting and the clarity of facial expression were adequate. White signers were asked to wear a plain, dark shirt, and black signers were asked to wear a plain, light colour shirt.

Two cameras were used – one to cover the general signing space, and the other to focus on the face. The reason for this is that facial expressions, including eye gaze and mouth patterns, are likely to be important formational features of *classifier* constructions.

3.3. Ethical considerations

3.3.1. Participants - issue of anonymity

Researchers in sign languages are faced with a challenge which is unavoidable in the context of a visual-gestural language: participants are always identifiable because nonmanual features (including facial expressions) form an important part of the linguistic structure of the language. Often still-frames of digitally recorded signed texts are used in research publications to show these features. The implication of this is that participants have the right to know exactly how the digital texts will be utilised. I stated all possible uses of these texts in the letter of consent. Participants then were able to make an informed choice.

3.3.2. "Respect, beneficence and justice"

An important aspect of empirical research is to appreciate the role played by the participants and to try to reciprocate the benefit they provide to the research. I have borrowed three terms from Harris et al. (2009) for stating the underlying principles of this research: *respect*, *beneficence* and *justice*. I will provide definitions of each of these concepts, and then proceed to explain how I will apply them after the completion of the research.

Respect refers to treating people as autonomous agents and providing protection for those with diminished autonomy. … **Beneficence** includes securing the participants' well-being by doing them no harm, maximising possible benefits, and minimising possible harm. **Justice** focuses not on the individual relationship between the researcher and the participants but on the distribution of goods and services in the research setting. In other words, one group should not be singled out for excessive participation in research, nor should another group be excluded from this opportunity (Harris, et.al, 2009: 105).

With regard to *respect*, all participants were fully informed through the medium of SASL and made an informed choice. Each participant received the written *Participant Information Sheet* and the *Informed Consent Form*. Apart from this, I translated these two ethics documents into SASL. The hard copies can be seen in the appendix and the SASL versions of these two documents are available on the CD.

Hard copies for participants' signatures were only provided to each participant after he/she had watched the SASL version of the ethics documents and was given the opportunity to clarify any aspects of the document with me. I chose not to use an interpreter because I am a proficient SASL signer and also because I have known all participants for a number of years.

The principles of *beneficence* and *justice* overlap somewhat in practice. As mentioned before, all participants are involved in SASL teaching, either formally or informally and some have been in the process of obtaining academic qualifications. The implication of this is that some participants have acquired knowledge of research practices. Apart from this inherent benefit, I intend to offer community services such as a free seminar based on the findings of this study for all Deaf people involved in the teaching of SASL nationally. Given the current financial constraints at tertiary institutions in South Africa, I might have to include the research findings in short courses offered by the SASL Department of the University of the Witwatersrand instead of offering a seminar.

There are a number of Deaf people involved in teaching SASL to hearing people, or to Deaf learners as a school subject in South African schools. This means that the data collected as well as the conclusions of the research will benefit members of the community, as well as the language of the community. This corresponds to the phrases "maximising benefits" and the "distribution of goods" used by Harris et al. (2009).

3.4. Transcription

3.4.1. Choice of transcription system

I chose and adapted the Berkeley Transcription System (BTS) as the basis for transcribing the classifiers in relation to the formational properties investigated in this study. According to Slobin et al. (2001) the main purpose of the BTS is to establish a standardised means for researchers to transcribe signed utterances. This is one of the reasons I chose the BTS - should any transcription become the norm for sign language research, the potential benefits for training researchers as well as collaborative cross-linguistic research are tremendous.

Apart from the above, two objectives (amongst others) stated in relation to the main purpose struck me as potentially useful for this study: "Representation at the level of meaning components" and "full representation of elements of polycomponential verbs" [i.e. classifiers] (2001: 63). I will elaborate on the relevance of these two objectives in the section below.

Another reason for choosing this particular system is that it uses standard ASCII codes, and does not require the use of any special fonts, nor a familiarisation process with a set of symbols. The abbreviations available for transcription (each with an explanation) initially seemed to be quite transparent and therefore user-friendly.

3.4.2. The semantic approach of the BTS

According to Slobin et al. (2001: 69-70) a semantic representation approach minimises the influence of gloss on transcription and analysis. In order to highlight this point, I will explain the problem related to glossing, especially in relation to classifiers and their meaning components and illustrate - with examples - how the BTS can minimise it.

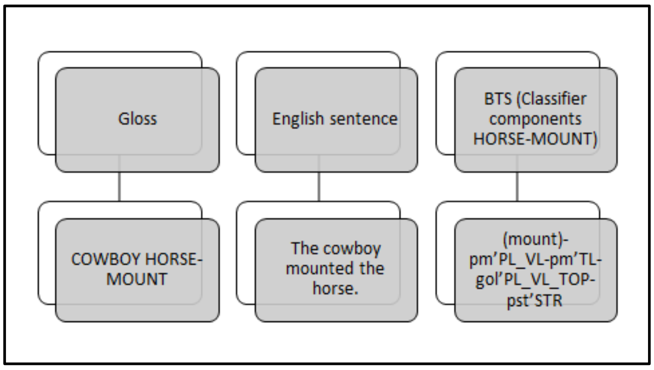
A particular problem faced by sign language researchers is that glossing poses the danger of transferring the linguistic structures used in the glossing language to the sign language under investigation. In the context of this particular study, even though the concept classes *Property*, *Event* and *Entity* roughly correspond to the traditional spoken language word classes of 'adjective', 'verb' and 'noun', I wanted to avoid the direct transfer of spoken language word classes in English to classifiers in SASL.

Frishberg et al. (2012: 1057) state that "any gloss carries the part-of-speech membership of a spoken language word, suggesting that the sign in question belongs to the same category." The semantic representation approach can avoid this problem by focusing on meaning rather than form. They further point out that the majority of verbs in sign languages are polycomponential, and often nouns, too. For these signs there is no single word in the glossing language which can represent all the levels of meaning. This applies in particular to classifiers, as is evident in Chapter 2. Figure 3-2 below (***CL-14***) does not simply mean 'jump' but is layered with meaningful components. The full meaning is as follows: *An animate being with two bent legs jump onto a round, container-like object*. In the context of the data elicitation clip, this example would be glossed as BIRD-JUMP-ON-EDGE-OF-NEST.

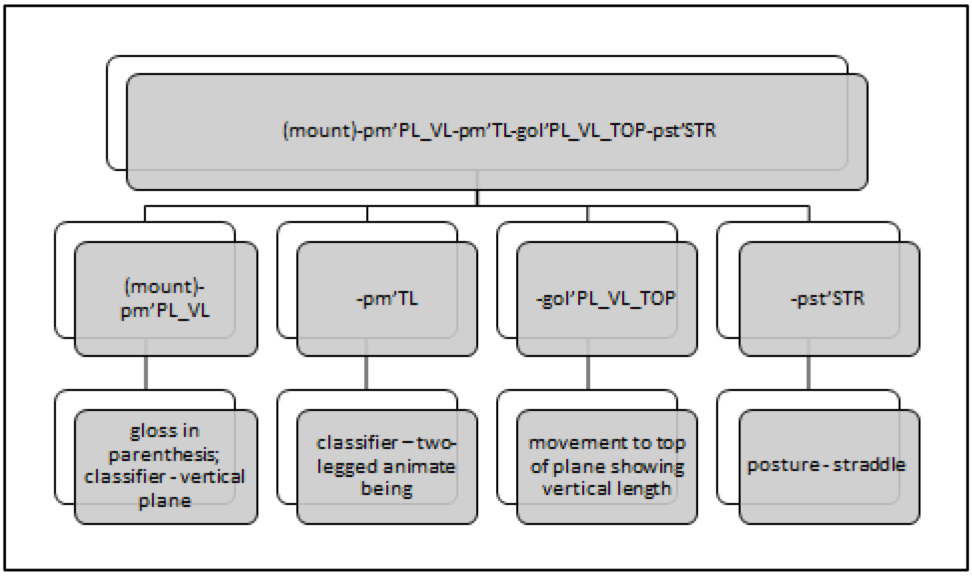
FIGURE 3-2 ***CL-14*** **– A POLYCOMPONENTIAL SIGN IN SASL**

According to Slobin et al., the BTS treats classifiers as *property markers*: "… handshapes that identify a referent by indicating a relevant property of that referent" (2001: 69). Figures 3-3(a)-(d) below (adapted from Hoiting & Slobin, 2002: 6-7) illustrate, by using a classifier which can traditionally be glossed as COWBOY-MOUNT-HOURSE, how the BTS can make provision for the various meaning components of classifiers and also prevent the transfer of word classes from the glossing language to sign languages. This particular example clearly illustrates the relevance of the two objectives of the BTS mentioned in the introductory part of this section.

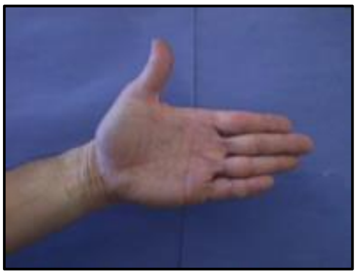
Note that this example is a figure and ground construction and therefore contains two different classifiers and two different referents. Both classifiers are traditional entity classifiers, where the hands physically represent a part of each referent, in this case the cowboy's legs and the horse's back. Figure 3-3(a) presents the gloss, the full English sentence and the BTS transcription. Figure 3-3(b) gives a breakdown of Figure 3-3(a) and is also explained verbally. Figures 3-3(c) and (d) illustrate the relevant property markers from the BTS manual (i.e. classifier handshapes). In Figure 3-3(e) an SASL signer illustrates the sign.



a)

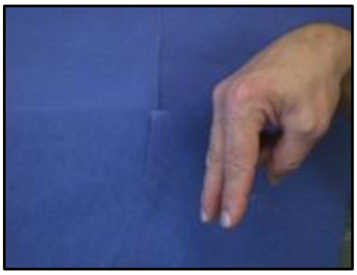


b)



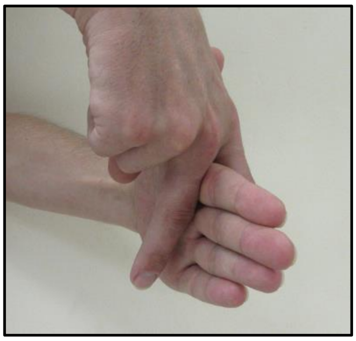
c)

PL_VL: Plane showing vertical length (fingertips forward)



d)

TL: Two-Legged animate being



e)

TWO-LEGGED-ANIMATE BEING-STRADDLES A VERTICAL PLANE

FIGURE 3-3 (A)-(E) BTS PROPERTY MARKERS

The first row of Figure 3-3(b) is the full BTS transcription for this sign. The English word 'mount' in parenthesis does not have any transcription significance – it is added merely to facilitate an understanding of the transcription that follows in the same line. There are four meaning components in this example, as can be seen in the four blocks in the second row of Figure 3-3(b). The third row of Figure 3-3(b) explains the four meaning components. As one can see, the example contains the two property markers illustrated in Figures 3-3(c) – (d) - *pm'PL_VL* and *pm'TL*.

The first property marker – *pm'PL_VL* – reflects a plane showing vertical height. This is a property of the referent – which without discourse context could mean a fence or an animal such as a horse or a big dog. The second property marker - *pm'TL* - shows that a property of the referent is that she, he or 'it' (i.e. an animal) has two legs. Again, this property of the referent could lend itself to numerous meanings – a child, a man, a ghost, and animal or even an alien.

In terms of the two remaining meaning components, the third component in Figure 3-3(b) provides information about the direction of the movement as well as the location (-*gol' PL_VL_TOP*) of the property marker *pm'TL* in relation to the property marker *pm'PL_VL*. I.e., it provides information about locative relations. The fourth meaning component provides information about the posture of the *pm'TL*.

Furthermore, by using the name *pm'TL* as opposed to *V-CL* (the inverted form of the V-handshape) the focus remains on a property of the referent (i.e. meaning) rather than becoming a transcription based on the phonological feature of 'handshape' (i.e. form – V-handshape). Slobin et al. (2003: 273) state that "rather than emphasize classification as the central feature of "classifier" handshapes in polycomponential signs, it seems more useful to treat them as marking a relevant property of a referent. The major function of such a handshape is to evoke a relevant referent in discourse …"

The BTS transcription in Figure 3-3(b) above – (mount)-pm’PL_VL –pm’TL-gol’PL_VL_TOP-pos’STR – is a semantically appropriate transcription. In a descriptive study of formational features of classifiers in SASL, presumably the focus would have to be on form. However, in this particular study – given the fact that classifiers are polycomponential signs – the semantic approach is essential as well.

3.5. Organisation of the data

As mentioned at the beginning of this chapter, I obtained data from five different signers. A total of fifty ‘whole scene’ classifiers were transcribed, analysed and described - ten classifiers per participant. Note that as a result of this being a small scale study, I did not have the luxury of choosing particular classifiers therefore I used the first ten classifiers in each video clip. I numbered the classifiers from ***CL-1*** to ***CL-50*** so that each classifier has a unique identity (***CL-ID***). Note that some classifiers were repeated by individual participants, in which case I did not include them. Such classifiers are numbered as 1B, 44C etc.

The term ‘whole scene’ is used to make provision for two-handed classifiers with two distinct referents and also includes two-handed classifiers with one referent as well as one-handed classifiers which inherently can have only one referent. Examples of whole scene classifiers from the SASL data set can be seen below in Figures 3-4(a)-(d).

a) ***CL-48***	b) ***CL-3***	c) ***CL-24***	d) ***CL-31***
LOOK-AT-CLOCK	MANY-CLOUDS	MANY TREES (Alt)	NEST-IN-TREE-BRANCH
00:00:16.905	00:00:05.080	00:00:07.380	00:00:02.560

FIGURE 3-4 EXAMPLES OF WHOLE SCENE CLASSIFIERS

The distinction illustrated above was useful for dividing the classifiers into three groups for ease of data presentation and discussion – Group A, Group B and Group C. I created these three groups in order to make provision for figure and ground constructions, i.e. the distinction between symmetrical two-handed classifiers (one referent) and two-handed classifiers with a different referent for each hand.

1) ***Group A***: One-handed classifiers, e.g. LOOK-AT-CLOCK (***CL-48***), where one hand articulates a round object.
2) ***Group B***: Two-handed classifiers with one referent, e.g. MANY-CLOUDS (***CL-3***), where both hands articulate a sphere-like object. In some cases the hands alternate, e.g. MANY-TREES (***CL-24***) where the signer uses first her right hand and then her left hand.
3) ***Group C***: Two-handed classifiers with two referents, e.g. NEST-IN-TREE-BRANCH (***CL-31***) where one hand articulates an object that is split into two and the other hand articulates a sphere-like object. For the majority of classifiers in this group the two hands have a figure-ground relationship. In the example above – ***CL-31*** -

the right hand denotes the ground – the fork of a tree branch – and the left hand denotes the figure – the nest.

3.6. Organisation and description of the ELAN Tiers

I created five ELAN files (one for each participant) with 41 tiers each and transcribed data in tiers in the order indicated below. I used BTS symbols (and at times my own) for annotations in the ELAN files. A full list of symbols and corresponding keys for annotating the formational features can be seen in Chapter 5 at the beginning of each relevant section. I created three different groups of tiers which I explain and illustrate below – see Tables 3-2 to 3-4 below.

The first group of tiers (1-6) provides the following basic information: the unique classifier identity (e.g. ***CL-15***), gloss of the classifier as well as gloss of lexical items (for ease of reading), the referent matching each classifier, and the traditional classifiers (entity, handling and SASS).

The second group of tiers was used to distinguish the concept class *Event* from the other two concept classes. These tiers focus on the distinction between 'movement' and 'motion'. For elaboration on this point, see the section *Movement of the hands and movement of the referent* later in this chapter. Note that this particular distinction is not part of the formational features.

The tiers in Group 3 are the formational features that were selected for this study – classifier handshape, eyegaze focus, mouth and face actions, movement path direction, movement path shape and movement pattern.

	Tier Name	Description of Tier
1	CL-ID	Classifier-ID
2	Lex-Gloss	Gloss – lexical item
3	CL-Gloss	Gloss - classifier
4	Ref-2H	Referent(s) - Two-handed classifier(s)
5	Ref-RH	Referent Right hand classifier
6	Ref-LH	Referent Left hand classifier
7	Handl-CL-2H	Traditional classifier category Handling - Two-handed classifier(s)
8	Handl-CL-RH	Traditional classifier category Handling - Right hand classifier
9	Handl-CL-LH	Traditional classifier category Handling - Left hand classifier
10	Ent-CL-2H	Traditional classifier category Entity - Two-handed classifier
11	Ent-CL-RH	Traditional classifier category Entity Right hand classifier
12	Ent-CL-LH	Traditional classifier category Entity Left hand classifier
13	SASS-2H	Traditional classifier category SASS -Two-handed classifier
14	SASS-RH	Traditional classifier category SASS - Right hand classifier
15	SASS-LH	Traditional classifier category SASS - Left hand classifier

TABLE 3-2 ELAN TIERS - GROUP 1

	Tier Name	Description of Tier
16	Mvt-2H Y/N	Movement Two-handed classifier(s)
17	Mvt-RH Y/N	Movement Right hand classifier
18	Mvt-LH Y/N	Movement Left hand classifier
19	MotRef-2H Y/N	Motion of the Referent - Two-handed classifier(s)
20	MotRef-RH Y/N	Motion of the Referent – Right hand classifier
21	MotRef-LH Y/N	Motion of the Referent – Left hand classifier
22	Mvt C/S-2H Y/N	Movement Change or State - Two-handed classifier(s)
23	Mvt C/S-RH Y/N	Movement Change or State Right hand classifier
24	Mvt C/S-LH Y/N	Movement Change or State Left hand classifier
25	CC-2H	Concept Class Two handed classifier(s)
26	CC-RH	Concept Class Right hand classifier
27	CC-LH	Concept Class Left hand classifier

TABLE 3-3 ELAN TIERS - GROUP 2

	Tier Name	Description of Tier
28	CL-HS-2H	Handshape (s) of two-handed classifier(s)
29	CL-HS-RH	Handshape right hand classifier
30	CL-HS-LH	Handshape left hand classifier
31	Eg-Foc	Eyegaze Focus
32	MFA	Mouth and Face Actions
33	MvtPD-2H	Movement Path Direction - Two-handed classifier
34	MvtPD-RH	Movement Path Direction - Right hand classifier
35	MvtPD-LH	Movement Path Direction - Left hand classifier
36	MvtPS-2H	Movement Path Shape - Two-handed classifier
37	MvtPS-RH	Movement Path Shape - Right hand classifier
38	MvtPS-LH	Movement Path Shape - Left hand classifier
39	MvtPat-2H	Movement Pattern - Two-handed classifier
40	MvtPat-RH	Movement Pattern Right hand classifier
41	MvtPat-LH	Movement Pattern Left hand classifier

TABLES 3-4 ELAN TIERS - GROUP 3

3.7. Explanation of the individual ELAN tiers

3.7.1. Classifier-ID

Classifier-ID refers to the unique number allocated to each classifier in the data analysed and described for this research. The numbers were allocated as follows:

Video Clip 1: ***CL-1*** – ***CL-10***,

Video Clip 2: ***CL-11*** – ***CL-20***,

Video Clip 3: ***CL-21*** – ***CL-30***,

Video Clip 4: ***CL-31*** – ***CL-40***

Video Clip 5: ***CL-41*** – ***CL-50***.

3.7.2. Gloss

I used the glossing conventions with the focus on meaning, and therefore did not indicate grammatical information, e.g. nonmanual features for topicalisation. I used capital letters to indicate the meaning of signs in English. Since classifiers are polycomponential signs and therefore usually cannot be glossed with one English word, I used hyphens to indicate that the English words refer to one classifier. I also glossed all lexical items in between classifiers in the tier above so that the reader can follow the meaning easily. Information about nonmanual features and facial expressions is provided in a separate tier.

In the case of classifiers with two referents (i.e. whole scene classifiers), the gloss represents the meaning of the whole scene classifier. See Figure 3-5 below where ***CL-50*** is glossed as BIRD-JUMP-ON-EDGE-OF-NEST, not as JUMP and NEST.

BIRD-JUMP-ON-EDGE-OF-NEST (20.515)

FIGURE 3-5 GLOSSING CONVENTION

3.7.3. Referents

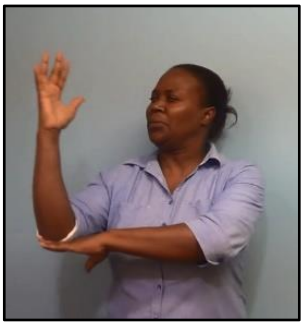
In the data presented in this study, 13 classifiers are articulated with one hand and therefore have one referent each, i.e. Group A. In Group B there are 22 two-handed classifiers with one referent each and in Group C there are 15 two-handed classifiers with two referents each (i.e. a total of 30 classifier handshapes and a total of 30 referents). Note that referents for classifier handshapes are written without any capital letters in order to distinguish between the glossing of classifiers and the actual referent they represent.

3.7.4. Classifier Categories

As mentioned in Chapter 2, I used the three traditional categories of classifiers listed below for the classifiers in the data. Conceptually, 'handling' classifiers are likely to match the concept class *Event* whereas 'SASSes' are likely to match the concept class *Property* and 'Entity' classifiers can belong to either concept class *Event* or concept class *Entity*.

1) Entity: The hand physically represents the referent, or part of the referent.
2) Handling classifiers: The way in which the hand is used, gives an indication of the kind of object that is handled.
3) SASSes: The hand provides descriptive information about an object.

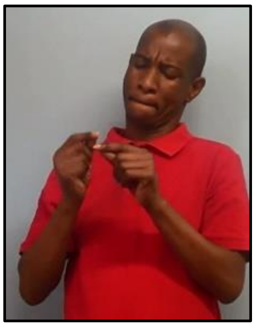
See Figures 3-6 (a)-(c) below for examples of these three different categories of classifiers.



a) *CL-1* Entity

TREE

01.320



b) *CL-12*: Handling

SMALL ENTITY

06.080

c) *CL-42*: SASS

SPHERE

03.555

FIGURE 3-6 EXAMPLES OF THE THREE CLASSIFIER CATEGORIES

3.7.5. Movement of the hands and movement of the referent

Movement of the hands is inherent to sign languages and therefore may be purely articulatory. However, it could also indicate actual movement of the referent. Following Emmorey (2002: 74), the term *movement* is used to refer to movement of the hands as articulators and the term *motion* is used to refer to movement of the referent. This distinction is important because if it is the latter, it is likely that the movement of a particular classifier will result in the classifier being categorised as concept class *Event* because if the referent moves, this movement indicates change as opposed to state.

3.7.6. Concept Classes

The three concept classes *Event*, *Entity* and *Property* are compared on the basis of the distribution of the selected formational features. These three concept classes roughly correspond with the three traditional English word classes of 'verb', 'noun' and 'adjective'.

3.7.7. Classifier Handshapes

I used the classifier handshapes from the BTS as far as possible. Some handshapes in this data set had no corresponding symbols in the BTS, in which case I created my own symbols and keys. In order to ensure that the 'new' symbols are identifiable as such, I used an asterisk in superscript for each of these throughout this study. I used photographs to illustrate all handshapes for each group of classifiers, including those from the BTS. Images, symbols and keys of these handshapes appear in Chapter 4. I also discuss some challenges related to the BTS handshapes in Chapter 5.

3.7.8. Eyegaze Focus

I identified five different eyegaze 'focal points' in this set of data. I noticed that the eyegaze focus can be on one or a combination of the following: classifier, 'remote referent', 'implied object', a non-specific area in the signing space and the camera. I will explain each of these focal points in the section below, except for signing space and camera which both are self-explanatory.

I made a distinction between 'consistent' and 'sequential' eyegaze focus - 'consistent' eyegaze focus means there is no shift of focal point during the articulation of a classifier; 'sequential' instances, on the other hand, refer to more than one focal point. An example of this can be seen in Figures 3-7(a) and (b) below when the signer articulates EGG-BULGE. Initially the eyegaze focus is on the classifier and then the signer glances at the camera. This sequence is indicated with a colon in the tiers as 'CL; Cam'. Other classifiers display 'consistent eyegaze', i.e. no shift in eyegaze focus during the articulation of the classifiers.

a) ***CL-7*** EGG-BULGE
Focus on classifier
00:00:19.200

b) ***CL-7*** EGG-BULGE
Focus on camera
00:00:19.400

FIGURE 3-7 EXAMPLE OF SEQUENCES OF EYEGAZE FOCUS

Eyegaze on the classifier means that the focal point is the hand or hands articulating the classifier. For figure and ground constructions – regardless whether the eyegaze was on the figure or the ground - I captured each such instance as 'focal point classifier'. See the example of a figure and ground construction in Figure 3-8 below, which illustrates eyegaze focus on the ground.

CL-31 NEST-IN-TREE-BRANCH

FIGURE 3-8 EXAMPLE OF EYEGAZE FOCUS ON THE GROUND IN A WHOLE SCENE CLASSIFIER

I borrowed the term 'remote referent' from Kaneko and Mesch (2013: 382) because it seemed to be the most appropriate term and explanation to describe the examples in Figures 3-9(a)-(c) below.

'Remote referent' refers to instances where the eyes are directed toward the classifier and yet the focal point is beyond the articulators of the classifier. This happens when the referent of the classifier entails an extent (of something) – such as a field, the woods, a crowd of people, a herd of cattle and so on. In this data set, in most cases when the eyegaze is on this 'remote referent', the function of the gaze is to give an indication of the physical extent of the scene.

In their discussion of eyegaze functions which are unique to creative signing, Kaneko and Mesch observe that “eye gaze is one of the very few ways to physically refer to remote referents without creating "visual noise” which, by moving and extending other body parts, would be a problem” (2013: 378). Refer to Chapter 2 for a more detailed discussion of eyegaze.

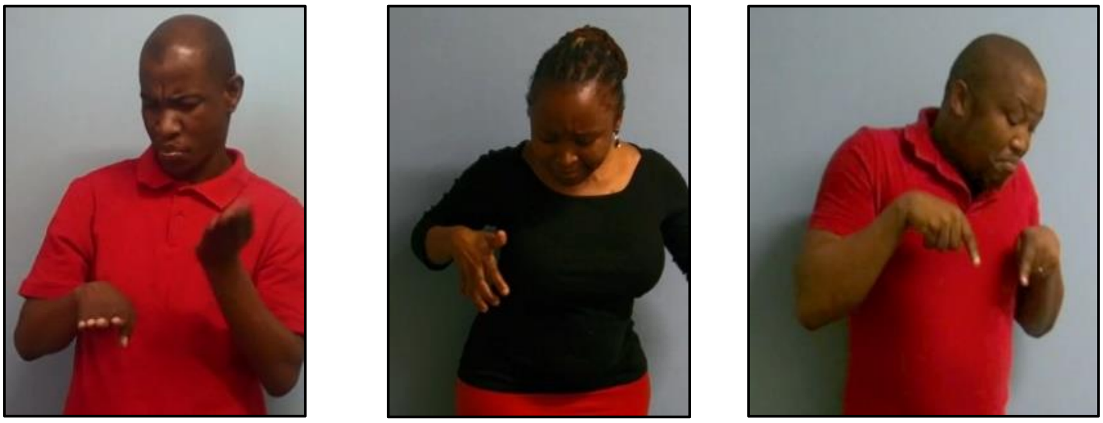
a) ***CL-1*** TREE-MANY 00:00:01.320

b) ***CL-21*** SURROUNDINGS-BIG 00:00:02.160

c) ***CL-22*** GRASS-LOTS 00:00:03.097

FIGURE 3-9 EXAMPLES OF EYEGAZE FOCUS ON A ‘REMOTE REFERENT’

‘Implied object’ refers to instances where the focal point is an object for which the signer does not articulate an actual lexical item. In Figure 3-10(a) below the bird is wrapping a blanket over the egg and the focal point remains the egg. In Figure 3-10(b) the bird moves her tummy out of the way while the eyegaze focus remains on the egg underneath her. In Figure 3-10(c) the bird pulls up her legs to look at the egg underneath her. In all these examples there is no lexical item visible at this point but in the context of the elicitation video clip we know what the signer is looking at.



a) ***CL-17***
WRAP-EGG-WITH-BLANKET
00:00:23.000

b) ***CL-35***
TUMMY-LIFT-LOOK-AT-OBJECT
00:00:14.733

c) ***CL-45***
BIRD-PULL-UP-LEGS
00:00:08.781

FIGURE 3-10 EXAMPLES OF EYEGAZE FOCUS ON THE 'IMPLIED OBJECT'

Examples of eyegaze focus on a non-specific area in the signing space can be seen in Figures 3-11(a)-(c) below.

a) ***CL-28***
CROCHET-SMALL-PANTS
00:00:22.180

b) ***CL-41***
NEST-IN-BRANCH-FORK
00:00:02.805

c) ***CL-47***
BIRD-SIT-ON-EGG
00:00:12.262

FIGURE 3-11 EXAMPLES OF EYEGAZE FOCUS ON A NON-SPECIFIC AREA IN THE SIGNING SPACE

I differentiated between focal points and eyegaze focus which is likely to have a discourse function and which – in most instances – is quite brief. I did not use these 'discourse' instances for numerical values in Excel graphs, although I noted them. For example, if the signer focuses his / her eyegaze on the classifier and also looks briefly at the camera or into the signing space, the numerical value (1 per instance) was allocated only to the 'classifier as focal point', although the sequence would still be acknowledged and indicated as 'CL; Cam; CL'. Figures 3-12(a)-(d) below illustrate this phenomenon. Note that when the eyes are closed for the whole duration of the classifier, such a classifier is excluded from any comparison relating to eyegaze focus because the focal point cannot be determined.

a) Focal Point classifier
00:00:12.799

b) Focal point classifier
00:00:13.192

c) Look at camera
00:00:13.693

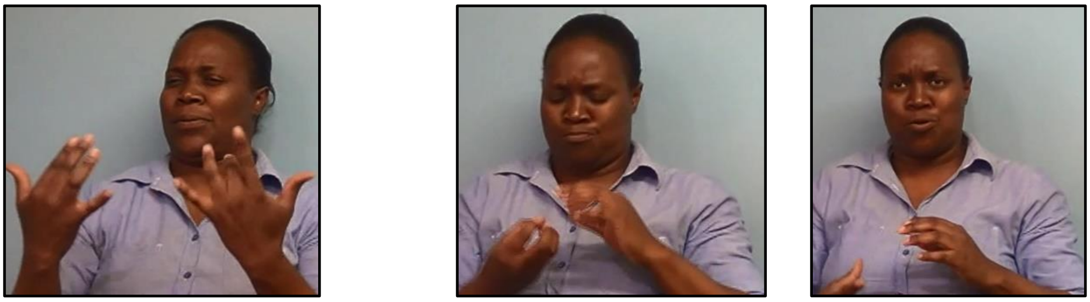
d) Focal point classifier
00:00:13.793

FIGURE 3-12 EXAMPLE OF SEQUENCES OF EYEGAZE FOCUS - NEST-IN-BRANCH-FORK (*CL-26*)

3.7.9. Mouth and face Actions

All classifiers I described are accompanied by mouth and face actions. I identified the following mouth and face actions: 'lips pursed', 'lips pursed slightly', 'lips pursed forward', 'lips pursed sour', 'lips pursed open', 'lips pursed smile; 'lips pulled back from teeth', 'tongue protrusion', 'tongue between teeth and lower lip', 'smile', 'mouth corners down', 'blowing gently', 'expel air', 'suck in air', 'cheeks puffed', 'cheeks hollow', 'wrinkled nose', 'frown' and 'eyebrows raised'. See p. 155 for the complete list of mouth and face actions, including the abbreviations used for transcriptions and Excel sheets.

Note that features which occur simultaneously are indicated with a hyphen e.g. 'frown while blowing gently' would be transcribed as 'Frn-BlG'. Features which are articulated sequentially are indicated with a semi-colon, e.g. 'frown while lips are pursed and cheeks puffed' and then expel air while frowning' would be transcribed as 'LP-Frn-CPf; Frn-EA'. Figures 3-13(a) and (b) illustrate these examples of simultaneous and sequential mouth and face actions. All other mouth and face actions can be seen in Chapter 4, together with the potential meanings that may be attributed to them in the context of this particular set of data.



a) ***CL-2***
Frn-BlG (00:00:02.710)
Simultaneous
GRASS-LOTS

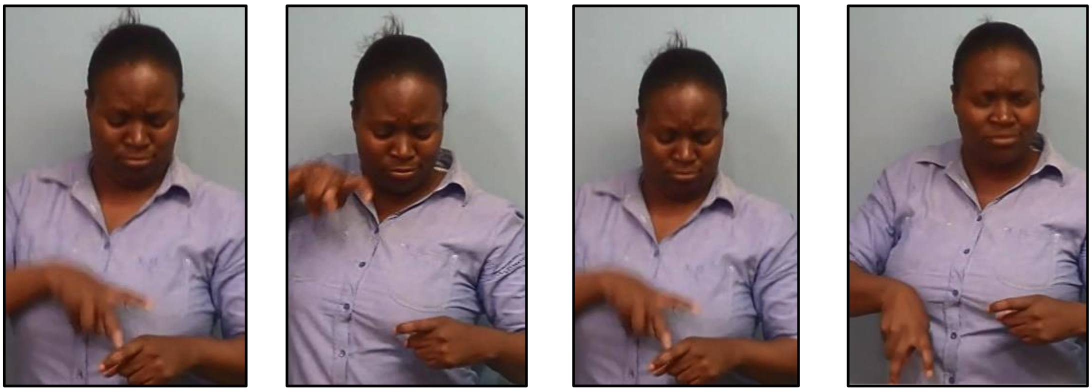
b) ***CL-7***
LP-Frn-CPf (00:00:18.986); Frn-EA (00:00:19.466)
Sequential
EGG-BULGE

FIGURE 3-13 EXAMPLES OF SIMULTANEOUS AND SEQUENTIAL MOUTH AND FACE ACTIONS

3.7.10. Movement in relation to direction, shape and pattern

I distinguished between three main groups of movement for each classifier: the movement path direction, the movement path shape and the movement pattern. Each main group has a number of subgroups, which is explained below.

Movement path direction includes the sub-groups ‘left’, ‘right’, ‘up’, ‘down’, ‘forward’, ‘backward’, ‘convergent’ and ’divergent’. Movement path shape includes ‘arc’, ‘line’ and ‘circle’. Movement pattern includes ‘alternating’, ‘bending’, ‘bouncing’, ‘change of orientation’, ‘closing’, ‘opening’, ‘rubbing’ and ‘wiggling’. See some examples in Figures 3-14(a)-(c) below.



00:00:20.021 00:00:20.241 00:00:20.038 00:00:20.648

a) Direction - Backward movement b) Pattern - BENDING

00:00:19.943 200:00:0.016 00:00:20.466 00:00:20.494

c) Shape - Arc

FIGURE 3-14 EXAMPLES OF MOVEMENT TYPES - *CL-8* JUMP-OFF-EGG

3.8. Method of analysis and description of data

As mentioned earlier in this chapter, the aim of this study is to find potential relations between the three concept classes - *Event*, *Entity* and *Property* - and the distribution of selected formational features in this data set.

After I transcribed the data, I created three Excel documents, one for each group described earlier in this chapter - Groups A, B and C. Some of the formational features were quite straightforward and corresponded one to one with the number of classifiers in each concept class, e.g. traditional classifier categories. All Excel sheets used for this study are in the appendix.

However, other features were quite complex in that they consist of a number of sub-groups which co-occur within a single classifier. Apart from the fact that the number of instances did not correspond with the number of classifiers – which I will discuss briefly below – it also necessitated the creation of columns in the Excel sheets which reflect the finer detail.

Table 3-5 below illustrates a part of this kind of finer detail relating to the feature 'Mouth and Face Actions'. Note that all these examples merely serve to illustrate the process and do not necessarily reflect all the data correctly. I used the type of sheet in Table 3-5 below to calculate the number of instances per concept class in each column.

Where relevant, I first looked at overall distribution. An example in this particular case would be to use the Excel data for the creation of a pie graph illustrating the distribution of all mouth and face actions regardless of concept class, as can be seen in Figure 3-15 below. In this manner I could determine which of the sub-groups occurred more often. Note that the abbreviations used here are explained in Chapter 4.

CL-ID	CL HS	Referent	CC Property	*CC Event*	*CC Entity*	MFA LP	MFA LP	MFA LP	MFA LP Open	MFA LP Smile	MFA Tongue	MFA - TBTL	MFA Smile	MFA MCD	MFA BlG	MFA SA	MFA CPf	MFA Frn	MFA Sq	MFA EbR	Total MFA
2	EXP-GROWTH	grass			1										1			1			**2**
5	SPHERE	nest	1					1									1	1			**3**
10	BENT-B	egg																			
17	CB (Alt)	blanket		1			1				1	1						3			**6**
18	WS	blanket		1			1							1				1			**3**
21	PL-H-WIDE	surroundings			1					2									1	1	**4**
24	TREE (Alt)	trees			1										1		1		1		**3**
29	SPHERE	egg		1													1	2			**3**
32	SPHERE	bum		1			1		1					1						3	**6**
33	SPHERE	bum		1					1	1				2							**4**
42	SPHERE	nest	1						1					1		1					**3**
45	STK	legs		1				1						1						1	**3**
46	SPHERE	tummy		1				1						1						1	**3**
49	STK (Alt)	legs		1					1					1						1	**3**
			2	**8**	**3**	**0**	**3**	**3**	**4**	**3**	**1**	**1**	**0**	**8**	**2**	**1**	**3**	**8**	**2**	**7**	**46**

TABLE 3-5 NUMERICAL VALUES FOR SUB-GROUPS OF 'MOUTH AND FACE ACTIONS'

LPS	3
LPFw	3
LP Open	4
T-Prtr	1
TBTL	1
MCD	8
BlG	2
SA	1
CPf	3
Frn	8
Sq	2
EbR	7

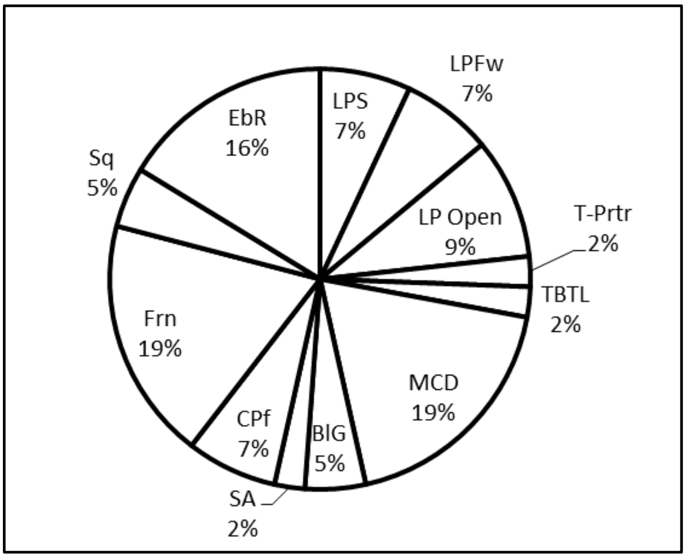


FIGURE 3-15 OVERALL DISTRIBUTION OF ALL MOUTH AND FACE ACTIONS

As is evident in Table 3-5 and Figure 3-15 above - unlike traditional classifier categories – features such as 'Mouth and Face Actions' do not have a one to one correspondence with each classifier. See Table 3-6 below which presents the totals of the data in Table 3-5 (an Excel sheet) in relation to each concept class.

In the concept class *Property*, there are two classifiers but four instances of mouth and face actions. In the concept class *Event*, there are seven classifiers but 20 instances of mouth and face actions and in the concept class *Entity*, there are 3 classifiers but seven instances of mouth and face actions.

Concept Class	**Number of classifiers**	**Instances of mouth and face actions**
Property	2	4
Event	7	20
Entity	3	7

TABLE 3-6 INSTANCES OF MOUTH AND FACE ACTIONS ACROSS THE THREE CONCEPT CLASSES

The total number of concept classes varied across Groups A, B and C. I therefore calculated the proportion of formational feature per concept class and not the sum of features represented. Based on the numbers in Table 3-6 above, I created ratio graphs for the three concept classes to indicate the ratio for a) the feature as a whole (i.e. the total of mouth and face actions for each concept class), and b) the sub-groups. An example of the latter would be a comparison of the ratios of 'mouth corners down' or 'cheeks puffed' across the three concept classes. Examples of these types of graphs can be seen in Figures 3-16 and 3-17 below.

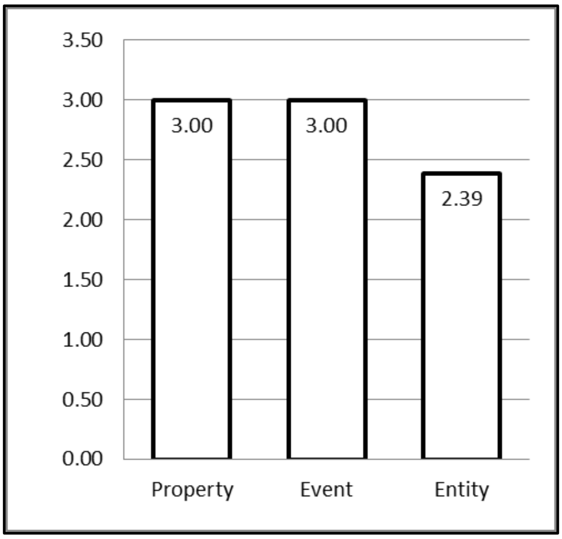


FIGURE 3-16 RATIO OF ALL MOUTH AND FACE ACTIONS

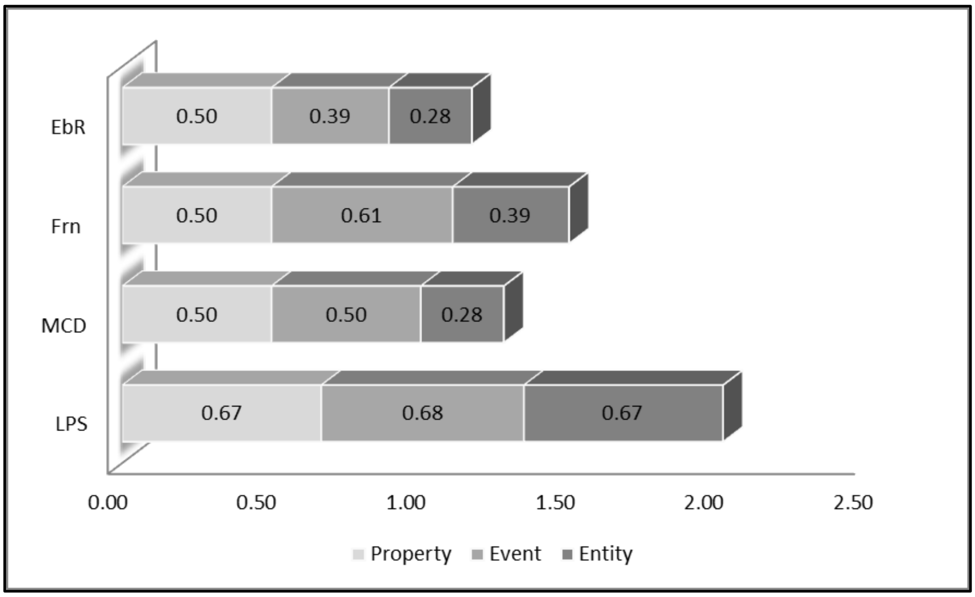


FIGURE 3-17 RATIO OF THE FOUR MAIN SUB-GROUPS OF MOUTH AND FACE ACTIONS

Chapters 4 and 5 provide the detailed presentation and the subsequent discussion of data based on the processes outlined in this chapter.

CHAPTER 4 - Data Presentation

4.1. Introduction

The focus of this chapter is the presentation of the results of this study. Section 4.2 presents data from the three groups of classifiers mentioned in Chapter 3 – one-handed classifiers (Section 4.2.1), two-handed classifiers with one referent (Section 4.2.2) and two-handed classifiers with two referents (Section 4.2.3).

4.2. Data presentation

4.2.1. Group A - one-handed classifiers

This data set contains 13 examples of one-handed classifiers. Table 4-1 below is included for ease of reference and presents all classifiers and their referents in this group ordered according to ***CL-ID***. Also see Figure 4-1 below, which illustrates these handshapes. All the handshapes appear in the BTS with the exception of PINKY-FORK.

CL-ID	Gloss	CL	Ref
1	TREE-MANY	TREE	trees
7	EGG-BULGE	SPHERE	egg
13	PICK-UP-AND-LOOK-AT-CLOCK	WC (wide C)	clock
15	THIS-EGG	SPHERE	egg
19	LEAVE-FROM-COVERED NEST	PL-H (horizontal plane)	nest
25	FORK-IN-TREE-BRANCH	*PINKY-FORK	branch
30	PICK-UP-AND-LOOK-AT-CLOCK	WC (wide C)	clock
35	TUMMY-RIGHT-SIDE-LIFT-LOOK-AT-OBJECT	SPHERE	tummy
36	LOOK-AT-EGG-THERE	SPHERE	egg
37	PICK-UP--LOOK-AT-EGG-CURIOUS	SPHERE	egg
39	CLOCK-THERE	SPHERE	clock
40	(LOOK-AT-OBJECT)-EGG-THERE	SPHERE	egg
48	PICK-UP-AND-LOOK-AT-CLOCK	WC (wide C)	clock

TABLE 4-1 GROUP A - ONE-HANDED CLASSIFIERS

In terms of the three concept classes, this group of classifiers does not contain any samples of the concept class *Property*. Of these 13 classifiers, six falls under the concept class *Event* and seven under the concept class *Entity*.

Classifier categories

In terms of the three categories of classifiers mentioned in Chapter 3 – *Entity*, *Handling* and *SASS* - five of these classifiers are handling classifiers, and eight are entity classifiers. There are no SASSes in this group. Table 4-2 below illustrates the overall distribution of these categories in relation to the concept classes *Event* and *Entity*. In the concept class *Event* five out of six classifiers are handling classifiers and one out of six is an entity classifier. All seven classifiers in the concept class *Entity* are entity classifiers (i.e. 100%).

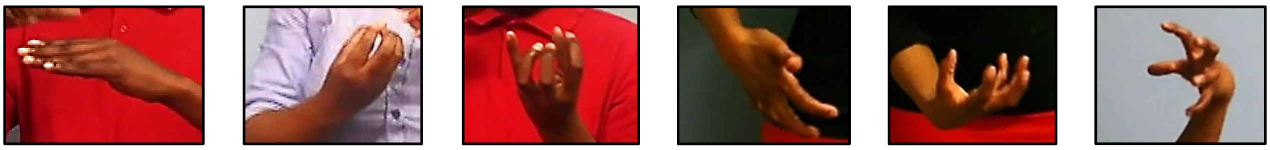
	Concept class *Event*	**Concept Class *Entity***
Entity classifiers	1 (EGG-BULGE)	7
Handling classifiers	5	0

TABLE 4-2 GROUP A - DISTRIBUTION OF CLASSIFIER CATEGORIES

Handshapes

Figure 4-1 below reflects the classifier handshapes that I identified in Group A. There are five different handshapes in this group of 13 classifiers – TREE, WC, PINKY-FORK, SPHERE and PL-H. Keys for symbols follow in brackets after the classifier handshape. Note that in the case of 'PL-H' I used the symbol from the BTS although the handshape is slightly different. In this section there is one handshape – PINKY-FORK – which does not appear in the list of handshapes in the BTS manual.

TREE (***CL-1***)	WC (Wide C) (***CL-13***)	WC (Wide C) (***CL-30***)	WC (Wide C) (***CL-48***)	PINKY-FORK (***CL-25***)
TREE-MANY	PICK-UP-AND-LOOK-AT-CLOCK	PICK-UP-AND-LOOK-AT-CLOCK	PICK-UP-AND-LOOK-AT-CLOCK	FORK-IN-TREE-BRANCH



PL-H (Horizontal plane) (***CL-19***)	SPHERE (***CL-7***)	SPHERE (***CL-15***)	SPHERE (***CL-35***)	SPHERE (***CL-36***, ***CL-37*** & ***CL-40***)	SPHERE (***CL-39***)
LEAVE-FROM-COVERED NEST	EGG-BULGE	THIS-EGG	TUMMY-RIGHT-SIDE-LIFT-LOOK-AT-OBJECT	(LOOK-AT-) EGG-THERE	CLOCK-THERE

FIGURE 4-1 GROUP A – CLASSIFIER HANDSHAPES

Apart from the fact that the SPHERE-handshape is dominant in both concept classes *Event* and *Entity*, no particular pattern is evident as can be seen in Table 4-3 below. The fact that five different handshapes are used for 13 classifiers means that in some instances one handshape denotes different referents. In this data set there is one handshape (SPHERE) which denotes different referents – 'tummy' ***(CL-35)***, 'clock' ***(CL-39)*** and 'egg' (***CLs-36, 37*** & ***CL-40***). Figures 4-2(a)-(c) below illustrate this.

Classifier Handshape	Concept Class Event	Concept Class Entity	Total Number
PINKY-FORK	0	1	1
PL-H	0	1	1
SPHERE	3	4	7
TREE	0	1	1
WC	3	0	3

TABLE 4-3 CLASSIFIER HANDSHAPES AND CONCEPT CLASSES

The fact that five different handshapes are used for 13 classifiers means that in some instances one handshape denotes different referents. In this data set there is one handshape (SPHERE) which denotes different referents – 'tummy' ***(CL-35)***, 'clock' ***(CL-39)*** and 'egg' (***CLs-36, 37*** & ***CL-40***). Figures 4-2(a)-(c) below illustrate this.

a) 'tummy' (***CL-35***) TUMMY-RIGHT-SIDE-LIFT

b) 'clock' (***CL-39***) CLOCK-THERE

c) 'egg' (***CL-36***, ***CL-37*** & ***CL-40***) (LOOK-AT) EGG-THERE

FIGURE 4-2 THE HANDSHAPE SPHERE DENOTING DIFFERENT REFERENTS

There are also instances where the same referent is denoted by different handshapes. Figures 4-3(a) and (b) below show the two different handshapes denoting the referent 'clock'.

a) SPHERE (***CL-39***)
CLOCK-THERE

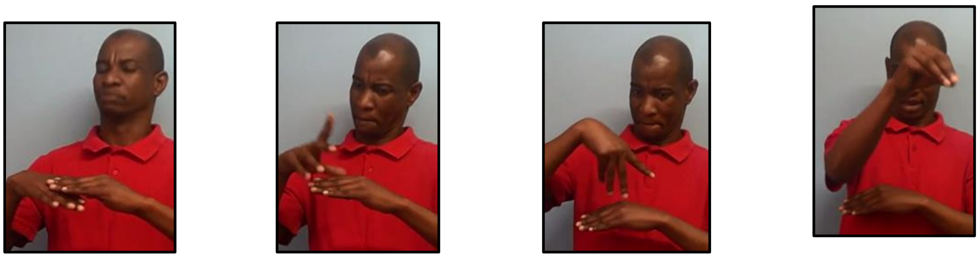
b) WC (***CL-13*** & ***CL-30***)
PICK-UP-AND-LOOK-AT-CLOCK

FIGURE 4-3 THE REFERENT 'CLOCK' DENOTED BY DIFFERENT HANDSHAPES

Eyegaze focus – consistent or sequential

As mentioned in Chapter 3, for the presentation of data relating to eyegaze focus I distinguished between 'consistent' and 'sequential' eyegaze focus. I also investigated whether or not there are differences between the two concept classes in relation to the focal points.

There is one instance where the eyegaze focus is initially on an unidentified area in the signing space and subsequently follows the movement of the lexical item LEAVE, which is articulated by the right hand. It seems to be a case of perseveration – one hand of the previous classifier (FOLD-BLANKET) remains in place and then it becomes another classifier with ‘nest’ as a referent. The handshape is PL-H (horizontal plane). The transition from ***CL-18*** to ***CL-19*** and the duration of ***CL-19*** are illustrated in Figure 4-4 below. Figure 4-5 illustrates the shift in eyegaze from the signing space to the lexical item. In this particular case, the eyegaze focus is only on the lexical item. For this reason, ***CL-19*** is excluded from eyegaze-related comparisons and therefore the total number of classifiers is 12 instead of 13.



25.794 25.970 26.351 26.784

FIGURE 4-4 THE TRANSITION FROM *CL-18* TO *CL-19* AND THE ARTICULATION OF *CL-19*

25.987 26.101 26.167 26.417 26.487

25.560 26.640 26.940 27.640 27.700

FIGURE 4-5 EYEGAZE FOCUS SHIFTS IN *CL-19*

In this data set there are 12 instances of eyegaze. Ten out of 12 instances of eyegaze focus are consistent and two out of 12 are sequential. In this data set there are no instances where the eyes are invisible for the full duration of articulation of the classifier. Note that there are some instances where the gaze is invisible for a short duration, yet visible for most of the duration of the particular classifier.

The comparison of 'consistent' and 'sequential' eyegaze focus in terms of the concept classes *Event* and *Entity* indicates that for both concept classes the majority of eyegaze focus instances are consistent and not sequential. In the group of classifiers identified as concept class *Event* there is one example of sequential focus. This can be seen in ***CL-7*** where the SPHERE handshape is used to denote the referent 'egg' as illustrated in Figures 4-6(a) and (b) below. In this particular instance the shift is from the classifier to the camera, which is transcribed in the ELAN file as 'CL; Cam'. As explained in Chapter 3, the semi-colon indicates sequential focal points.

a) Classifier as focal point

(b)Focus on camera

FIGURE 4-6 EYEGAZE SHIFT IN THE CONCEPT CLASS *EVENT* – *CL-7* – EGG-BULGE

In the group of classifiers identified as concept class *Entity* there are two examples of sequential focus. The first shift in eyegaze focus is evident when where Participant 2 uses the SPHERE-handshape in ***CL-15*** to denote the referent 'egg'. It has a sequence of classifier-camera-classifier (transcribed as 'CL; Cam; CL'). See Figures 4-7(a)-(c) below.

a) Classifier as focal point

b) Camera as focal point

c) Classifier as focal point

FIGURE 4-7   EYEGAZE SHIFT (1) IN THE CONCEPT CLASS *ENTITY* – *CL-15* – THIS-EGG

The second shift, where Participant 4 uses the SPHERE-handshape in ***CL-39*** for the referent 'clock' (CLOCK-THERE), has the following sequence of eyegaze focus: 'Invisible; CL-SPHERE'. See Figures 4-8(a) and (b) below for examples.

a) Eyegaze focus invisible
26.382

b) Eyegaze focus on classifier
27.160

FIGURE 4-8   EYEGAZE SHIFT (2) IN THE CONCEPT CLASS *ENTITY* – *CL-39* - CLOCK-THERE

Eyegaze Focus – focal points

The next section relating to eyegaze focus deals with the various focal points observed (as explained previously). The total number of focal points is 15, which does not correspond to the number of classifiers in this group (12). The reason for this is that all instances of focal points were taken into account (i.e. consistent eyegaze focus as well as the individual shifts within the sequential group).

Table 4-4 below provides the abbreviations used for transcribing the different focal points. Table 4-5 below shows the overall distribution of focal points. In the majority of instances the focus is on the classifier. The other numbers and percentages do not seem to be significant.

Eg-Foc Cam	Eyegaze focus on camera
Eg-Foc CL	Eyegaze focus on classifier
Eg-Foc Inv	Eyegaze focus invisible
Eg-Foc I-Obj	Eyegaze focus on implied object
Eg-Foc Ref	Eyegaze focus on referent
Eg-Foc RR	Eyegaze focus on remote referent

TABLE 4-4 ABBREVIATIONS FOR EYEGAZE FOCUS

Classifier	9
Referent	0
Remote Referent	1
Implied Object	3
Camera	2

TABLE 4-5 COMPARISON OF DIFFERENT FOCAL POINTS

Figure 4-9 below illustrates the distribution of focal points. 'Camera' as focal point is excluded when the distribution of features across concept classes is compared. Note that in this data set there are no instances of the referent as focal point. The classifier as focal point has an identical distribution across both concept classes. There is only one instance of the remote referent in this data set and it falls under the concept class *Entity.* The implied object appears in both concept classes as focal point.

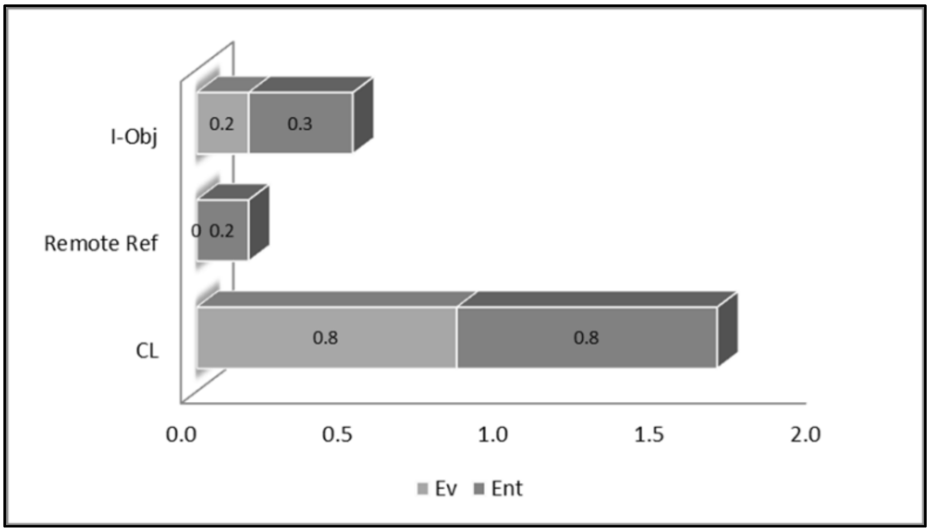


FIGURE 4-9 THE DISTRIBUTION OF EYEGAZE FOCAL POINTS

Mouth and face actions

The next formational feature being investigated is 'Mouth and Face Actions'. In this data set there are 55 instances of mouth and face actions across 19 different types as can be seen in Table 4-6 below. All classifiers in this group presented with mouth and face actions. ***CL-19*** is somewhat different. This classifier handshape 'PL-H' constitutes a horizontal plane but it is not a figure and ground construction as one would expect. It actually forms the basis (i.e. the ground) for a **lexical** item (‘figure’) and not for another classifier. Note that the mouth actions evident during the articulation of this classifier (LEAVE-COVERED-NEST) are obligatory for the SASL **lexical item** LEAVE.

The data shows that there are more mouth and face actions in the concept class *Event* than in the concept class *Entity* as is evident in Figure 4-10 below.

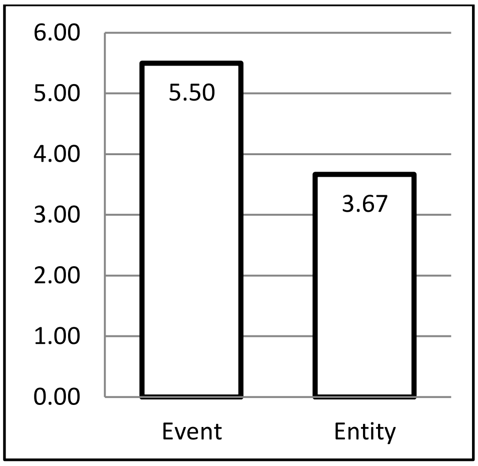


FIGURE 4-10 OVERALL DISTRIBUTION OF MOUTH AND FACE ACTIONS

The majority of the 19 different types of mouth and face actions occur between one and four times in the data. Amongst these 19 types, I identified four main types that present with a higher number of instances, based on the numerical totals in the relevant Excel sheet. The four main types are ‘Mouth Corner Down’ (11), ‘Frown’ (11), ‘Eyebrows Raised’ (11) and ‘Lips Pursed’ (10). Note that all the different types of ‘Lips Pursed’ were grouped together, e.g. ‘Lips Pursed Forward’, ‘Lips Pursed Inward’, and so on. Figure 4-11 below shows the distribution of these four groups across the concept classes. In each main group, there are a higher number of actions in the concept class *Event*. Although there are not many classifiers in Group A, it seems that mouth and face actions increase when a classifier belongs to the concept class *Event*.

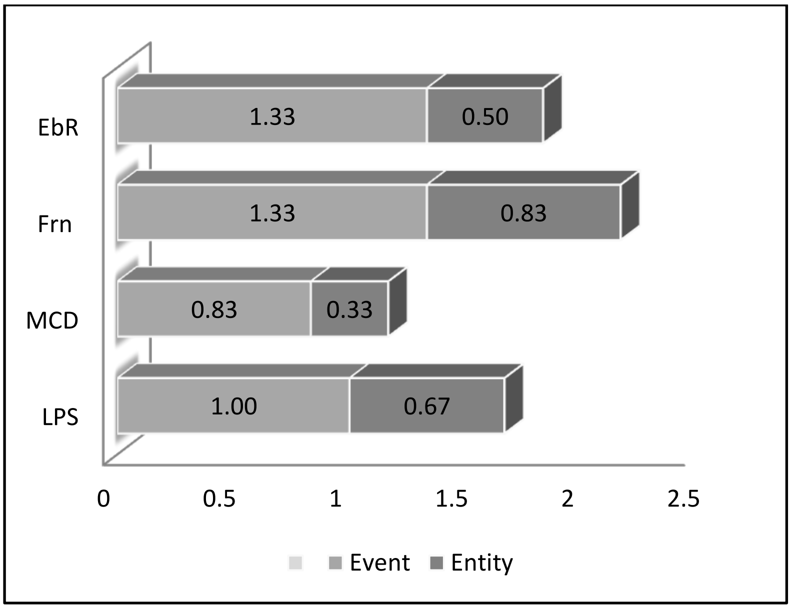


FIGURE 4-11 THE DISTRIBUTION OF THE FOUR MAIN GROUPS OF MOUTH AND FACE ACTIONS

Movement

The final feature to be presented is movement. I used the BTS as a guide to distinguish between 'movement **path direction**', 'movement **path shape**' and 'movement **pattern**'. I identified a total of 30 movement instances across the different types of movements. There were 15 instances in the 'movement direction' group, ten in the 'movement shape' group and five in the 'movement pattern' group. Figure 4-12 below illustrates that in terms of overall distribution, the concept class *Event* has a higher number of movement than *Entity* (2.67 as opposed to 2.00), which is not a significant difference.

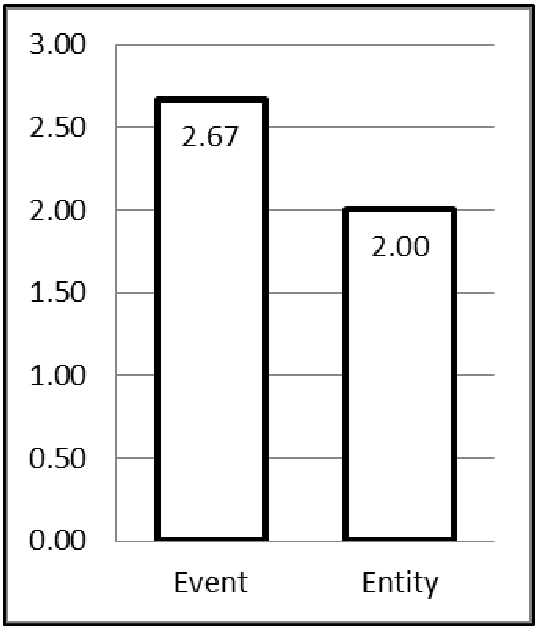


FIGURE 4-12 OVERALL DISTRIBUTION OF MOVEMENT TYPES

When comparing the three main groups of movements (i.e. path shape, path direction and pattern), the movement **pattern** group is the only group where the difference between the concept classes is noticeable. At this stage, the number of tokens is small and this difference may not be important. The concept class *Event* has the higher number (0.67) compared to *Entity* (0.14). The differences between the two concept classes in terms of movement path shape and movement path direction are relatively small in comparison to the movement pattern group. Figure 4-13 below illustrates the distribution of the three movement groups across the concept classes.

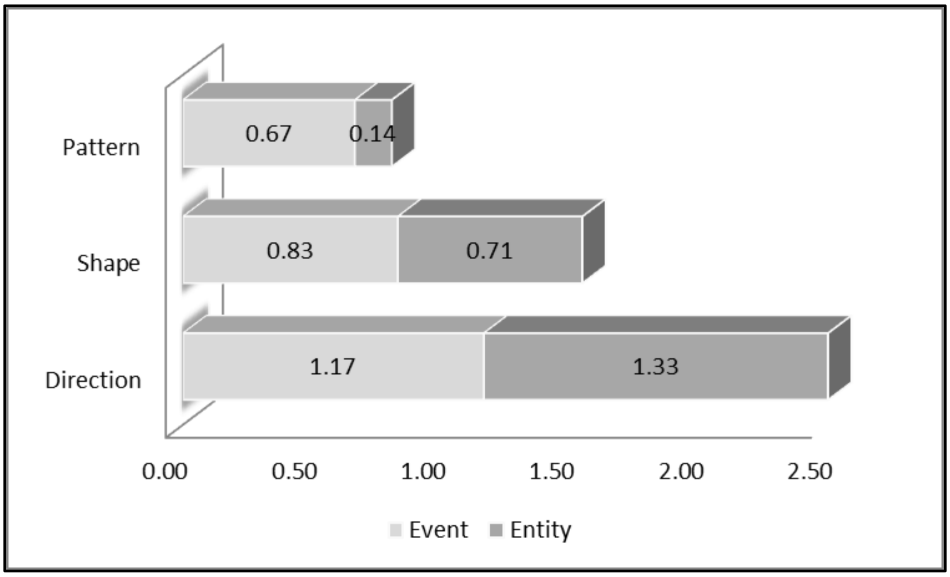


FIGURE 4-13 THE DISTRIBUTION OF THE THREE MAIN GROUPS OF MOVEMENT TYPES

Summary – Group A

The 13 classifiers in Group A represent two of the three concept classes - *Event* (six) and *Entity* (seven). In the concept class *Event*, there is one entity classifier and five handling classifiers. All seven classifiers in the concept class *Entity* are entity classifiers. There are no SASSes. There is a total of five different classifier handshapes in Group A. There are examples of one referent denoted by multiple handshapes as well as one handshape denoting multiple referents. Consistent eyegaze seems to be the norm in this group, and the majority of eyegaze focal points are the classifier. For both 'mouth and face actions' and 'movement' the concept class *Event* has a higher number of instances than the concept class *Entity*. There is one exception to this – the concept class *Entity* has a higher number of movements in the movement **direction** group than *Event* (1.33 as opposed to 1.17). This is not a significant difference.

4.2.2. Group B - two-handed classifiers with one referent

This group of classifiers contains 22 examples of two-handed classifiers with one referent. This is the only group which contains examples of all three concept classes. Note that ***CL-10*** is excluded from all comparisons and thus the total of classifiers in this group is 21. The reason for this exclusion will be discussed in Chapter 5.

The majority of classifiers are in the concept class *Event* (11), six are in the concept class *Entity* and four are in the concept class *Property*. Table 4-10 below presents the classifier-ID, gloss, the classifier handshapes and their meanings, as well as the referents for each classifier. The handshapes in Table 4-10 will be discussed in the separate section about handshapes.

CL-ID	Gloss	Classifier handshape & explanation	Referent
2	GRASS-LOTS	*EXP-GROWTH (expanse of vegetation)	grass
3	CLOUDS-MANY-IN-SKY	SPHERE	clouds
5	NEST	SPHERE	nest
6	KNIT	STK (stick)	needles
10	COVER-EGG	BB (Bent B)	egg
11	NEST	*WO (woven object)	nest
17	WRAP-EGG-WITH-BLANKET	*CB (Alt) (closed B)	blanket
18	BIRD-CLAW-BLANKET-STRETCH	*WS (woven surface)	blanket
21	SURROUNDINGS-BIG	PL-H-WIDE (wide horizontal plane)	surroundings
22	GRASS-LOTS	*EXP-GROWTH	grass
23	EARTH-LOTS	FO (flattened O)	earth
24	TREE-MANY	TREE (Alt)	trees
27	NEST	*C-BENT-5 (closed bent 5)	nest
29	EGG-BULGE	SPHERE	egg
32	BUM-SIT-DOWN-ON-EGG	SPHERE	bum

CL-ID	Gloss	Classifier handshape & explanation	Referent
33	BUM-WIGGLE	SPHERE	bum
38	COVER-EGG-WITH-BUM	SPHERE	bum
42	NEST	SPHERE	nest
44	SEW-SMALL-PANTS	*TE (thin entity)	sewing needle
45	BIRD-PULL-UP-LEGS	STK	legs
46	MOVE-TUMMY-LEFT	SPHERE	tummy
49	PULL-UP-RIGHT-LEG-PULL-UP-LEFT-LEG	STK (Alt)	legs

TABLE 4-6 GROUP B – TWO-HANDED CLASSIFIERS WITH ONE REFERENT

Classifier categories

Examples of all three categories of classifiers were identified in this data set. Four of the classifiers are SASSes, five are handling classifiers and 12 are entity classifiers. Table 4-7 below illustrates the overall distribution of these categories in relation to the concept classes *Property*, *Event* and *Entity*. In the concept class *Property* all four of the classifiers are SASSes. In the concept class *Event* six out of 12 classifiers are entity classifiers and five are handling classifiers. All classifiers in the concept class *Entity* are entity classifiers (i.e. six out of six).

	Concept class *Event*	**Concept class Property**	**Concept Class *Entity***
SASSes	0	4	0
Entity classifiers	6	0	6
Handling classifiers	5	0	0

TABLE 4-7 DISTRIBUTION OF CLASSIFIER CATEGORIES

Classifier handshapes

I identified 12 different handshapes in this group of 21 classifiers as illustrated in Figure 4.12 below. Seven of these 12 handshapes do not appear in the list of handshapes in the BTS and I named them as follows: EXP-GROWTH (expanse of vegetation), CB (closed B), C-BENT-5 (closed Bent 5), TE (thin entity), WO (woven object), PL-H-WIDE (wide horizontal plane) and WS (woven surface). The TE-handshape name has been adapted from Zwitserlood, meaning 'thin entity' (2003: 163). Figure 4-14 below provides examples of all the above handshapes.

C BENT-5: ***CL-27***
NEST

CB (closed B)(Alt): ***CL-17***
WRAP-EGG-WITH-BLANKET

EXP-GROWTH: ***CL-2***
GRASS-LOTS

EXP-GROWTH: ***CL-22***
GRASS-LOTS

FO (flat O): ***CL-23***
LOT-OF-EARTH

PL-H-WIDE (wide horizontal plane): ***CL-21***
SURROUNDINGS-BIG

SPHERE: ***CL-3***

CLOUDS-MANY-IN-SKY

SPHERE: ***CL-5***

NEST

SPHERE: ***CL-29***

EGG-BULGE

SPHERE: ***CL-32***

BIRD-SIT-DOWN-ON-EGG

SPHERE: ***CL-33***

BIRD-WIGGLE-BUM

SPHERE: ***CL-38***

BIRD-COVER-EGG-WITH-BUM

SPHERE: ***CL-42***

NEST

SPHERE: ***CL-46***

MOVE-TUMMY-LEFT

STK: ***CL-6***

KNIT

STK: ***CL-45***

BIRD-PULL-UP-LEGS

STK: ***CL-49***

PULL-UP-RIGHT-LEG-PULL-UP-LEFT-LEG

TE: ***CL-44***

SEW-SMALL-PANTS

TREE: ***CL-24***

TREE-MANY

WO: ***CL-11***

NEST

WS: ***CL-18***

BLANKET-STRETCH

FIGURE 4-14 CLASSIFIER HANDSHAPES

When comparing handshapes in relation to the three concept classes of *Property*, *Event* and *Entity*, there does not seem to be any particular pattern (see Table 4-8 below). As in Group A, the SPHERE-handshape is dominant.

Classifier Handshape	**Concept Class** ***Property***	**Concept Class** ***Event***	**Concept Class** ***Entity***
BB (Bent B)			
CB (Alt) (closed B)		1	
C-BENT-5 (closed bent 5)	1		
EXP-GROWTH (expanse of vegetation)			2
FO (flat O)			1
PL-H-WIDE (Wide horizontal plane)			1
SPHERE	3	5	
STK (stick)		3	
TE (thin entity)		1	
TREE (Alt)			1
WO (woven object)			1
WS (woven surface)		1	

TABLE 4-8 CLASSIFIER HANDSHAPES AND CONCEPT CLASSES

There are two referents in this data set which are denoted by more than one handshape – ‘blanket’ and ‘nest’. In Figures 4-15 (a) and (b) below, ‘blanket’ is denoted by the handshapes CB (Closed B) and WS (Woven Surface). Figures 4-16(a)-(c) illustrate the different handshapes for the referent ‘nest’.

a) CB

CL-17 WRAP-EGG-WITH-BLANKET

b) WS

CL-18 BIRD-CLAW-BLANKET-STRETCH

FIGURE 4-15 THE REFERENT ‘BLANKET’ DENOTED BY TWO DIFFERENT HANDSHAPES

a) C BENT-5

b) SPHERE

c) WO

FIGURE 4-16 THE REFERENT ‘NEST’ DENOTED BY THREE DIFFERENT HANDSHAPES

In this data set, there are two handshapes that denote multiple referents. The first of these is STK (stick), denoting the referents ‘knitting needles’ and ‘legs’ respectively. See Figures 4-17(a) and (b) below for examples of these referents.

a) ‘knitting needles’

CL-6 KNIT

b) ‘legs’

CL-45 PULL-UP-LEGS

FIGURE 4-17 THE HANDSHAPE STK DENOTING TWO DIFFERENT REFERENTS

The second handshape denoting multiple referents is the handshape SPHERE, which denotes the referents ‘bum’, ‘clouds’, ‘egg’, ‘nest’ and ‘tummy’ respectively. See these examples in Figures 4-18 (a)-(e) below.

a) ‘bum’

CL-33 BUM-WIGGLE

b) ‘clouds’

CL-3 CLOUD-MANY-IN-SKY

c) ‘egg’

CL-29 EGG-BULGE

d) ‘nest’

CL-42 NEST

e) ‘tummy’

CL-46 MOVE-TUMMY-LEFT

FIGURE 4-18 THE HANDSHAPE SPHERE DENOTING FIVE DIFFERENT REFERENTS

Eyegaze focus – consistent or sequential

In Group B, the total number of classifiers for presenting eyegaze data is 20, not 21. The reason for this is that there is one instance in which the eyegaze focus is invisible - ***CL-38***. As explained in Chapter 3, the instances where signers look at the camera or an unspecified area in the signing space will be noted for determining consistent or sequential eyegaze, but will not form part of the numerical data used for the investigation of focal points. The overall distribution of consistent or sequential eyegaze focus indicates that consistent focus is evident in the majority of classifiers in this group. Out of 20 classifiers, 15 instances of eyegaze focus are consistent and five are sequential. All the sequential instances are the result of looking at the camera.

The comparison of 'consistent' and 'sequential' instances of eyegaze focus in relation to the three concept classes indicates the following: The concept class *Property* has an equal number of consistent and sequential instances. In the other two concept classes the majority of eyegaze focus instances are consistent and not sequential. The concept class *Event* has the highest number of consistent eyegaze focus. This is illustrated in Figure 4-19 below.

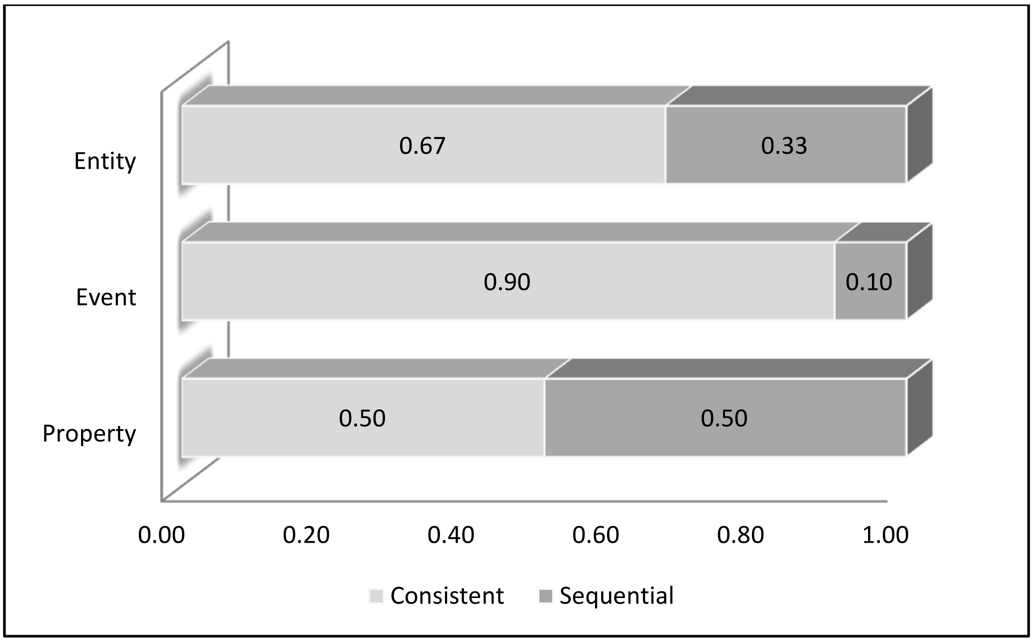


FIGURE 4-19 CONSISTENT AND SEQUENTIAL EYEGAZE FOCUS

Eyegaze Focus – focal points

The total number of focal points is 25. Once the numerical value of camera as focal point has been removed, the total of focal points is 20. Table 4-9 below shows the overall distribution of focal points. In Group B, the implied object has the higher number of focal point instances. There are no significant differences between the different focal points identified in this group of classifiers.

Classifier	5
Referent	4
Remote Referent	5
Implied Object	6
Camera	5

TABLE 4-9 COMPARISON OF DIFFERENT FOCAL POINTS

Figure 4-20 below illustrates the distribution of the focal points in relation to the concept classes, excluding camera as focal point. The classifier as focal point has the highest number in the concept class *Event* (0.30), although the difference is not significant in comparison with the other two concept classes. In the concept class *Property*, the referent has a higher number than the other two concept classes - 0.50 as opposed to 0.10 (*Event*) and 0.17 (*Entity*). The remote referent does not appear in the concept class *Event* and has a higher number in the concept class *Entity* (0.67) than in the concept class *Property* (0.25). The implied object as focal point occurs only in the concept class *Entity*.

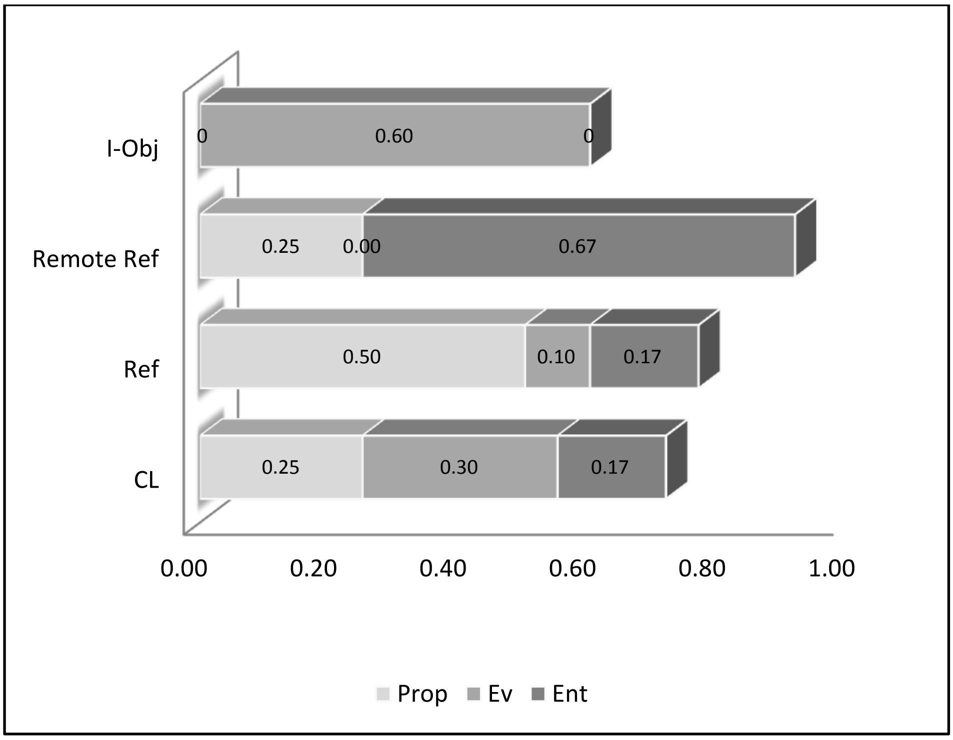


FIGURE 4-20 THE DISTRIBUTION OF EYEGAZE FOCAL POINTS

Mouth and face actions

All classifiers in this group presented with mouth and face actions. In this data set there are 66 instances of mouth and face actions. The data shows that there are more mouth and face actions in the concept class *Event* than in the concept classes *Entity* and *Property*, as illustrated in Figure 4-21 below. The difference between *Entity* and *Property* is quite small.

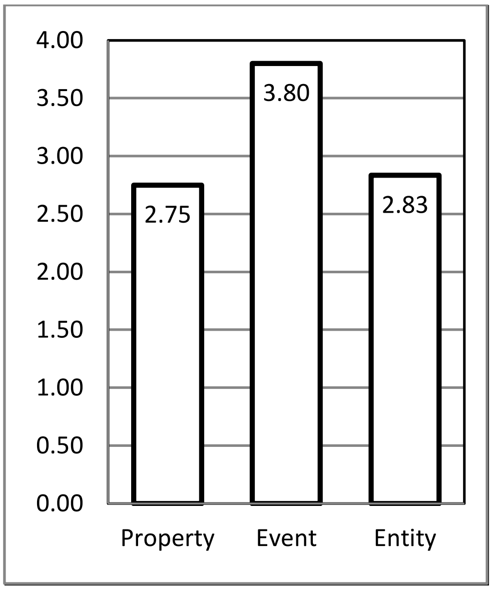


FIGURE 4-21 OVERALL DISTRIBUTION OF MOUTH AND FACE ACTIONS

As explained under 'Mouth and Face Actions' in Group A, I used the same four main groups – 'Lips Pursed', 'Mouth Corners Down', 'Frown' and 'Eyebrows Raised'. Figure 4-22 below shows the distribution of these four groups across the concept classes. Once again, in each main group, the majority of instances occur in the concept class *Event*.

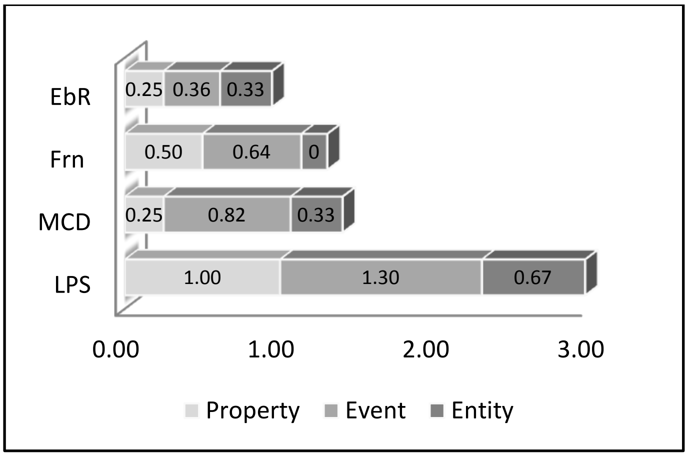


FIGURE 4-22 THE DISTRIBUTION OF THE FOUR MAIN GROUPS OF MOUTH AND FACE ACTIONS

Movement

In this set of data I identified a total of 94 movement instances across the different types of movements – 61 instances in the movement path direction group, 19 in the movement path shape group and 14 in the movement pattern group. In terms of overall distribution, Figure 4-23 below indicates that the concept class *Property* has a much lower number of movements than the concept classes *Event* and *Entity*, with *Event* having the highest number – 4.91 as opposed to *Entity* – 4.67.

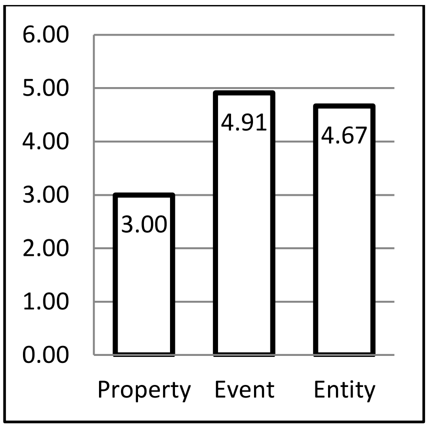


FIGURE 4-23 OVERALL DISTRIBUTION OF MOUTH AND FACE ACTIONS

The numbers for the three different movement groups across the three concept classes are illustrated in Figure 4-24 below and indicate the following: In terms of movement path direction, the concept class *Event* has the highest number of movements (3.36) and *Property* has the lowest number (1.50).

In terms of movement path shape, the concept classes *Entity* and *Property* have the highest number – 1.0 each and *Event* has 0.82. In terms of movement pattern, there is a significant difference between *Property* on the one hand (0.25), and *Event* (0.73) and *Entity* (0.83) on the other hand. Thus, for direction and pattern, the concept class *Property* has much lower numbers than the other two concept classes.

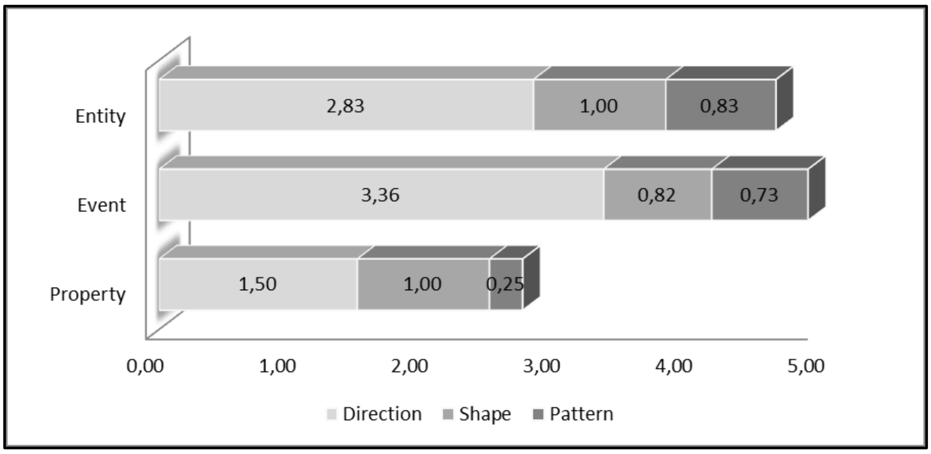


FIGURE 4-24 THE DISTRIBUTION OF THE THREE MAIN GROUPS OF MOVEMENTS

Summary – Group B

Group B contains classifiers belonging to all three concept classes – *Property* (four), *Event* (11) and *Entity* (six). In the concept class *Event*, there are six entity classifiers and five handling classifiers. All seven classifiers in the concept class *Entity* are entity classifiers. There are four SASSes in the concept class *Property*.

Of the 12 different handshapes identified in Group B, two are also found in Group A. Of the remaining ten handshapes, only two appear in the BTS. In this group there are two referents denoted by more than one handshape. There are also two handshapes denoting multiple referents.

As in Group A, consistent eyegaze is evident in the majority of classifiers in this group. In terms of overall distribution - i.e. regardless of concept class - eyegaze focal points vary almost equally amongst classifier, referent, remote referent and implied object. When focal points are compared across the three concept classes, the following differences stand out:

1) Amongst the three concept classes, *Property* has the highest number of referent as focal point.
2) The implied object as focal point occurs only in the concept class *Event*.
3) The concept class *Entity* has a much higher number of remote referent as focal point than the other two concept classes.

For both 'mouth and face actions' and 'movement', the concept class *Property* consistently has the lowest number of all three concept classes. *Event* consistently has the highest number. The difference between *Event* and *Entity* in terms of these numbers does not seem to be significant – there is a much bigger difference between *Property* and *Event*.

4.2.3. Group C - two-handed classifiers with two referents

This data set contains 15 examples of two-handed classifiers with two referents (i.e. figure and ground constructions). In this group of classifiers, ten classifiers fall under the concept class *Event* and five under the concept class *Entity*. There are no examples of the concept class *Property* in this data set. Table 4-10 below reflects all classifier handshapes, glosses and referents of each hand (i.e. a total of 30).

CL-ID	Gloss	Classifier handshape	Referent
4	NEST-IN-BRANCH-FORK	PINKY-FORK	branch
4	NEST-IN-BRANCH-FORK	SPHERE	nest
8	JUMP-OFF-EGG-WHILE-LOOK-AT-EGG	CN (container)	egg
8	JUMP-OFF-EGG-WHILE-LOOK-AT-EGG	TL (two-legged animate being)	legs
9	JUMP-ON-EGG	CN	egg
9	JUMP-ON-EGG	TL	legs
12	SEW-SMALL-PANTS	SE (small entity)	part of small pants
12	SEW-SMALL-PANTS	TE	sewing needle
14	JUMP-ON-AND-SIT-ON-EDGE-NEST	CN	nest
14	JUMP-ON-AND-SIT-ON-EDGE-NEST	TL	legs
16	EGG-PEEP-OUT-FROM-UNDER-BLANKET	BB (Bent B)	blanket
16	EGG-PEEP-OUT-FROM-UNDER-BLANKET	SPHERE	egg
20	EGG-BOUNCE-IN-NEST	CN	nest
20	EGG-BOUNCE-IN-NEST	SPHERE	egg
26	NEST-IN-BRANCH-FORK	PINKY-FORK	branch(RH)
26	NEST-IN-BRANCH-FORK	SPHERE	nest
28	CROCHET-SMALL-PANTS	STK (stick)	crochet needle
28	CROCHET-SMALL-PANTS	STK	part of small pants
31	NEST-IN-BRANCH-FORK	PINKY-FORK	branch
31	NEST-IN-BRANCH-FORK	SPHERE	nest
34	CROCHET-PANTS	STK	crochet needle
34	CROCHET-PANTS	STK	part of small pants
41	NEST-IN-BRANCH-FORK	PINKY-FORK	branch
41	NEST-IN-BRANCH-FORK	SPHERE	nest
43	BIRD-SIT-IN-NEST	BEAK	bird
43	BIRD-SIT-IN-NEST	SPHERE	nest
47	BIRD-SIT-ON-EGG	SPHERE	egg
47	BIRD-SIT-ON-EGG	TL	legs
50	BIRD-JUMP-ON-EDGE-OF-NEST	CN	nest
50	BIRD-JUMP-ON-EDGE-OF-NEST	TL	legs

TABLE 4-10 GROUP C – TWO-HANDED CLASSIFIERS WITH TWO REFERENTS

This group of classifiers posed quite a challenge in terms of investigating formational features such as eyegaze focus, mouth and face actions as well as movement (i.e. focusing on form) while at the same time attempting to address the classifiers as polycomponential signs (i.e. focusing on meaning). Each whole scene classifier has two different handshapes which can be semantically described – a total of 30 handshapes. I decided to include all 30 classifiers (i.e. the figure and the ground) for numerical purposes only when describing and discussing handshape-related features, e.g. the number of handshapes as well as discussing one handshape with multiple referents or one referent with multiple handshapes.

However, when investigating any other features which are form-related (eyegaze focus, mouth and face actions and movement) I realised that it was not possible to separate the figure and ground constructions because doing so resulted in the reduplication of data in terms of the concept classes and their numerical values. I therefore decided to use the part of these constructions which determines the concept class for describing the formational features. In all cases it was the figure. What this means, in effect, is that the numerical data for formational features was entered for the concept class of the figure, even though at times the observations applied to the ground-part of the construction.

Table 4-11 below illustrates my initial reduplication of concept classes when inputting data for eyegaze focus for this group. Figures 4-25 and 4-26 illustrate the difficulty of inputting the data against the figure-part of the whole-scene concept class when it actually applies to the ground-part.

CL-ID	CL	Ref	Concept Class Event	Concept Class Entity	Eg-Foc Consistent	Eg-Foc Sequential	Eg-Foc CL	Eg-Foc Ref	Eg-Foc I-Obj	Eg-Foc Cam	Eg-Foc Invisible
8	TL (two-legged animate being)	legs	1								
9	TL	legs	1								
12	TE (thin entity)	sowing needle	1								
14	TL	legs	1								
20	SPHERE	egg	1				1				1
34	STK (stick)	crochet needle	1			1	1				
47	TL	legs	1								
50	TL	legs	1								
4	PINKY-FORK	fork in tree branch		1	1		1				
4	SPHERE	nest		1							
8	CN (container)	nest		1		1			1	1	
9	CN	nest		1	1		1				
12	SE (small entity)	part of small pants		1	1		1				
14	CN	nest		1	1		1				
20	CN	nest		1		1					
26	PINKY-FORK	fork in tree branch		1		1	1			1	
26	SPHERE	nest		1							
31	PINKY-FORK	fork in tree branch		1	1		1				
31	SPHERE	nest		1							
34	STK	part of small pants		1							
41	PINKY-FORK	fork in tree branch		1		1	1				
41	SPHERE	nest		1							
43	BEAK	bird		1		1	1			1	
43	SPHERE	nest		1							
47	CLOSED SPHERE	egg		1		1	1				
50	CN	nest		1	1		1				
16	BB (bent B)	blanket									1
16	CLOSED SPHERE	egg									
28	STK	crochet needle									1
28	STK	part of small pants									
			8	18	6	7	12	0	1	3	

TABLE 4-11 REDUPLICATION OF CONCEPT CLASSES

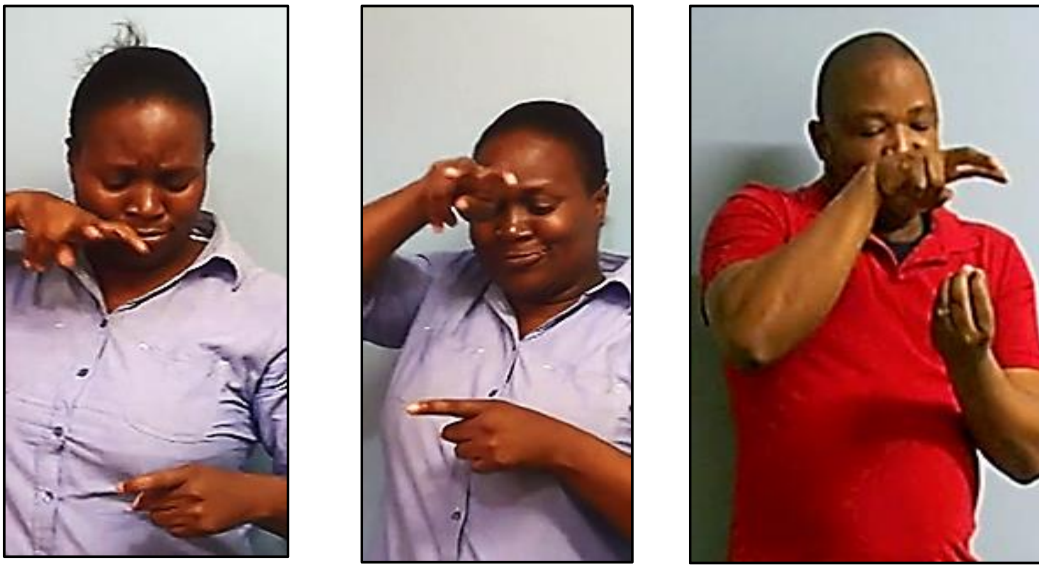
Note that in Table 4-11 above, three classifiers are excluded because the eyegaze focus is invisible. Therefore the total of concept classes for both hands is 26 and not 30. The data input was for either the figure or the ground – i.e. only one hand. This means that for 26 concept classes (and 26 classifier handshapes) there are 13 eyegaze focus instances and 13 focal points – in both cases half the number of concept classes / classifier handshapes. The only way I could arrive at solving this problem was to input data against the concept class of the figure because in each case it determines the concept class of the whole-scene classifier.

CL-31 NEST-IN-TREE-BRANCH

FIGURE 4-25 EYEGAZE FOCUS ON THE GROUND-PART IN A WHOLE SCENE CLASSIFIER

It is clear in Figure 4-25 above that the focal point is the PINKY-FORK handshape, i.e. the ground-part. In this particular case, the figure and the ground both belong to the concept class *Entity* and therefore this does not pose a problem. In other cases, I discovered some interesting patterns regarding the ground-handshape as the focal point. This observation may be hard to explain if the focal point were entered against the figure-part of the construction because the data then becomes inconsistent in the context of the three concept classes.

The other dilemma is incorrect input. In Figures 4-26 (a)-(c) below, once again it is clear that the eyegaze focus is on the ground. In all three cases, the figure determines the concept class as *Event*. Inputting the eyegaze focal points against the figure-part is incorrect. On the other hand, inputting the focal points against the ground would be a mismatch with the concept class of the whole-scene classifier, which is also incorrect. In the end, for the sake of consistency, I decided that the concept class will determine where the data is inputted.



a) ***CL-8***: JUMP-OFF-EGG b) ***CL-9***: JUMP-ON-EGG c) ***CL-47***: BIRD-SIT-ON-EGG

FIGURE 4-26 EYEGAZE FOCUS ON THE GROUND-PART IN A WHOLE SCENE CLASSIFIER

Classifier categories

In this group of classifiers there are only handling and entity classifiers and no SASSes. Out of a total of 15 whole scene classifiers, three are handling classifiers and 12 are entity classifiers. Table 4-12 below illustrates the overall distribution of these categories in relation to the concept classes *Event* and *Entity*. In the concept class *Event* seven out of ten classifiers are entity classifiers and three are handling classifiers. All five classifiers in the concept class *Entity* are entity classifiers.

	Concept class *Event*	**Concept Class *Entity***
Entity classifiers	7	5
Handling classifiers	3	0

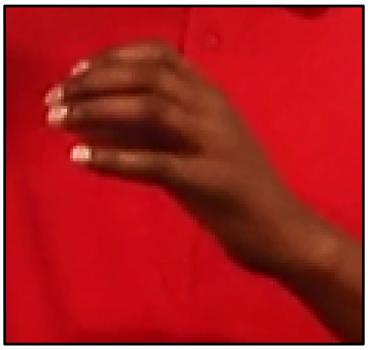
TABLE 4-12 DISTRIBUTION OF CLASSIFIER CATEGORIES

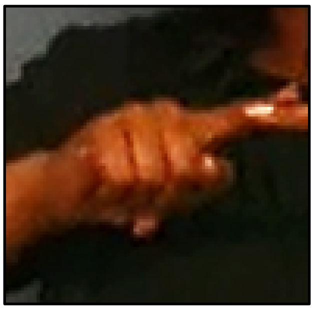
Classifier handshapes

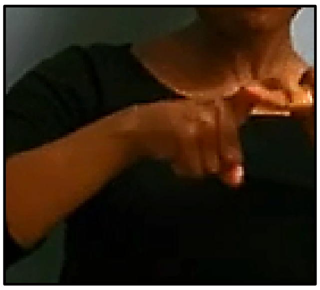
As mentioned earlier, I looked at the handshapes of both hands when handshape is a feature to be discussed (i.e. a total of 30). I identified nine different handshapes in this group of 30 classifier handshapes as illustrated in Figure 4-27 below. Five of these handshapes do not appear in the list of handshapes in the BTS: BB (Bent B), BEAK (a body part representing the bird), PINKY-FORK, SE (small entity) and TE (thin entity).

WHOLE-SCENE CLASSIFIER	**FIGURE**	**GROUND**
		
CL-4: NEST-IN-BRANCH-FORK	‘nest’	‘fork in tree branch’
		
CL-8: JUMP-OFF-EGG	‘bird’s legs’	‘edge of nest’
		
CL-9: JUMP-ON-EGG	‘bird’s legs’	‘egg’

WHOLE-SCENE CLASSIFIER	FIGURE	GROUND
		
CL-12: SEW-SMALL-PANTS	‘needle’	‘small pants’
		
CL-14: JUMP-ON- SIT-ON-EDGE-NEST	‘birds’ legs’	‘nest’
		
CL-16: EGG-PEEP-OUT-FROM-BLANKET	‘egg’	‘blanket’

WHOLE-SCENE CLASSIFIER	**FIGURE**	**GROUND**
		
CL-20: EGG-BOUNCE-IN-NEST	‘egg’	‘nest’
		
CL-26: NEST-IN-BRANCH-FORK	‘nest’	‘fork in tree branch’

WHOLE-SCENE CLASSIFIER	**FIGURE**	**GROUND**
		
CL-28: CROCHET-SMALL-PANTS	‘crochet needle’	‘small pants’

WHOLE-SCENE CLASSIFIER	**FIGURE**	**GROUND**
		
CL-31: NEST-IN-BRANCH-FORK	‘nest’	‘fork in tree branch’
		
CL-34: CROCHET-PANTS	‘crochet needle’	‘small pants’
		
CL-41: NEST-IN-BRANCH-FORK	‘nest’	‘fork in tree branch’

WHOLE-SCENE CLASSIFIER | **FIGURE** | **GROUND**

CL-43: BIRD-SIT-IN-NEST

'bird'

'nest'

CL-47: BIRD-SIT-ON-EGG

'bird's legs'

'egg'

CL-50: BIRD-JUMP-ON-EDGE-OF-NEST

'bird's legs'

'nest'

FIGURE 4-27 GROUP C – CLASSIFIER HANDSHAPES

As is the case with Groups A and B, there is not any particular pattern of handshape in terms of the concept classes, apart from the SPHERE-handshape being dominant again. Table 4-13 below illustrates the distribution of handshapes across the concept classes in this group.

Classifier Handshape	**Concept Class *Event***	**Concept Class *Entity***
BB (Bent B)	0	1
BEAK	0	1
CN (container)	0	5
PINKY-FORK	0	4
SE (small entity)	0	1
SPHERE	2	6
STK (stick)	2	2
TE (thin entity)	1	0
TL (two-legged animate being	5	0

TABLE 4-13 DISTRIBUTION OF CLASSIFIER HANDSHAPES ACROSS THE CONCEPT CLASSES *ENTITY* AND *EVENT*

There are three referents in this data set which are denoted by more than one handshape. The first is ‘egg’, denoted by the handshapes CN (container) and SPHERE as illustrated in Figures 4-28 (a) and (b) below. The second referent is ‘nest’ - also denoted by the handshapes CN and SPHERE, as can be seen in Figures 4-29 (a) and (b) below. The third referent is ‘part of small pants’, denoted by the handshapes SE (small entity) and STK (stick) in Figures 4-30(a) and (b) below.

Two of these three examples also occur in the 'reverse' position – the handshape CN denotes the two referents 'nest' and 'egg', and the handshape SPHERE also denotes these two referents. One other handshape denoting more than one referent is STK, which denotes 'crochet needle' and 'part of small pants' – see Figures 4-31(a) and (b).

a) CN

CL-8: JUMP-OFF-EGG

b) SPHERE

CL-47: BIRD-SIT-ON-EGG

FIGURE 4-28 THE REFERENT 'EGG' DENOTED BY TWO HANDSHAPES

a) SPHERE

CL-43: BIRD-SIT-IN-NEST

b) CN

CL-50: BIRD-JUMP-ON-EDGE-OF-NEST

FIGURE 4-29 THE REFERENT 'NEST' DENOTED BY TWO HANDSHAPES

a) SE　　　　　　　　b) STK

CL-12: SEW-SMALL-PANTS　　***CL-28***: CROCHET-SMALL-PANTS

FIGURE 4-30 THE REFERENT 'PART OF SMALL PANTS' DENOTED BY TWO HANDSHAPES

a) ***CL-28***: 'part of small pants'　　b) ***CL-34***: 'crochet needle'

FIGURE 4-31 THE HANDSHAPE STK DENOTING TWO REFERENTS

Eyegaze focus – consistent or sequential

Out of a total of 15 whole scene classifiers, only 13 are relevant for comparisons relating to eyegaze because the focal point is invisible in two classifiers – ***CL-16*** and ***CL-28***. The overall distribution of consistent or sequential eyegaze focus indicates that consistent focus is evident in the majority of classifiers in this group, as is the case with Groups A and B. Out of 13 classifiers, nine instances of eyegaze focus are consistent and four are sequential. As with the other two groups, the sequential instances are the result of either looking at the camera or an area in the signing space.

When the two concept classes *Event* and *Entity* are compared in relation to 'consistent' and 'sequential' instances of eyegaze focus, the concept class *Entity* has the highest number of consistent eyegaze focus (0.80) as opposed to the concept class *Event* (0.63). See Figure 4-32 below.

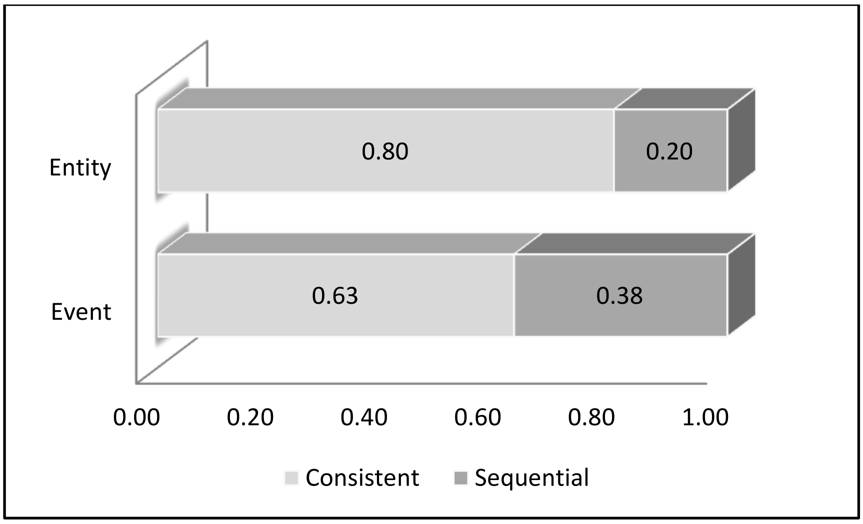


FIGURE 4-32 THE DISTRIBUTION OF CONSISTENT AND SEQUENTIAL EYEGAZE

Eyegaze Focus – focal points

In Group C, apart from sequences with the camera or signing space, there is no variation in focal points. In all cases, regardless of concept class, the focus is on the classifier, i.e. the classifier is the focal point 100% for each concept class. The number of focal points is 16 but once the numerical value of camera as focal point has been removed, the total of focal points is 13 whole scene classifiers.

Mouth and face actions

In this data set there are 56 instances of mouth and face actions, observed in all classifiers in this data set. Once again, as with Groups A and B, the data shows that there are more mouth and face actions in the concept class *Event* (4.40) than in the concept class *Entity* (2.40), as illustrated in Figure 4-33 below.

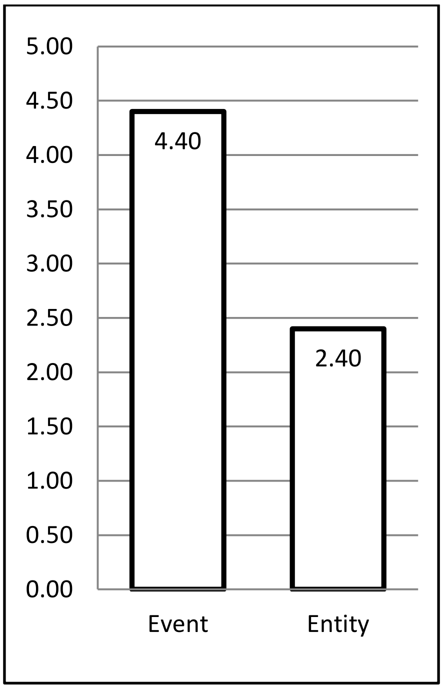


FIGURE 4-33 OVERALL DISTRIBUTION OF MOUTH AND FACE ACTIONS

The four main groups – 'Lips Pursed' (LP), 'Mouth Corners Down', 'Frown' (Frn) and 'Eyebrows Raised' (EbR) – display a similar trend as in Groups A and B. In each main group, the majority of instances occur in the concept class *Event*, with the exception of

‘Lips Pursed’. As can be seen in Figure 4-34 below, there seems to be a more significant difference between the two concept classes in relation to the mouth and face action ‘frown’. The other three main groups do not display such a difference in the total number. The distribution of these four groups across the two concept classes can be seen in Figure 4-34.

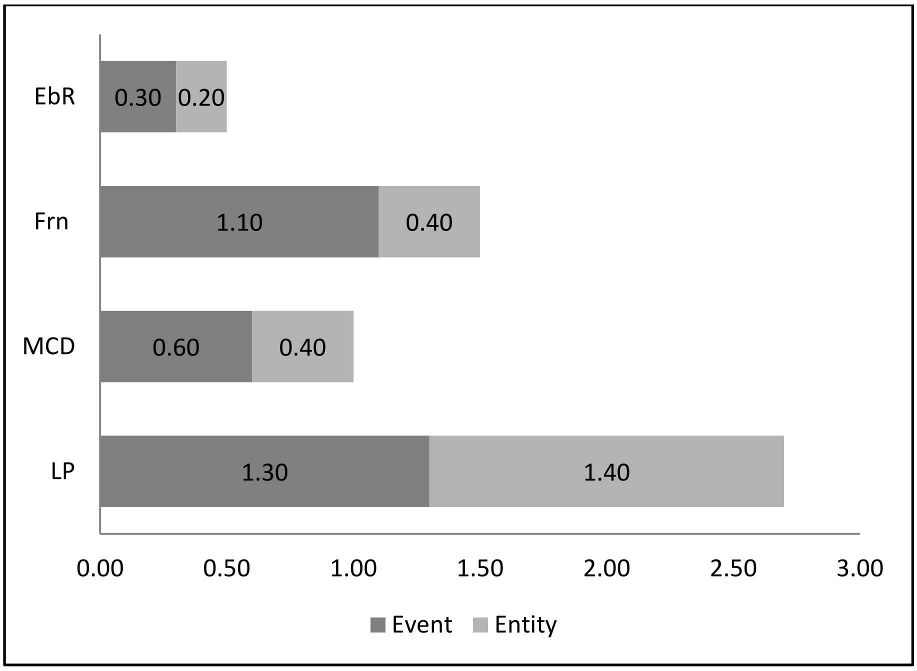


FIGURE 4-34 THE DISTRIBUTION OF THE MAIN GROUPS OF DISTRIBUTION OF MOUTH AND FACE ACTIONS

Movement

I identified a total of 64 movement instances including the three main different types of movements mentioned in previous sections. In terms of overall distribution, the majority of these instances fall under the group ‘direction’ (35), with no significant differences between 'shape' (15) and 'pattern' (14). The concept class *Event* had the highest number of movements (4.8) as opposed to *Entity* (3.2).

The differences between the three different movement groups across the two concept classes are illustrated in Figure 4-35 below. In the group movement path direction, the concept class *Event* has a higher number of movements than *Entity*. This difference is not significant. The two concept classes have the same number of movement shape instances. There is a significant difference in terms of movement **pattern** – 1.3 in the concept class *Event* and only 0.2 in the concept class *Entity*.

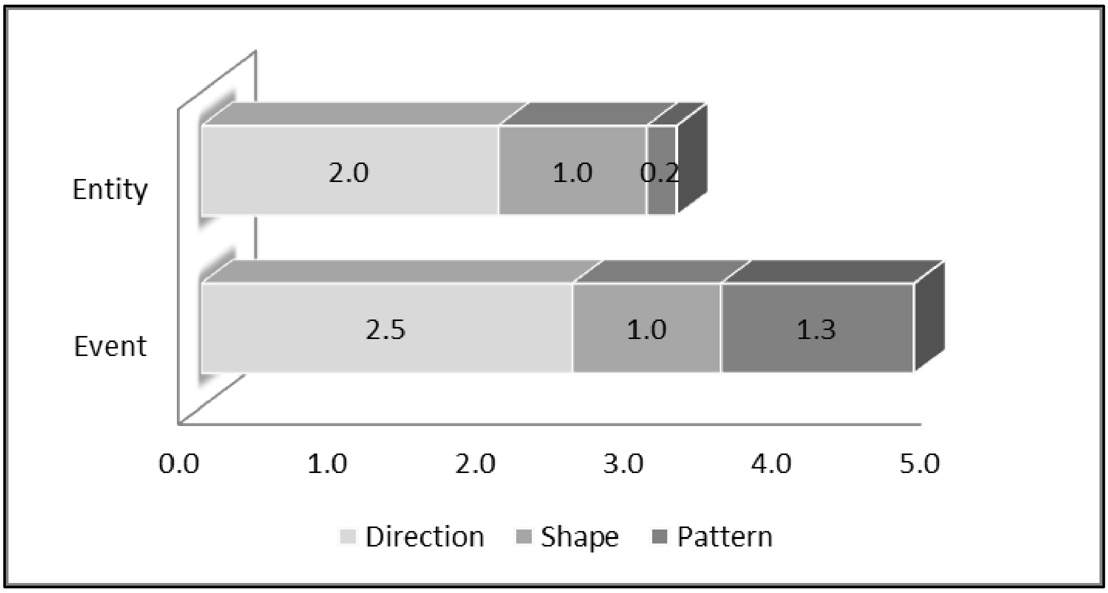


FIGURE 4-35 THE DISTRIBUTION OF THE THREE MAIN GROUPS OF MOVEMENTS

Summary

Group C contains classifiers that belong to two of the three concept classes – *Event* (ten) and *Entity* (five). In the concept class *Event*, there are seven entity classifiers and three handling classifiers. All five classifiers in the concept class *Entity* are entity classifiers. There are no SASSes in Group C.

Five of the nine different handshapes identified in Group C do not appear in Groups A and B. Three of these nine handshapes are in the BTS manual. Three referents in this group are denoted by more than one handshape and two handshapes denote more than one referent.

The trend of consistent eyegaze is evident in the majority of classifiers in this group as well. When focal points are compared in relation to the two concept classes, eyegaze focus is on the classifier 100% for both, i.e. there is no variation in the focal point. In terms of mouth and face actions, the number in the concept class *Entity* is almost double that of the number in the concept class *Event*. This is also the case for the formational feature 'movement'. Here, the biggest difference between the two concept classes occurs in the 'movement pattern' group.

CHAPTER 5 - Overview and data discussion

5.1. Overview

This chapter provides an overview and a discussion of all classifiers in the data set. The distribution of all classifiers investigated in this study indicates the following: Out of 49 classifiers, four belong to the concept class *Property* (8%), 27 belong to the concept class *Event* (55%) and 18 belong to the concept class *Entity* (37%). See Table 5-1 below for the complete list of classifiers, handshapes, referents and concept classes. Note that this table is organized according to the concept classes.

CL-ID	Group	Gloss	CL HS	Referent	CC Property	CC Event	CC Entity
3	B	CLOUDS-MANY-IN-SKY	SPHERE	clouds	1		
5	B	NEST	SPHERE	nest	1		
27	B	NEST	C-BENT-5	nest	1		
42	B	NEST	SPHERE	nest	1		
6	B	KNIT	STK	needles		1	
7	A	EGG-BULGE	SPHERE	egg		1	
8	C	JUMP-OFF-EGG-WHILE-LOOK-AT-EGG	TL	legs		1	
9	C	JUMP-OFF-EGG-WHILE-LOOK-AT-EGG	TL	legs		1	
12	C	SEW-SMALL-PANTS	TE	sewing needle		1	
13	A	PICK-UP-AND-LOOK-AT-CLOCK	WC	clock		1	
14	C	JUMP-ON-AND-SIT-ON-EDGE-NEST	TL	legs		1	
16	C	EGG-PEEP-OUT-FROM-UNDER-BLANKET	SPHERE	egg		1	
17	B	WRAP-EGG-WITH-BLANKET	CB (Alt)	blanket		1	
18	B	BIRD-CLAW-BLANKET-STRETCH	WS	blanket		1	
20	C	EGG-BOUNCE-IN-NEST	SPHERE	egg		1	
28	C	CROCHET-PANTS	STK	crochet needle		1	
29	B	EGG-BULGE	SPHERE	egg		1	
30	A	PICK-UP-AND-LOOK-AT-CLOCK	WC	clock		1	
32	B	BUM-SIT-DOWN-ON-EGG	SPHERE	bum		1	
33	B	BUM-WIGGLE	SPHERE	bum		1	
34	C	CROCHET-PANTS	STK	crochet needle		1	
35	A	TUMMY-RIGHT-SIDE-LIFT-LOOK-AT-OBJECT	SPHERE	tummy		1	
37	A	PICK-UP-AND-LOOK-AT-EGG-CURIOUS	SPHERE	egg		1	
38	B	COVER-EGG-WITH-BUM	SPHERE	bum		1	
44	B	SEW-SMALL-PANTS	TE	sewing needle		1	
45	B	BIRD-PULL-UP-LEGS	STK	legs		1	

CL-ID	Group	Gloss	CL HS	Referent	CC Property	CC Event	CC Entity
46	B	MOVE-TUMMY-LEFT	SPHERE	tummy		1	
47	C	BIRD-SIT-ON-EGG	TL	legs		1	
48	A	PICK-UP-AND-LOOK-AT-CLOCK	WC	clock		1	
49	B	PULL-UP-RIGHT-LEG-PULL-UP-LEFT-LEG	STK (Alt)	legs		1	
50	C	BIRD-JUMP-ON-EDGE-OF-NEST	TL	legs		1	
1	A	TREE-MANY	TREE	trees			1
2	B	GRASS-LOTS	EXP-GROWTH	grass			1
4	C	NEST-IN-BRANCH-FORK	SPHERE	nest			1
11	B	NEST	WO	nest			1
15	A	THIS-EGG	SPHERE	egg			1
19	A	LEAVE-FROM-COVERED NEST	PL-H	nest			1
21	B	SURROUNDINGS-BIG	PL-H-WIDE	surroundings			1
22	B	GRASS-LOTS	EXP-GROWTH	grass			1
23	B	EARTH-LOTS	FO	earth			1
24	B	TREE-MANY	TREE (Alt)	trees			1
25	A	FORK-IN-TREE-BRANCH	PINKY-FORK	branch			1
26	C	NEST-IN-BRANCH-FORK	SPHERE	nest			1
31	C	NEST-IN-BRANCH-FORK	SPHERE	nest			1
36	A	LOOK-AT-EGG-THERE	SPHERE	egg			1
39	A	CLOCK-THERE	SPHERE	clock			1
40	A	(LOOK-AT-OBJECT)-EGG-THERE	SPHERE	egg			1
41	C	NEST-IN-BRANCH-FORK	SPHERE	nest			1
43	C	BIRD-SIT-IN-NEST	BEAK	bird			1
~~*10*~~	~~*B*~~	~~*COVER-EGG*~~	~~*BB (Bent B)*~~	-	-	-	-
					4	**27**	**18**

TABLE 5-1 CLASSIFIERS, REFERENTS AND CONCEPT CLASSES

5.1.1. Classifier categories

In terms of the distribution of classifier categories, the majority of classifiers are entity classifiers (32), followed by handling classifiers (13) and then SASSes (four). All classifiers in the concept class *Property* are SASSes (i.e. 100%). All classifiers in the concept class *Entity* are entity classifiers (100%). The concept class *Event* contains both handling classifiers and entity classifiers. See Figure 5-1 below, which illustrates the almost equal distribution of entity and handling classifiers in the concept class *Event*.

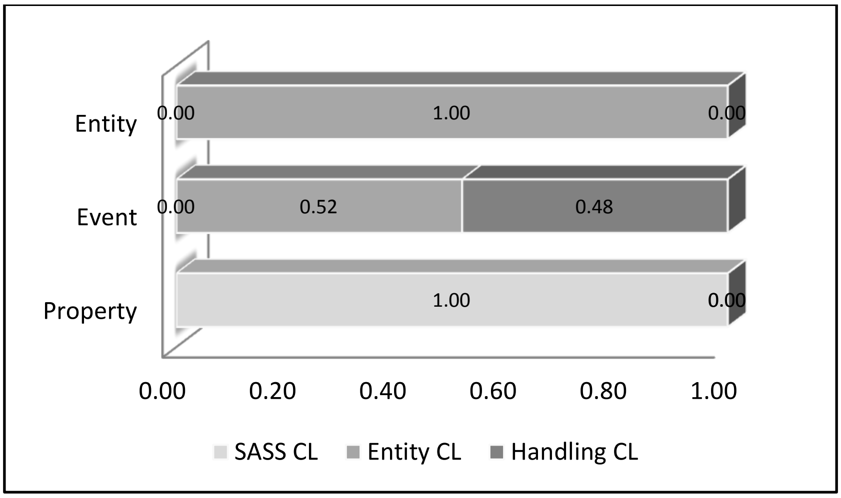


FIGURE 5-1 THE DISTRIBUTION OF THE THREE CLASSIFIER CATEGORIES

5.1.2. Handshape

A total of 19 different classifier handshapes were identified in the full set of data. Of these 19 handshapes, only eight appear in the BTS. The other handshapes were allocated symbols on a semantic basis. These are discussed in more detail in Section 5.2.2. The complete list of symbols and keys are on p. 182. See Table 5-2 below, which indicates the full set of handshapes which were transcribed in the data. Note that handshapes appearing in the BTS Manual are indicated in grey.

	CL Handshape
1	BB (Bent B)
2	BEAK
3	C BENT-5
4	CB (Alt) (closed B)
5	**CN (container)**
6	EXP-GROWTH (expanse of vegetation)
7	**FO (flat O)**
8	PINKY-FORK
9	**PL-H (horizontal plane)**

	CL Handshape
10	PL-H-WIDE (wide horizontal plane)
11	SE (small entity)
12	**SPHERE**
13	**STK (stick)**
14	TE (thin entity)
15	**TL (two-legged animate being)**
16	**TREE**
17	**WC (wide C)**
18	WO (woven object)
19	WS (woven surface)

TABLE 5-2 CLASSIFIER HANDSHAPES IDENTIFIED ACROSS THE FULL DATA SET

Figure 5-2 below illustrates the distribution of classifier handshapes. The SPHERE-handshape has the highest number of occurrences (36%), followed by the handshape STK (11%) and TL, CN and PINKY-FORK (8% each).

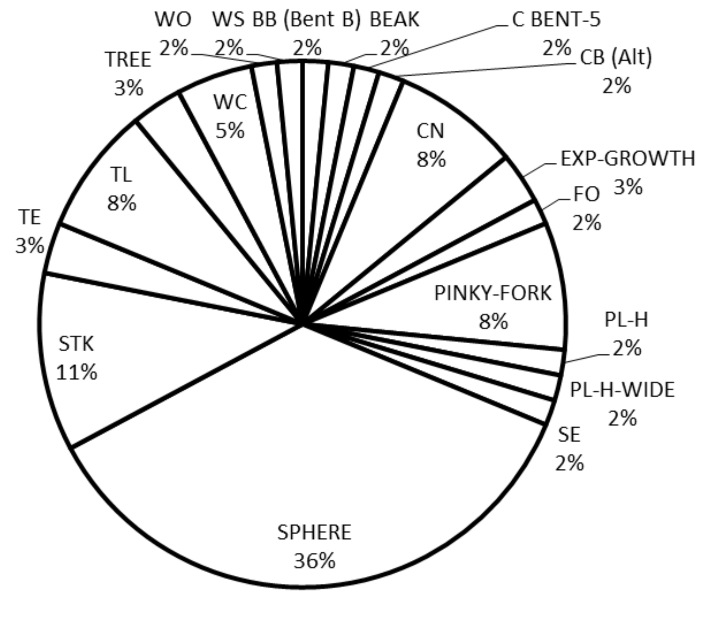


FIGURE 5-2 DISTRIBUTION OF HANDSHAPES

Across the full data set, two handshapes appear in more than one concept class. The handshape SPHERE appears in all three concept classes and the handshape STK appears in *Event* and *Entity.* Given the fact that the elicitation video clip is about an egg and a nest, the high number of SPHERE-handshapes illustrated in Figure 5-2 above and Table 5-3 below is not surprising. The SPHERE-handshape has the highest number of occurrences in the concept class *Property* where it appears as a SASS. There is no significant difference between the number of occurrences of SPHERE in the concept classes *Event* and *Entity*.

Classifier Handshape	Total
CN	5
PINKY-FORK	5
SPHERE	23
STK	7
TL	5

TABLE 5-3 NUMBER OF MAIN CLASSIFIER HANDSHAPES

The handshapes PINKY-FORK and CN appear only in the concept class *Entity*, whereas the handshape TL only appears in the concept class *Event*. Figure 5-3 below illustrates the distribution of the main classifier handshapes (i.e. five or more occurrences) across the three concept classes.

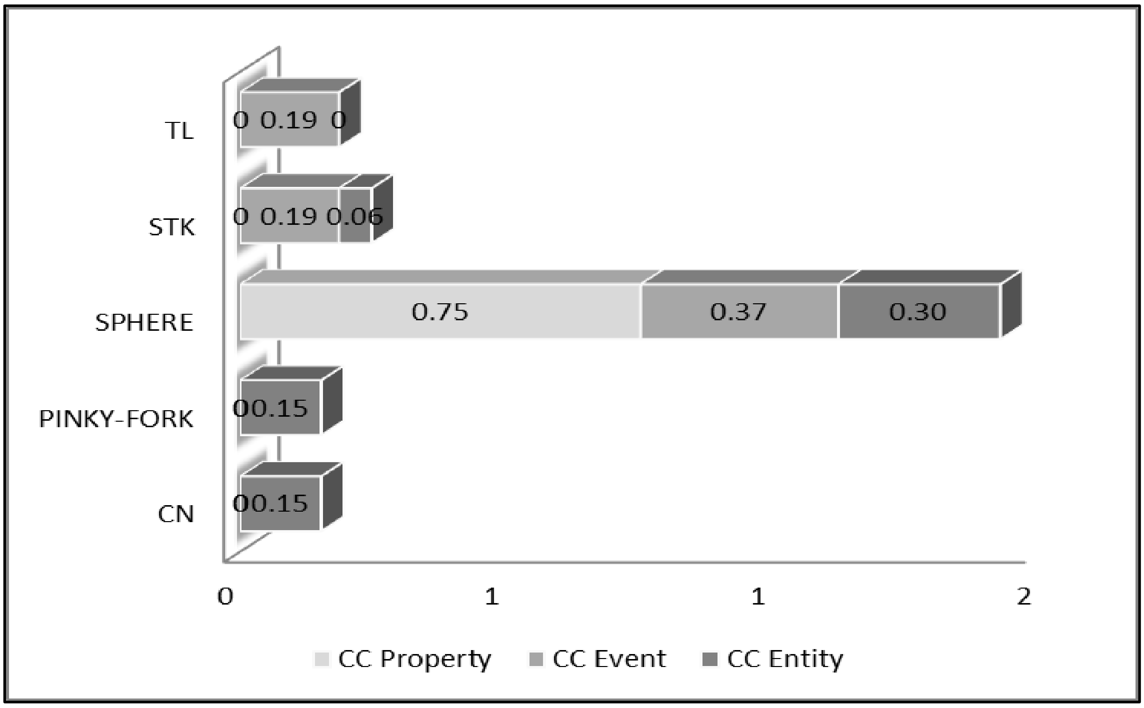


FIGURE 5-3 THE DISTRIBUTION OF HANDSHAPES ACROSS THE CONCEPT CLASSES

Apart from looking at the classifier handshapes, I also looked at the phenomenon of one handshape denoting more than one referent and one referent denoted by multiple handshapes. Table 5-4 below illustrates the three handshapes which denote multiple referents – a total of 11 different referents. Table 5-5 provides a breakdown of all referents, the handshapes which represent them, the total of instances of all references and handshapes, as well as all instances of the same referent denoted by multiple handshapes. The number of handshapes denoting the same referent varies from two to five.

Handshape	Referent	Gloss	Total of referents denoted by handshape
CN (container) – two referents	egg (1)	CL-8 JUMP-OFF-EGG-WHILE-LOOK-AT-EGG CL-9 JUMP-ON-EGG	2
	nest (2)	CL-14 JUMP-ON-AND-SIT-ON-EDGE-NEST CL-20 EGG-BOUNCE-IN-NEST CL-50 BIRD-JUMP-ON-EDGE-OF-NEST	3
SPHERE – five referents	bum (3)	CL-33 BUM-WIGGLE CL-32 BUM-SIT-DOWN-ON-EGG CL-38 COVER-EGG-WITH-BUM	3
	clouds (4)	CL-3 CLOUDS-MANY-IN-SKY	1
	egg (5)	CL-7 EGG-BULGE CL-15 THIS-EGG CL-16 EGG-PEEP-OUT-FROM-UNDER-BLANKET CL-20 EGG-BOUNCE-IN-NEST CL-29 EGG-BULGE CL-36 LOOK-AT-EGG-THERE CL-37 PICK-UP-AND-LOOK-AT-EGG-CURIOUS CL-40 (LOOK-AT-OBJECT)-EGG-THERE CL-47 BIRD-SIT-ON-EGG	9
	nest (6)	CL-4 NEST-IN-BRANCH-FORK CL-5 NEST CL-26 NEST-IN-BRANCH-FORK CL-31 NEST-IN-BRANCH-FORK CL-41 NEST-IN-BRANCH-FORK CL-42 NEST CL-43 BIRD-SIT-IN-NEST	7
	tummy (7)	CL-35 TUMMY-RIGHT-SIDE-LIFT-LOOK-AT-OBJECT CL-46 MOVE-TUMMY-LEFT	2
STK (stick) - four referents	crochet needle (8)	CL-28 CROCHET-SMALL-PANTS CL-34 CROCHET-SMALL-PANTS	2
	knitting needles (9)	CL-6 KNIT	1
	legs (10)	CL-45 BIRD-PULL-UP-LEGS CL-49 PULL-UP-RIGHT-LEG-PULL-UP-LEFT-LEG	2
	small pants (11)	CL-28 CROCHET-SMALL-PANTS CL-34 CROCHET-SMALL-PANTS	2

TABLE 5-4 VARIOUS HANDSHAPES DENOTING MULTIPLE REFERENTS

	Handshapes	Gloss	Total of handshapes denoting referents
'blanket' (3 HS)	BB (Bent B)	***CL-16*** EGG-PEEP-OUT-FROM-UNDER-BLANKET	1
	CB (Alt)	***CL-17*** WRAP-EGG-WITH-BLANKET	1
	WS (woven surface)	***CL-18*** BIRD-CLAW-BLANKET-STRETCH	1
'clock' (2 HS)	SPHERE	***CL-39*** CLOCK-THERE	1
	WC (wide C)	***CL-13*** PICK-UP-AND-LOOK-AT-CLOCK ***CL-30*** PICK-UP-AND-LOOK-AT-CLOCK ***CL-48*** PICK-UP-AND-LOOK-AT-CLOCK	3
'egg' (2 HS)	SPHERE (6)	***CL-7*** EGG-BULGE ***CL-15*** THIS-EGG ***CL-16*** EGG-PEEP-OUT-FROM-UNDER-BLANKET ***CL-20*** EGG-BOUNCE-IN-NEST ***CL-29*** EGG-BULGE ***CL-36*** LOOK-AT-EGG-THERE ***CL-37*** PICK-UP-AND-LOOK-AT-EGG-CURIOUS ***CL-40*** (LOOK-AT-OBJECT)-EGG-THERE ***CL-47*** BIRD-SIT-ON-EGG	7
	CN (container)	***CL-8*** JUMP-OFF-EGG-WHILE-LOOK-AT-EGG ***CL-9*** JUMP-ON-EGG	2
'legs' (2 HS)	STK (stick)	***CL-45*** BIRD-PULL-UP-LEGS ***CL-49*** PULL-UP-RIGHT-LEG-PULL-UP-LEFT-LEG	2
	TL (two-legged animate being)	***CL-8*** JUMP-OFF-EGG-WHILE-LOOK-AT-EGG ***CL-9*** JUMP-ON-EGG ***CL-14*** JUMP-ON-AND-SIT-ON-EDGE-NEST ***CL-47*** BIRD-SIT-ON-EGG ***CL-50*** BIRD-JUMP-ON-EDGE-OF-NEST	5
'nest' (5 HS)	C-BENT-5 (CLOSED BENT 5)	***CL-27*** NEST	1
	CN	***CL-14*** JUMP-ON-AND-SIT-ON-EDGE-NEST ***CL-20*** EGG-BOUNCE-IN-NEST ***CL-50*** BIRD-JUMP-ON-EDGE-OF-NEST	3
	PL-H (horizontal plane)	***CL-19*** LEAVE-FROM-COVERED NEST	1
	SPHERE	***CL-4*** NEST-IN-BRANCH-FORK ***CL-5*** NEST ***CL-26*** NEST-IN-BRANCH-FORK ***CL-31*** NEST-IN-BRANCH-FORK ***CL-41*** NEST-IN-BRANCH-FORK ***CL-42*** NEST ***CL-43*** BIRD-SIT-IN-NEST	7
	WO (woven object)	***CL-11*** NEST	1
'small pants' (2 HS)	SE (small entity)	***CL-12*** SEW-SMALL-PANTS	1
	STK	***CL-28*** CROCHET-SMALL-PANTS ***CL-34*** CROCHET-PANTS	2

TABLE 5-5 MULTIPLE HANDSHAPES DENOTING THE SAME REFERENTS

5.1.3. Eyegaze focus – consistent or sequential

In terms of the full data set, the total number of classifiers relevant for eyegaze focus comparisons is 46. As mentioned before, the following classifiers are not included here:

1) ***CL-19*** - an exception where the focal point is the lexical item
2) ***CL-10*** - an exception across all features in relation to concept classes
3) ***CL-16***, ***CL-28*** and ***CL-38*** – eyegaze focus invisible

Consistent eyegaze focus is evident in 34 out of 45 classifiers. Figure 5-4 below illustrates the overall distribution of consistent and sequential eyegaze focus.

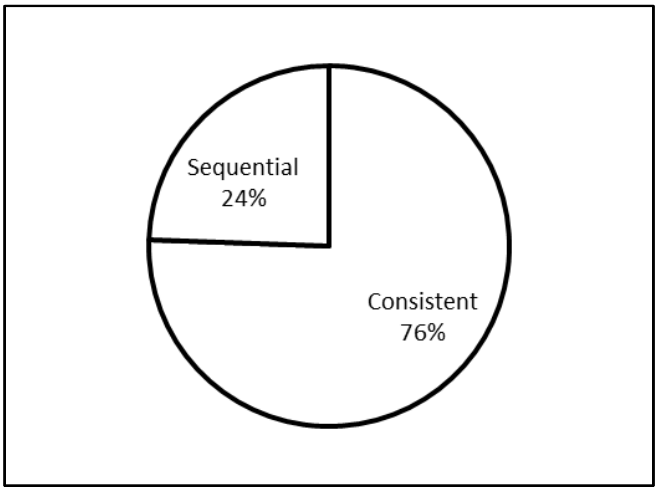


FIGURE 5-4 CONSISTENT AND SEQUENTIAL EYEGAZE FOCUS FOR THE FULL DATA SET

The comparison between 'consistent' and 'sequential' eyegaze focus across the concept classes is illustrated in Figure 5-5 below. The highest number of consistent eyegaze focus occurs in the concept class *Event*, although it is not significantly higher than in the concept class *Entity*. In the concept class *Property*, there are an equal number of consistent and sequential eyegaze focus instances.

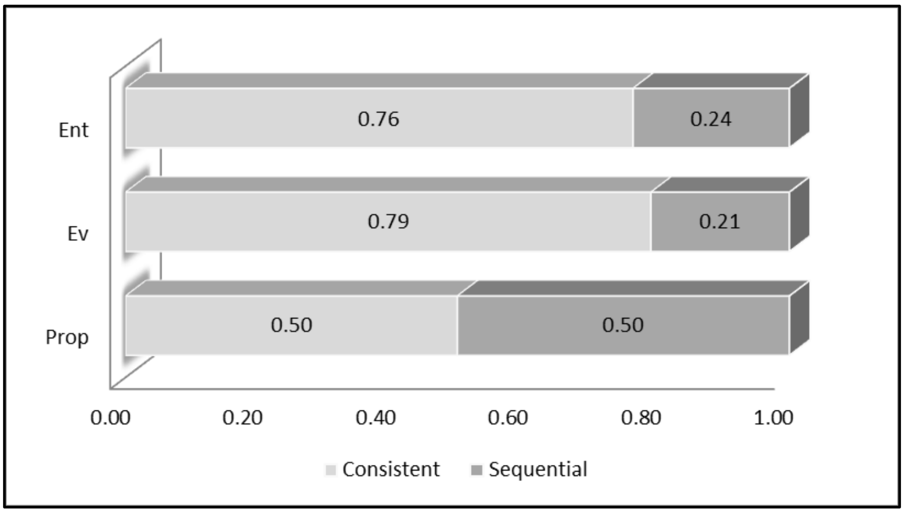


FIGURE 5-5 THE DISTRIBUTION OF CONSISTENT AND SEQUENTIAL EYEGAZE FOCUS

5.1.4. Eyegaze Focus – focal points

As mentioned earlier, the total number of focal points does not necessarily correspond with the total number of classifiers. The total number of classifiers in this particular comparison is 45 while the total number of focal points is 55. In terms of overall distribution, the classifier as focal point has the highest number (26 out of 45) and the second highest number is the implied object (10 out of 45), followed by the remote referent and then the referent. Figure 5-6 below reflects the overall distribution of focal points. The numerical value for camera is excluded and therefore, once again, there is a 100% correspondence of focal points with the number of classifiers.

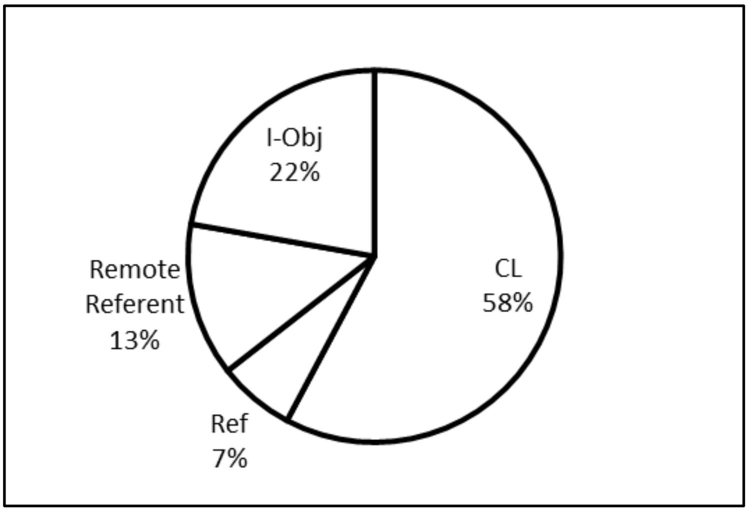


FIGURE 5-6 THE DISTRIBUTION OF EYEGAZE FOCAL POINTS

When investigating the distribution of focal points across the concept classes, the concept class *Property* is the only concept class which has the highest number for referent as focal point, followed by an equal number for classifier and remote referent and no instances of implied object.

The concept classes *Event* and *Entity* both have the highest number for classifier as focal point. In the concept class *Event* there are no instances of referent or remote referent as focal points. The concept class *Entity* is the only concept class in which each type of focal point is represented, with the remote referent as the second highest number. Figure 5-7 below illustrates the distribution of the relevant focal points across the three concept classes.

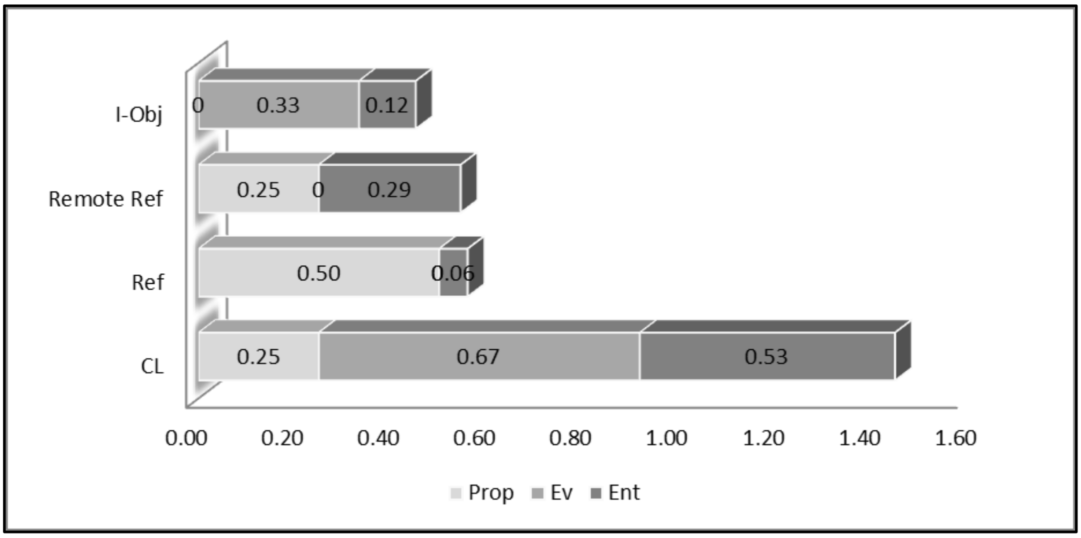


FIGURE 5-7 THE DISTRIBUTION OF EYEGAZE FOCAL POINTS

5.1.5. Mouth and face actions

A total of 19 different types of mouth and face actions were observed in all classifiers in the full data set. The total instances of mouth and face actions are 182. Refer to Table 5-6 below for the full list of symbols and keys identified in the data set.

1)	BlG	Blowing Gently
2)	CH	Cheeks Hollow
3)	CPf	Cheeks Puffed
4)	EA	Expel Air
5)	EbR	Eyebrows Raised
6)	Frn	Frown
7)	LP	Lips Pursed
8)	LPBT	Lips Pull Back from Teeth
9)	LPFw	Lips Pursed Forward
10)	LPI	Lips Pursed Inward
11)	LPO	Lips Pursed Open
12)	LPS	Lips Pursed Slightly

13)	LPSm	Lips Pursed Smile
14)	LPSour	Lips Pursed Sour
15)	MCD	Mouth Corner Down
16)	SA	Sucking in Air
17)	TBT	Tongue between teeth & lower lip
18)	TPrtr	Tongue Protrusion
19)	WrNose	Wrinkle Nose

TABLE 5-6 SYMBOLS AND KEYS FOR MOUTH AND FACE ACTIONS.

In the majority of cases, mouth and face actions are articulated in different sets of combinations of the 19 types of actions as listed in Table 5-7 below. These combinations are either simultaneous or sequential. Figure 5-8 provides examples from the data set.

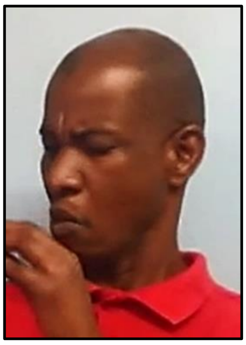
CL-ID	Type of mouth and face actions (Refer to p. 106)
1)	BlG-Sq
2)	BlG-Frn-Sq
3)	LPFw-Frn
4)	LPFw-Frn
5)	LPFw-CPf-Frn
6)	LPFw-Frn
7)	LP-Frn-CPf; EA-Frn
8)	LPS-Frn-EbR
9)	LPSm-EbR
10)	-
11)	LP-MCD-EbR
12)	LPInw-Frn
13)	LP-MCD; EbR
14)	LPS-EbR; TPrtr-Frn; LPSour-Frn
15)	TPrtr-Frn; TPrtr-EbR; LP-MCD-Frn; TBTL; LPO-Frn
16)	CPf-MCD-LP; MCD-CPf; EA-CH-MCD; CPf
17)	TBTL-Frn; TPrtr-Frn; LPO-Frn
18)	LPS-MCD-Frn
19)	-
20)	SA-Frn; CPF-Frn; EA-Frn; Frn-SA; Frn-LP;
21)	EbR-LPSm; LPSm-Sq
22)	LPS; BlG-Sq
23)	MCD-BlG
24)	BlG-CPf-Sq
25)	EbR-LPSm
26)	EbR-LPSm
27)	EbR-LPSm

28)	TPrtr; LPFw; LPSm; LPS-Frn
29)	Frn; Frn-CPf
30)	LPS-Frn; EbR
31)	LPSm; LPFw-Frn
32)	LPS-MCD; LPO
33)	LPO-MCD; LPSm-MCD
34)	LPSm-MCD-Frn
35)	LPSm-MCD-Frn-EbR; LPBT-MCD-Frn-EbR
36)	LPSm-Frn; Frn; SA-LPBT-Frn
37)	Frn-LPBT-SA; Frn-WrNse-LPBT
38)	LPSm-MCD
39)	LPSm-MCD-Frn
40)	Sm-EbR; Sm-SA
41)	LPSm-MCD
42)	LPO-MCD-SA
43)	LPS; LP-MCD
44)	LPO; LPO-EbR
45)	LPFw-MCD-EbR
46)	LPFw-MCD-EbR
47)	LPO-MCD
48)	LPS-MCD-EbR; LPO-MCD-Frn; EbR
49)	LPO-MCD-EbR
50)	LPO-MCD

TABLE 5-7 DIFFERENT COMBINATIONS OF MOUTH AND FACE ACTIONS ACROSS THE FULL DATA SET

Each classifier in the data set is articulated with a minimum of two mouth and face actions and a maximum of ten. Out of 48 classifiers (i.e. excluding ***CL-10*** and ***CL-19***), 26 are articulated with only one set of simultaneous mouth and face actions and 22 are articulated with sequences of either single or simultaneous actions. For example, ***CL-22*** - GRASS-LOTS – is articulated with 'lips-pursed' first, followed by a simultaneous combination of 'blowing-gently' and 'squint'.

a) BlG: *CL-2*
'blowing gently'
02.360



b) EA-CH-MCD: *CL-16*
'expel air', 'cheeks hollow'; 'mouth corners down'
22.322

c) LP-Frn-CPf: *CL-7*
'lips pursed', 'frown'; 'cheeks puffed'
19.234

d) EA-Frn: *CL-20*
'expel air'; 'frown'
00:00:29.632

e) EbR: *CL-9*
'eyebrows raised'
00:00:24.236

f) Frn: *CL-8*
'Frown'
00:00:13.941

g) LP: ***CL-11***
'lips pursed'
03.760

h) LPBT: ***CL-36***
'lips pulled back from teeth'
15.492

i) LPFw: ***CL-3***
'lips pursed forward'
05.120

j) LPI: ***CL-12***
'lips pursed inward'
06.000

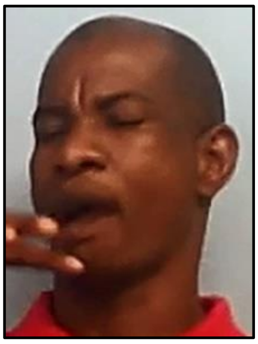
k)LPO: ***CL-32***
'lips pursed open'
05.789

l) LPS: ***CL-32***
'lips pursed slightly'
05.064

m) LPSm; ***CL-6***
'lips pursed smile'
14.321

n) LPSour: ***CL-14***
'lips pursed sour'
14.440

o) MCD: ***CL-49***
'mouth corners down'
19.541



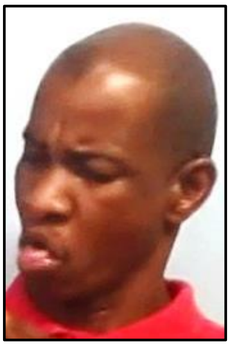
p) SA: ***CL-20***
'sucking in air'
00:00:29.060

q) Smile: ***CL-40***
'smile'
00:00:30.057

r) Sq: ***CL-2***
'squint'
00:00:02.360

s) TBTL: ***CL-17***
'tongue between teeth and lower lip'
22.424

t) TPrtr(1): ***CL-15***
'tongue protrusion'
16.960



u) TPrtr(2): ***CL-17***
'tongue protrusion'
22.547

v) WrNose: **CL-37**
'wrinkle nose'
22.575

w) Frn-LP-EbR: ***CL-8***
'frown', 'lips pursed'; 'eyebrows raised'
20.35

FIGURE 5-8 (A)-(W) EXAMPLES OF DIFFERENT MOUTH AND FACE ACTIONS

Figure 5-9 below shows the distribution of all mouth and face actions. Here it is evident that in terms of the total number of mouth and face actions, 'lips pursed' constitutes the largest group (29%), followed by 'frown' (21%), 'mouth corners down' (15%) and 'eyebrows raised' (11%). The majority of the different types of actions occur between one and five times in the data. I therefore focused these four main groups (which each shows more significant repetition) and after that I will present data for some of the smaller groups.

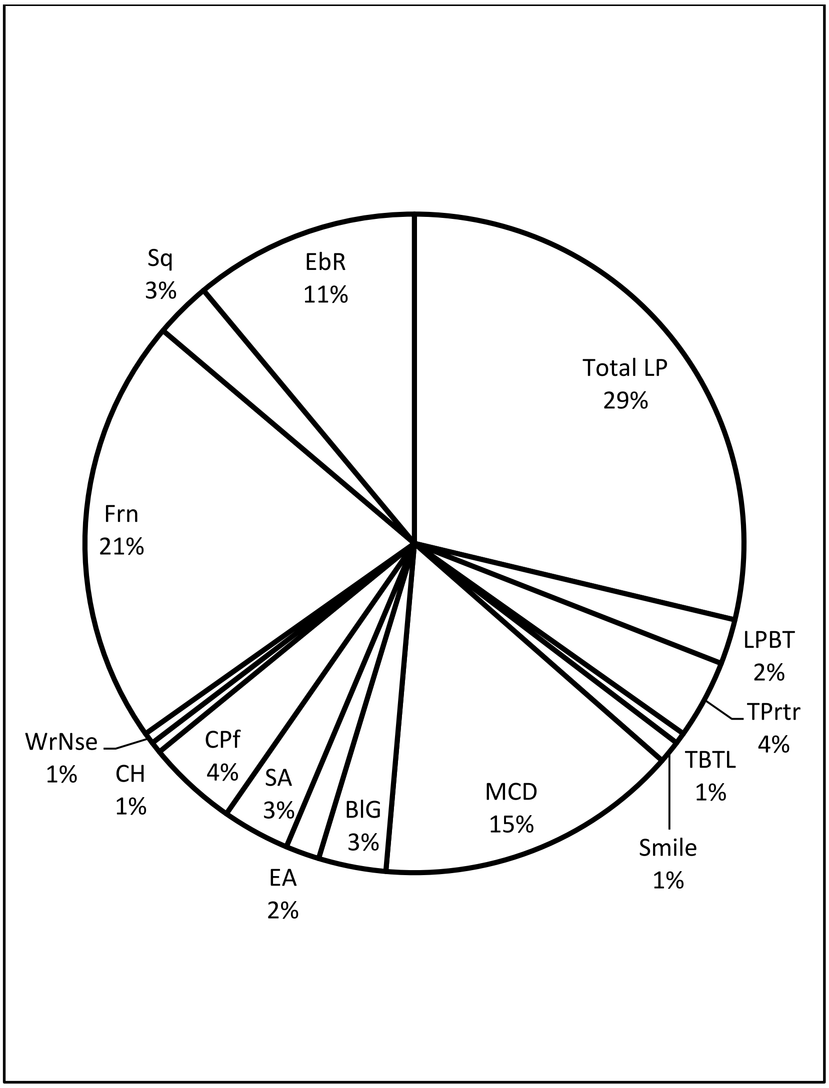


FIGURE 5-9 OVERALL DISTRIBUTION OF MOUTH AND FACE ACTIONS

Similar to the individual groups (A, B and C) the highest number of mouth and face actions occurs in the concept class *Event* and the lowest number in the concept class *Property* as can be seen in Figure 5-10 below.

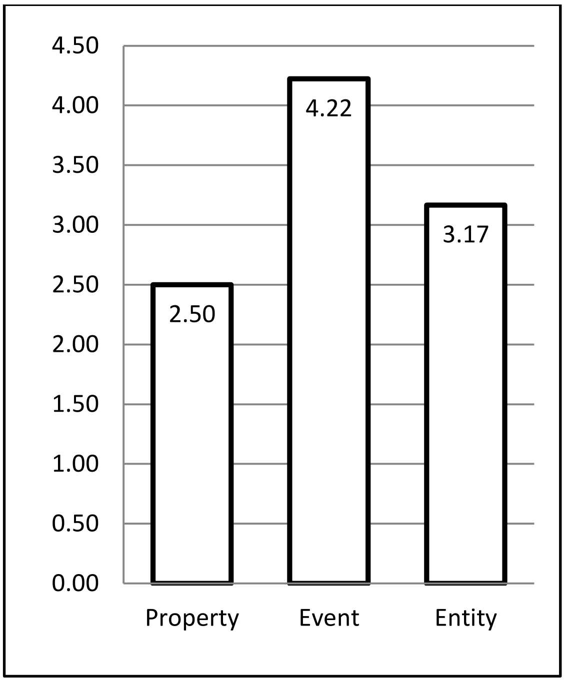


FIGURE 5-10 DISTRIBUTION OF MOUTH AND FACE ACTIONS

Figure 5-11 below illustrates the distribution of the four main groups of mouth and face actions across the three concept classes. The concept class *Event* has the highest number for all four main groups of mouth and face actions. All three concept classes have the highest number for 'lips pursed'.

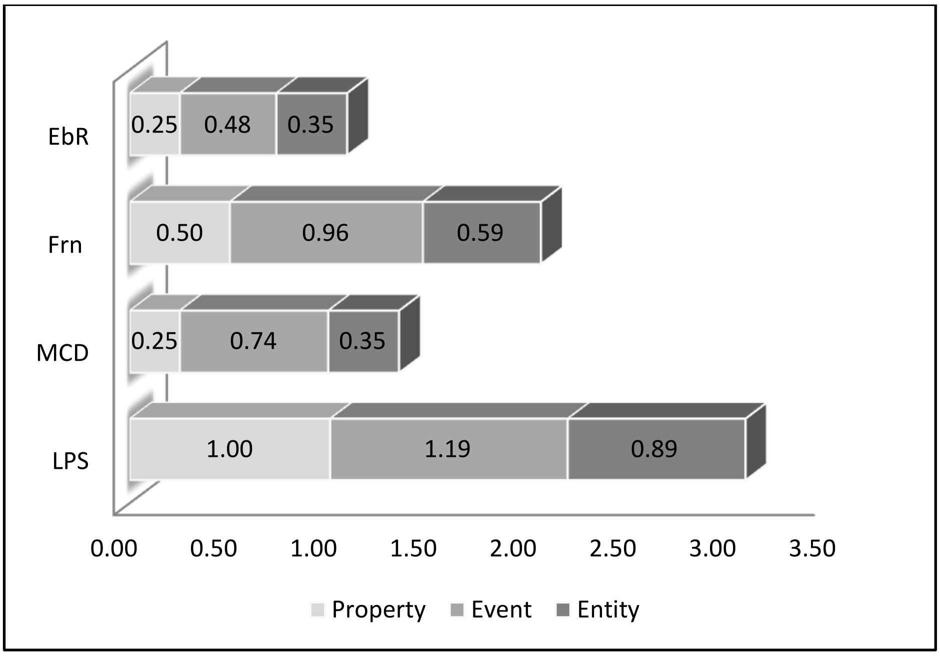


FIGURE 5-11 THE DISTRIBUTION OF THE FOUR MAIN GROUPS OF MOUTH AND FACE ACTIONS

In terms of the smaller groups, I looked at mouth and face actions which occur a) only within one particular concept class and b) more than once in this concept class. I found three examples of these mouth and face actions – see Figures 5-12(a)-(c) below. The first two mouth and face actions - 'blowing gently' (BlG) and 'squint' (Sq) - occur only in the concept class *Entity*. There are six instances of 'BlG' and five instances of 'Sq'. 'BlG' and 'Sq' appear in four of the classifiers together, and 'BlG' occurs in one classifier in combination with 'mouth corners down' (MCD).

There is one similar phenomenon in the concept class *Event*. 'Expel air' appears only in the concept class *Event* (three instances). Note that the numbers in Figure 5-12 below reflect the ratio of instances in relation to the number of classifiers in the relevant concept class.

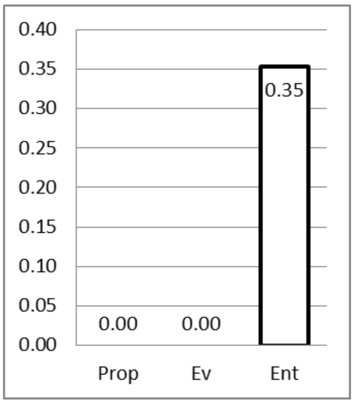
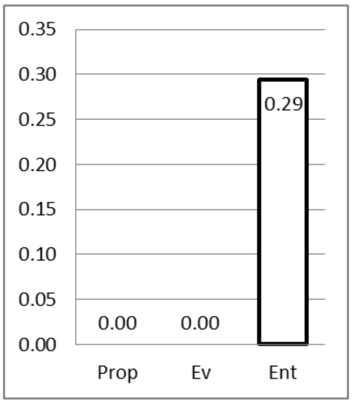
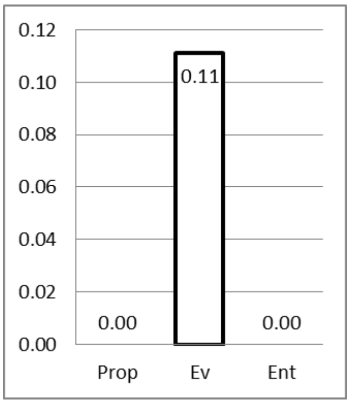
		
'blowing gently' Six classifiers in the concept class *Entity*	'squint' Five classifiers in the concept class *Entity*	'expel air 3 classifiers in the concept class *Event*

FIGURE 5-12 MOUTH AND FACE ACTIONS OCCURRING MORE THAN ONCE IN ONLY ONE CONCEPT CLASS

The 'blowing-gently' action seems to be associated with classifiers indicating quantity or extent. The six classifiers in Figure 5-13 below all indicate quantity or the extent of a large area. With the exception of ***CL-21*** and ***CL-23***, the mouth and face action 'squint' appears simultaneously with the action 'blowing gently' in each of the other classifiers. In ***CL-21*** 'squint' occurs with other mouth and face actions, and in ***CL-23***, 'mouth corners down' occurs with 'blowing gently'.

		
CL-1 TREE-MANY BlG-Sq	***CL-2*** GRASS-LOTS BlG-Frn-Sq	***CL-21*** SURROUNDINGS-BIG EbR-LPSm; LPSm-Sq

CL-22

GRASS-LOTS
LPS; BlG-Sq

CL-23

EARTH-LOTS
MCD-BlG

CL-24

TREE-MANY
BlG-CPf-Sq

FIGURE 5-13 MOUTH AND FACE ACTION OCCURING IN ONLY ONE CONCEPT CLASS

Figure 5-14 below illustrates the mouth and face action 'expel air' occurring in the concept class *Event*. These occurrences form part of a variety of combinations – 'EA-Frn' and 'EA-CH-MCD' as shown in Figure 5-13. The action of 'expel air' occurs only in the concept class *Event*, although not in isolation.

CL-7

LP-Frn-CPf; EA-Frn

Lips Pursed-Frown-Cheeks Puffed; Expel Air-Frown

EGG-BULGE

CL-16

CPf-MCD-LP; MCD-CPf; EA-CH-MCD; CPf

Cheeks Puffed-Mouth Corners Down-Lips Pursed; Mouth Corners Down-Cheeks Puffed; Expel Air-Cheeks Hollow-Mouth Corners Down; Cheeks Puffed

EGG-PEEP-OUT-FROM-UNDER-BLANKET

CL-20

SA-Frn; CPF-Frn; EA-Frn; Frn-SA; Frn-LP;

Suck Air-Frown; Cheeks Puffed-Frown; Frown-Suck Air; Frown-Lips Pursed

EGG-BOUNCE-IN-NEST

FIGURE 5-14 MOUTH AND FACE ACTION OCCURING IN ONLY ONE CONCEPT CLASS

5.1.6. Movement

The data set consists of three different types of movements – movement path direction, movement path shape and movement pattern. See Tables 5-8 to 5-10 below for abbreviations used for the three main groups within the movement component. There is total of 198 movement instances in these three groups. There are 117 instances in the movement 'path direction' group, 47 in the movement 'path shape' group and 33 in the movement 'pattern' group.

L	Left
R	Right
U	Up
D	Down
Fw	Forward
Bw	Backward
Conv	Convergent
Div	Divergent

TABLE 5-8 ABBREVIATIONS FOR MOVEMENT PATH DIRECTION (MVT-DIR)

A	Arc
C	Circle
L	Line

TABLE 5-9 ABBREVIATIONS FOR MOVEMENT PATH SHAPE (MVT-SHAPE)

ALT	ALTERNATING
BEND	BENDING
BOUNCE	BOUNCING
CLOSE	CLOSE
CO	CHANGE OF ORIENTATION
OPEN	OPEN
RUB	RUBBING
WIG	WIGGLING

TABLE 5-10 ABBREVIATIONS FOR MOVEMENT PATTERN (MVT-PAT)

As is the case with mouth and face actions, the concept class *Event* has the highest number of movements amongst the three concept classes as is evident in Figure 5-15 below.

This seems to indicate an important difference between the concept classes – conceptually *Event* means that ‘something happens’, therefore one could argue that increased movement relates to ‘something happening’. The differences within the three movement types in terms of number are explained below.

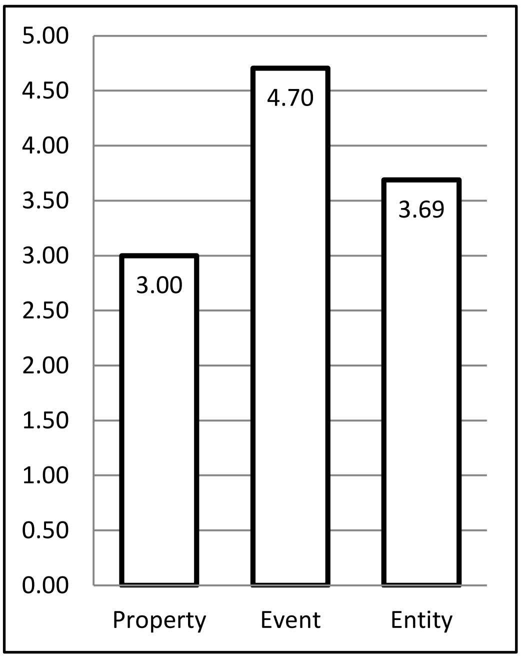


FIGURE 5-15 DISTRIBUTION OF MOVEMENT INSTANCES

Apart from ***CL-19*** and ***CL-25***, all other classifiers display at least one of the three different types of movements. In the group ‘direction’ (e.g. ‘up’, ‘down’, ‘divergent’; ‘convergent’, etc.) all classifiers have a numerical value varying between one and eight. *Event* has the highest number of direction movements and *Property* the lowest number.

In terms of 'movement path shape', i.e. 'line', 'circle' and 'arc', the concept class *Property* has the highest number, but it is not significantly higher than the other two concept classes. What is noticeable in this group, is that the concept class *Entity* has double the proportions of the movement path shape 'line' in comparison to the concept class *Event* as is evident in Figure 5-16 below.

There are no instances of the concept class *Entity*. Only two other shapes appear in this concept class – one instance of 'arc' and one instance of 'circle'. All classifiers indicating location are articulated by using the movement path shape 'line', for example, NEST-IN-TREE-BRANCH (***CL-4***, ***CL-26***, ***CL-31*** and ***CL-41***), EGG-THERE (***CL-36*** and ***CL-39***) and BIRD-THERE-IN NEST (***CL-43***). These examples support the traditional notion that a downward movement indicates the location of an entity classifier.

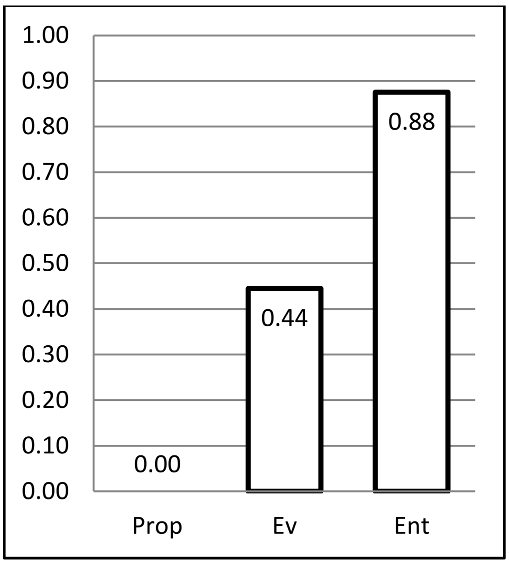


FIGURE 5-16 INSTANCES OF THE MOVEMENT PATTERN 'LINE'

The movement type 'pattern' shows the biggest differences between the concept classes. The concept class *Event* has a significantly higher number for 'pattern' movements in comparison to the two other concept classes. Figure 5-17 below illustrates the differences between the concept classes.

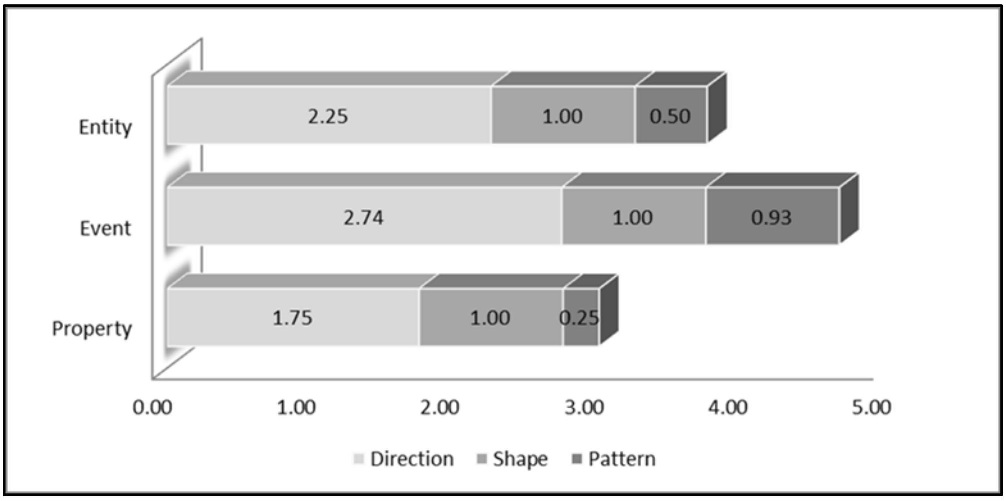
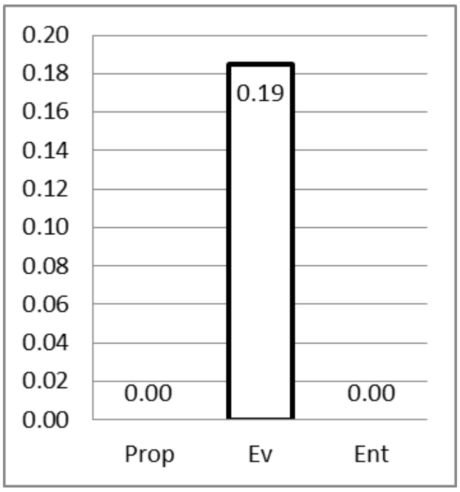
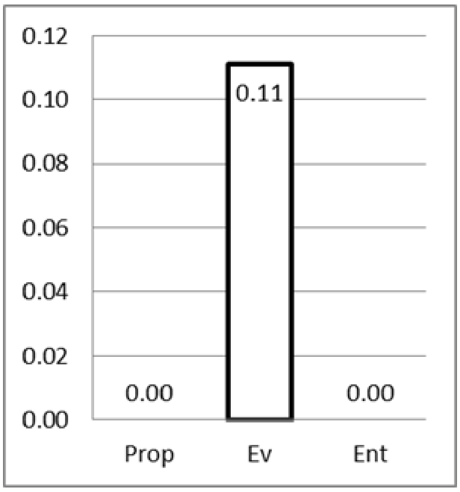


FIGURE 5-17 THE DISTRIBUTION OF THE THREE MAIN GROUPS OF MOVEMENTS

In terms of the smaller groups - i.e. sub-groups within each main group - I looked for movement types which occur within one particular concept class more than once. I found four such examples in the 'movement pattern' group and all of them belong in the concept class *Event*. Figures 5-18(a) and (b) below illustrate the ratio for 'BENDING' and 'OPENING'.



a) BENDING
CL-8, ***CL-9***, ***CL-14***, ***CL-47*** & ***CL-50***



b) OPENING
CL-7, ***CL-20*** & ***CL-29***

FIGURE 5-18 MOVEMENT PATTERNS OCCURRING ONLY IN THE CONCEPT CLASS *EVENT*

5.2. Data discussion

Before discussing the data, I would like to re-state the main research question: Are there formational features in SASL classifiers which may form the basis for differentiating between the three concept classes *Property*, *Event* and *Entity*?

As a result of the limited scope and nature of the study, the formational features selected for this study were handshape, eyegaze focal points, mouth and face actions and movement. As mentioned previously, the BTS was adapted as a transcription system, given the polycomponential nature of classifiers.

5.2.1. Classifier categories

The distribution of classifier categories indicates that only the concept class Event contains two different categories – entity and handling classifiers. The concept class Property contains only SASSes and the concept class Entity contains only entity classifiers.

5.2.2. Handshape

Since handshape is at the centre of the debates about the nature of and nomenclature about classifiers, I will discuss it first. As mentioned before, I used the BTS as far as possible to describe the handshapes, creating my own symbols for classifier handshapes when necessary.

In terms of the research question, the data shows that certain handshapes occur only in certain concept classes and that certain handshapes occur across concept classes. In some cases different handshapes denote the same referent and in other cases the same referent is denoted by different handshapes.

This kind of variation, which occurs across the five video clips, supports the view that classifiers in sign languages do not constitute a grammaticised morphosyntactic subsystem, i.e. they are not always obligatory. The various choices evident in the data do seem to support Schembri's view that classifier handshapes are likely to be "subject to discourse-pragmatic use" (2003: 22). Figures 5-19(a)-(e) illustrate some examples of the variety of choices made by participants in this study between lexical items and classifiers. Table 5-11 below provides the gloss and indicates when a classifier is used.

	Gloss – Classifiers and lexical items
a)	BIRD SIT CL-NEST
b)	BIRD CL-NEST IX
c)	CL-NEST THERE MOTHER
d)	CL-NEST-IN-TREE-BRANCH BIRD CL-BUM-SIT
e)	CL-BIRD-THERE-IN-NEST

TABLE 5-11 CHOICES EXERCISED BY SIGNERS BETWEEN CLASSIFIERS AND LEXICAL ITEMS

a) Lexical items – BIRD; SIT; CL - NEST-BIG

b) Lexical item – BIRD, CL – NEST; IX

c) CL – NEST, Lexical items – THERE; MOTHER

d) CL – NEST-IN-TREE-BRANCH; Lexical item – BIRD; CL: BUM-SIT

e) CL – BIRD-THERE-IN-NEST

FIGURE 5-19 DISCOURSE CHOICES MADE BY PARTICIPANTS

As mentioned in the previous section, the handshape SPHERE is the only handshape that occurs in all three concept classes and the handshape STK occurs in the concept classes *Entity* and *Event*. Table 5-12 below shows the distribution of the two handshapes occurring across more than one concept class, as well as the distribution of handshapes occurring in only one concept class.

Handshape	Property	Event	Entity
BB (Bent B)	0	0	1
BEAK	0	0	1
C BENT-5	1	0	0
CB (Alt)	0	0	1
CN	0	0	5
EXP-GROWTH	0	0	2
FO	0	0	1
PINKY-FORK	0	0	5
PL-H	0	0	1
PL-H-WIDE	0	0	1
SE	0	0	1
SPHERE	3	10	10
STK	0	5	2
TE	0	2	0
TL	0	5	0
TREE	0	0	2
WC	0	3	0
WO	0	0	1
WS	0	1	0

TABLE 5-12 HANDSHAPES AND CONCEPT CLASSES

In the concept class *Property* all three SPHERE-handshapes are two-handed classifiers with one referent. In the concept class *Event*, three of the SPHERE-handshapes are one-handed classifiers, five are two-handed classifiers with one referent and two are two-handed classifiers with two referents. In the concept class *Entity* four classifiers with the SPHERE-handshape are one-handed and six are two-handed classifiers with two referents. There are no two-handed classifiers with one referent for the handshape SPHERE in the concept class *Entity*.

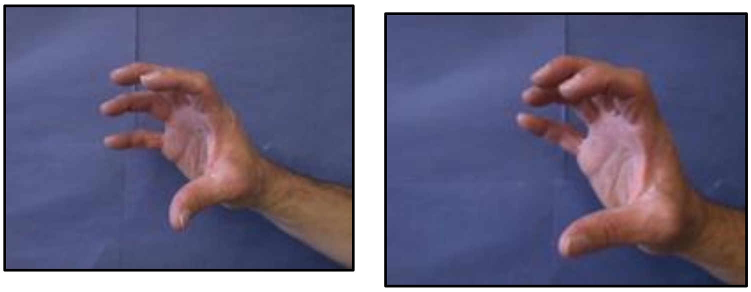
There are two different handshapes in the concept class *Property*, C Bent 5 and SPHERE. Only the SPHERE-handshape is repeated. There are seven handshapes in the concept class *Event* and repetition of three different handshapes. In the concept class *Entity* there are 14 different handshapes, of which five are repeated. The repetition of particular handshapes is likely to be the result of the nature of the elicitation clip which is bound to produce handshapes with semantic meanings such as 'round object' (SPHERE), 'container' (CN), 'two-legged animate being' (TL), 'stick-like object' (STK), 'fork-in-tree-branch' (PINKY-FORK), and 'round object being handled' (WC).

In a context where BTS handshapes were used, there is no indication in the data that a particular handshape is favoured by a particular concept class. However, the current version of the BTS poses several problems in terms of handshape. These issues relate to the semantic approach making provision for meaning components. In the process of this research, I only realised towards the end of the study that it may be possible to replace the 'non-semantic' symbols (i.e. phonological forms) with symbols which carry semantic meaning. I first illustrate a few problematic examples and then I will provide alternatives which potentially could contribute to the development of the BTS.

According to Slobin et al. (2001b: 88), "in some cases (as in HOLD property markers), the general semantic category (HOLD) is followed by an abbreviation for the specific handshape used." In the BTS Manual all "handle property markers" are identified phonologically. I provide three examples from the 18 forms available: BO – Baby O, BL – Bent L and WC- Wide C (Slobin et al., 2001a: 13-16). It is unclear why the preference should be form - e.g. BO (Baby O) as opposed to meaning. In terms of the general principles of the BTS, i.e. the semantic approach, it would be more appropriate to use a description such as 'HOLD-SPHERE'.

In the case of 'tracing property markers', the same principle should be followed, i.e. 'TRACE-SPHERE'. If this kind of consistency could be maintained, the semantic integrity of the system will not be affected adversely and it will also make a standardised transcription system (focused on meaning) more sustainable for researchers across different sign languages.

I realised that using phonological symbols to describe classifier handshapes is counter to the semantic point of departure of the system. Until I realised the conceptual error, I did not identify any examples of the concept class Property in my data. I then approached the data description in a different manner (i.e. from a semantic point of view) but I still used handshapes from the manual as far as possible for the sake of consistency. Once I started the different approach, I identified four examples which belong to the concept class Property. Figures 5-20(a)-(c) and Figures 5-21(a)-(c) below illustrate this problem.

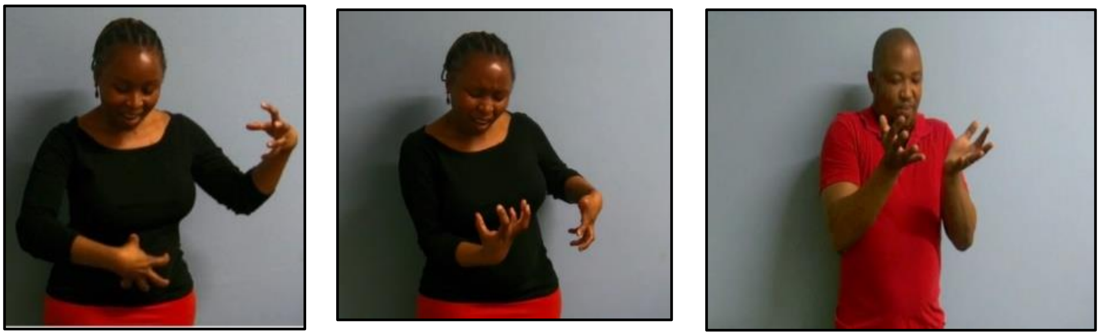


a) Entity property markers
SPHERE

b) Handle property markers
BF

c) Tracing property markers
No handshape for tracing a SPHERE-like object

FIGURE 5-20 BTS HANDSHAPES



a) *CL-40*: SPHERE (RH) - Entity
(EGG-THERE)

BTS: SPHERE

b) *CL-37*: SPHERE - Handling
HOLD-AND-LOOK-AT-EGG

BTS: HOLD-***BF***

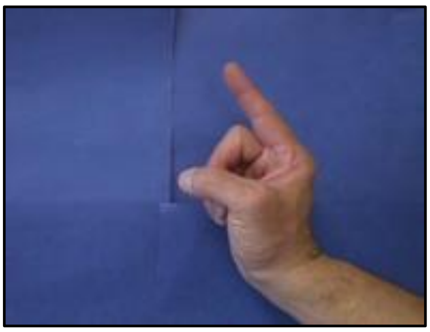
c) *CL-42*: SPHERE - Tracing
NEST

BTS: TRACE-***BF***

FIGURE 5-21 BTS AND SASL DATA - 'SEMANTIC CHALLENGES'

Initially I used only BTS handshapes (regardless of property marker category indicated in the BTS Manual) to describe my data. If I could not find a suitable handshape in the one category I would use one from another category for the sake of consistency. The use of BTS handshapes from all three classifier categories listed in the manual influenced the identification of concept classes in the data. An example of this is the initial identification of **CL-5**, **CL-7** and **CL-42** as 'entity' classifiers (as opposed to 'SASS') because the only section that includes the SPHERE handshape is 'entity property markers'.

I will discuss a few other examples in Figures 5-22 and 5-23 below to elaborate on this point. The handshape STK (stick-like object) in Figure 5-22(a) is indicated as an 'entity property marker' in the BTS manual. However, in the SASL data in Figures 5-23(a) and (b), it is a handling classifier ('handle property marker') (apart from also being an entity classifier – SMALL-PANTS). The closest match from the BTS set of 'handle property markers' can be seen in Figure 5-22(b) which does not represent the handshape in **CL-6** correctly from a conceptual point of view. The BTS entity classifier (STK) is a more appropriate conceptual symbol, as opposed to "OF: 1 Face".



a) BTS Entity property marker
STK: Stick-like object

b) BTS Handle property marker
OF: 1 Face (face of index finger)

FIGURE 5-22 BTS HANDSHAPES

a) *CL-6* - SASL handling classifier
STK: knitting needles

b) *CL-28* - SASL handling and entity classifiers
STK: crochet needle; STK: part of small pants

FIGURE 5-23 BTS HANDSHAPES - OVERLAP WITH SASL HANDSHAPES

In Figure 5-23(b) above, both hands have the same handshape – STK. Note that in the case of the left hand (which does not move), the STK-handshape is an entity classifier with the referent 'part of small pants'. Semantically a crochet needle could be described as a stick-like object (although it has a hook on the one end, unlike knitting needles). However, in the case where the referent is 'part of small pants' – even though the handshape is STK – it would be more appropriate to use 'small entity' (SE).

Figures 5-24(a)-(q) below illustrate some alternative handshape names that could be used for the sake of consistency within a semantic approach, whether they are entity, handling or SASS classifiers.

(a) ***CL-2***
EXP-GR
(expanse of vegetation)

(b) ***CL-23***
OCO
(outline curved object)

(c) ***CL-21***
PL-H-WIDE
(wide expanse)

(d) ***CL-23*** GRS
(grainy substance)

(e) ***CL-12*** **(RH)** TE
(thin entity)

(f) ***CL***-TE
(thin entity)

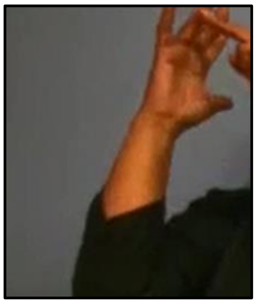
(g) ***CL-7*** SPHERE-CL
(closed sphere)

(h) ***CL-14*** SPHERE-HCL
(half-closed sphere)

(i) ***CL-11*** HWO
(handle woven object)

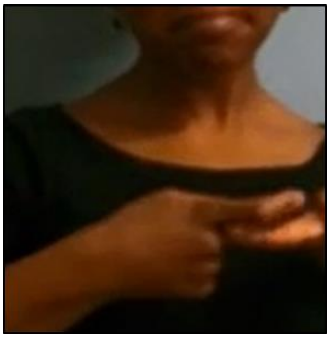
(j) ***CL-16*** (RH) CRO
(cover round object)

(k) ***CL-17*** FOL
(fold object in layers)



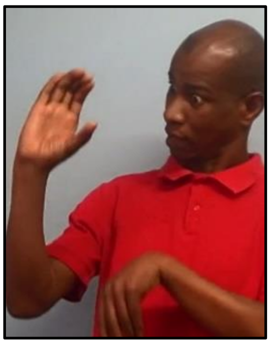
(l) ***CL-25*** SPLIT-V-PL-U/D
(split vertical plane up / down)

(m) ***CL-25*** SPHERE-BP
(bum represents bird shaking her bum)



(n) ***CL-34*** STK-HOOK
(stick-like object with a crooked end)

(o) ***CL-43*** BEAK-BP
(beak represents bird sitting in nest)



(p) ***CL-13*** HRO
(hold round object)

(q) ***CL-18-*** H-WO
(handle woven object)

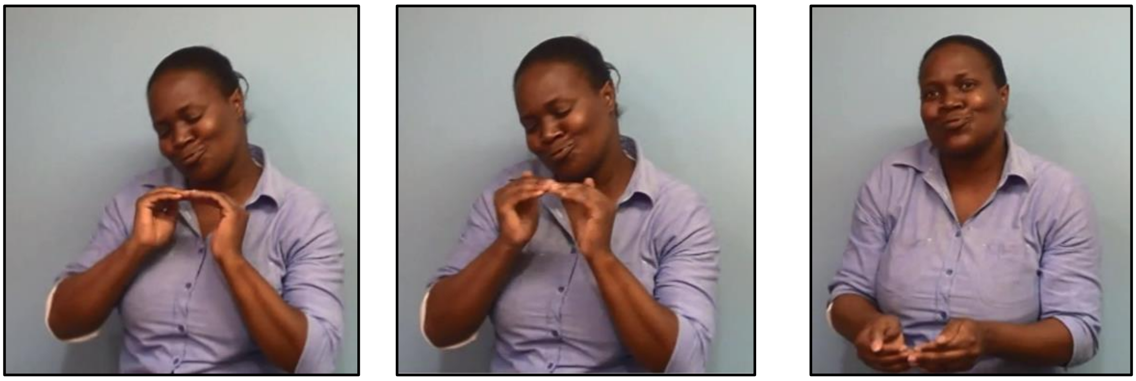
FIGURE 5-24 (A)-(Q) SEMANTIC HANDSHAPE ALTERNATIVES FOR BTS PHONOLOGICAL FORMS

Refined detail (e.g. SPHERE vs HALF-CLOSED SPHERE vs CLOSED SPHERE) is likely to result in a larger variety of handshapes, as well as less repetition of certain handshapes. Using the handshapes in Figure 5-24 above (instead of those I used to transcribe my data), is likely to have changed the outcome of the results relating to handshapes. If handshapes are named according to more detailed semantic information, then the total number of handshapes in this data would change from 19 to 22. See Table 5-13 below which lists all handshapes in the data set from a semantic perspective. Handshapes which are not in the BTS inventory are highlighted in grey.

	HANDSHAPE SYMBOL	**MEANING**	**BTS EQUIVALENT**	***CL-ID***
1)	BEAK-BP	bird's beak represents bird	BO (Baby O - handle property marker)	***CL-43***
2)	CN (BTS)	container	CN	***CL-50***
3)	EXP-GROWTH	expanse of vegetation	None	***CL-2***
4)	GRS	grainy substance	FO (Flattened O – handle property marker)	***CL-23***
5)	H-CCO	cover curved object	CS (Curved Surface)	***CL-10***
6)	H-CRO	cover round object	None	***CL-16***
7)	H-FO	handle flat object	FO (Flattened O)	***CL17***
8)	H-OCO	outline curved object	None	***CL-27***
9)	H-RO	handle round object	SPHERE	***CL-13***
10)	H-WO	handle woven object	None	***CL-18***
11)	PL-H (BTS)	horizontal plane	PL-H	***CL-19***
12)	PL-H-WIDE	wide expanse	None	***CL-21***
13)	SE	small entity	None	***CL-12*** (LH)
14)	SPHERE-BP (BTS)	birds' bum represents bird	SPHERE	**CL-25**
15)	SPHERE-CL (BTS)	closed sphere	SPHERE	***CL-7***
16)	SPHERE-HCL (BTS)	half-closed sphere	SPHERE	***CL-14***
17)	SPLIT-V-PL-U/D	split vertical plane up or down	None	***CL-25***
18)	STK (BTS)	stick	STK	***CL-28***
19)	STK-HOOK	stick with hook	None	***CL-34***
20)	TE (Zwitserlood)	thin entity	None	***CL-12*** (RH)
21)	TL (BTS)	two-legged animate being	TL	***CL-9***
22)	TREE (BTS)	tree	TREE	***CL-1***

TABLE 5-13 SEMANTICALLY REFINED HANDSHAPES

One last comment about handshape and concept classes, which addresses the exclusion of **CL-10** from the data. This classifier – see Figure 5-25 below – is an exception because it is the only example in this data set which could belong to two concept classes - either *Property* or *Event*. The handshape indicates a curved surface (*Property*), yet the movement indicates a change (i.e. *Event*) – the bird is covering the egg with a blanket. If a larger set of data had been used, it might have rendered more examples of this kind. I would call this example an 'irregular' classifier, analogous to irregular verbs in English, although I am not implying that this is a verb.[3]



25.058 25.078 25.586

FIGURE 5-25 AN EXAMPLE OF AN 'IRREGULAR' CLASSIFIER

[3] Interview, Prof. Peter Fridjhon, 23 January 2017. Prof. Fridjhon was appointed by the University of the Witwatersrand from 1980 until 2017. He retired in 2016 after years as Head the School of Statistics and Actuarial Science.

5.2.3. Eyegaze and focal points

The next feature to discuss is eyegaze and focal points. Sutton-Spence and Woll claim that "if the movement of the hand during a sign shows the motion of a referent (e.g. a car or a person moving) then the movement path of the eye gaze follows it …' (1999: 95).

Based on this observation, I was interested to see whether or not the eyegaze would follow the motion of the referent (i.e. as represented by the classifier) when the concept class was identified as *Event*. In the full data set, the concept class *Event* has the highest number of classifier as focal point, similar to what Sutton-Spence and Woll's found in BSL. The focal point in the concept class *Event* is either on the classifier (0.67), or on the implied object (0.33).

It seems that in the concept class *Entity*, although the classifier is the focal point for the majority of instances, there is also a trend to focus on the remote referent. More data might yield similar results. The concept class *Property* is the only concept class that has the referent as focal point for the majority of instances and not the classifier. In this particular data set it may be the result of the use of two-handed signs with one referent.

Apart from the above, some interesting correlations emerged between the features 'focal points' and 'mouth and face actions'. In the overview, I identified some classifiers with similar or identical mouth and face actions and the focal point for all these classifiers is the remote referent. Table 5-14 below illustrates the distribution of focal points compared to some of the sequences and types of mouth and face actions.

All these classifiers have one or a combination of the features 'blow gently' and 'squint' - ***CL-1***, ***CL-2***, ***CL-21***, ***CL-22*** and ***CL-24***. These actions do not occur in any other classifiers, except for 'blow gently' which also occurs in ***CL-23***. In the context of the elicitation material, it is likely that this particular combination of mouth and face actions means 'large quantity' or 'large area'. In all cases the remote referent is the focal point and all these classifiers belong to the group of entity classifiers. This is another area to research in the context of SASL classifiers – the probability of 'sets of mouth and face actions' matching other formational features.

CL-ID	**Referent**	**Focal point remote referent**	**Mouth and Face Actions**
1	trees	1	BlG-Sq (blow gently-squint)
2	grass	1	BlG-Frn-Sq (blow gently-frown-squint)
21	surroundings	1	LPSm-Sq (lips pursed smile-squint)
22	grass	1	BlG-Sq (Blow gently-squint)
23	earth	1	MCD-BlG (mouth corners down-blow gently)
24	trees	1	BlG-CPf-Sq (blow-gently-cheeks puffed-squint)

TABLE 5-14 FOCAL MOUTH FACE ACTIONS THAT COINCIDE WITH FOCAL POINTS

I observed one more interesting phenomenon in relation to eyegaze focal point. Data for figure and ground constructions was captured under 'figure', regardless whether the eyegaze was on the figure or on the ground. The group with two-handed classifiers and two referents (i.e. figure and ground constructions) - is the only group where the classifier is the focal point for all instances in this particular set of data.

See Figure 5-26 below which illustrates the difference between Groups A, B and C in terms of the classifier as focal point. This ratio indicates that the eyegaze focus is most likely to be on the classifier when the classifier is a figure and ground construction, i.e. the classifiers in Group C, regardless of concept class, and least likely to be on the classifier when a two-handed classifier has only one referent (Group B). Recent studies suggest that eyegaze either track the referent (when occurring with predicates) or mark constructed action (Engberg –Pedersen, 2003, cited in Cormier et al., 2015: 691).

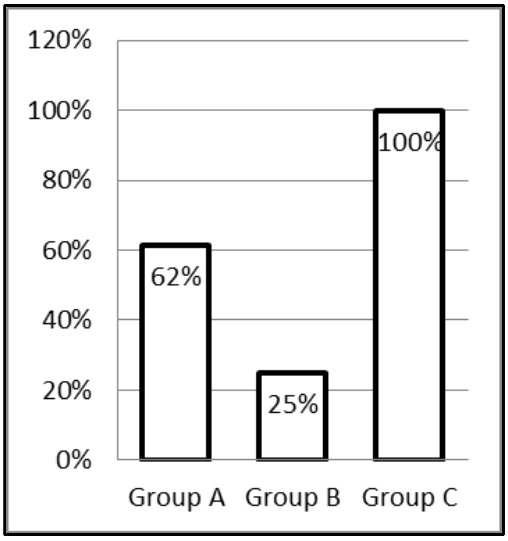


FIGURE 5-26 DISTRIBUTION OF CLASSIFIER AS FOCAL POINT ACROSS GROUPS A, B AND C

5.2.4. Mouth and Face Actions

The overview provided examples of different types of mouth and face actions in the data. The significance of some mouth and face actions has been highlighted under the section on focal points. Table 5-15 below provides the meaning of some of these mouth and face actions. This particular feature has not been researched in SASL yet, and the meanings were provided by a prelingually Deaf signer who has started signing from a young age.

		Mouth and face action(s)	Potential meaning
CL-2		BlG / BlG-Sq	Large quantity or extent
CL-3	Prop	LPFw-Frn	Something physically higher
CL-7	Ev	LP-Frn-CPf; EA-Frn	Something is happening
CL-8	Ev	Frn-LP-EbR	Something is really happening
CL-12	Ev	LPInw-Frn	Handling a very thin object which requires concentration
CL-14	Ev	TPrtr-Frn	Disbelief
CL 16	Ev	EA-CH-MCD	Surprised
CL-17	Ev	TBTL-Frn	Strong emphasis and focus on the action
CL-17	Ev	TPrtr-Frn	Mistake
CL-18	Ev	LPS-MCD-Frn	Not satisfied
CL-20	Ev	SA-Frn; EA-Frn; Frn-SA	SA and EA correspond with bouncing of referent
CL-32	Ev	LPO	Satisfied
CL-36	Ent	SA-LPBT-Frn	Surprised
CL-37	Ev	WrNose	Curious

TABLE 5-15 POTENTIAL MEANINGS FOR SOME MOUTH AND FACE ACTIONS IN SASL CLASSIFIERS

In relation to the types of mouth gestures discussed in Chapter 2, I did not observe any examples of mouthings, except in lexical items, which are not under discussion here. The majority of mouth gestures in the data set seem to be adverbial in nature, rather than enactments or echo phonology. Even though echo phonology appears only once in the full data set, it merits a detailed discussion about echo phonology. Recent literature (amongst others Woll, 2008; 2014 and Crasborn et al., 2008) reports two constraints in relation to echo phonology in the context of lexical items: These mouth actions are obligatory in the citation forms of lexical signs (i.e. they form part of the citation form) and they have no lexical content (i.e. they are semantically empty).

I found one example in the data that appears to be echo phonology in relation to the core of the definition of this phenomenon, i.e. that the mouth gestures echo the manual movements in such signs (Woll, 2014). This example – ***CL-7*** - does not conform to the constraints applying to echo phonology in the context of lexical items mentioned above. A larger data set may render more such examples of this phenomenon.

Tongue protrusion occurs in the concept classes *Event* and *Entity* but not in the concept class *Property*. I did not manage to discuss all the examples of tongue protrusion with the participant who used it most. Only two examples were verified: 'disbelief' (***CL-14***) and 'mistake' (***CL-17***). Some of the articulations of tongue protrusion described in Figure 5-27 below may have equivalents (in terms of form and meaning) in other sign languages.

CL-14 (14.292)

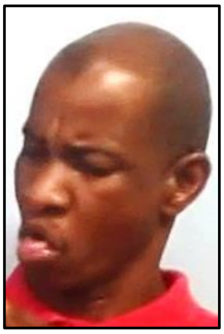
Curled upwards; out-in

CL-15 (16.770)

Centre; mouth not pursed

CL-15 (17.757)

Curled right



CL-17 (22.547)

Centre; mouth pursed

CL-17 (22.777)

Rolled-up-between lips

CL-17 (22.907)

Rolled-up-between lips; protruding slightly

CL-28 (18.780)

Tongue slightly protruding

FIGURE 5-27 EXAMPLES OF TONGUE PROTRUSION

5.2.5. Movement

As mentioned in the overview, there are 198 instances of movement in the full data set. There are two classifiers which do not display any movement – ***CL-19*** and ***CL-25***. As explained before, ***CL-19*** is part of a figure and ground construction where the classifier handshape represents a horizontal plane. ***CL-25*** is an interesting case where the signer uses the lexical item for tree, and then points at the handshape for TREE which then becomes the classifier handshape PINKY-FORK with the gloss FORK-IN-TREE-BRANCH. These two classifiers are excluded from this particular comparison.

The most revealing movement type in this set of data is movement 'pattern'. As mentioned earlier, the concept class *Event* has the highest number of movement patterns in comparison to the other two concept classes. Apart from this, there are 21 classifiers that do not display any movement pattern at all.

Figure 5-28 below gives an indication of the lack of movement pattern in these 21 classifiers across the concept classes - the highest number in the concept class *Property* and the lowest number in the concept class *Event*. This is once again the result of the concept class *Event* meaning that 'something is happening', and given the nature of sign languages, it is likely that a movement pattern is a requirement.

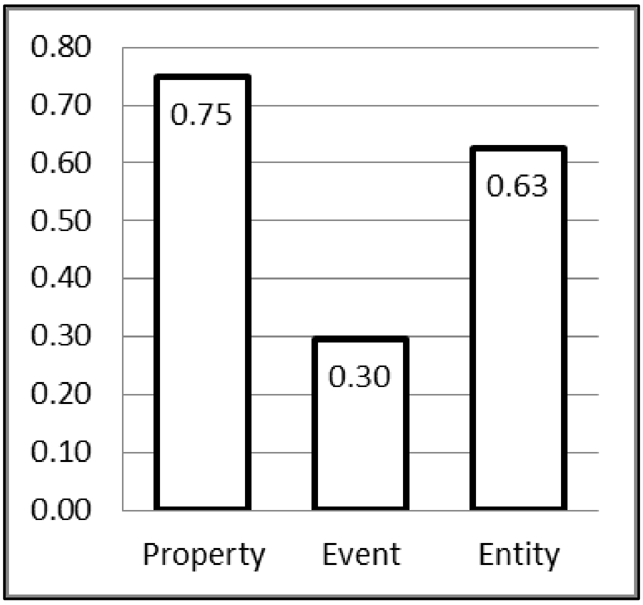


FIGURE 5-28 LACK OF MOVEMENT PATTERNS

Another finding is that the movement shape 'line' has the highest number in the concept class *Entity*. Six out of the 13 classifiers displaying 'line' as a movement path shape are classifiers which indicate a specific location of an entity. These classifiers all express figure and ground constructions.

The movement path shape 'circle' has the highest number in the concept class *Property* which is not surprising – all classifiers in this concept class are SASSes, with the SPHERE-handshape appearing across all concept classes. In the context of the elicitation clip, it is likely that SASSes would trace or outline the shape of a sphere-like object.

5.2.6. Summary

This section provides a summary of the data discussion in relation to the three concept classes. In the concept class *Property* it may be possible that handedness is a distinctive characteristic because there are only two-handed signs in this concept class which are all symmetrical. Eyegaze focal point can be another distinctive feature of this class - it has the highest number of the referent as focal point. It is the only concept class with no significant difference between sequential and consistent eyegaze – the distribution is identical.

The concept class *Event* can be characterised by the wide variety of mouth and face actions and movements. This means that there are shifts of formational features in this concept class. It is the only concept class where the mouth and face action 'expel air' occurs. It is also the only concept class that contains the movement patterns ‘bending’ and ‘opening’. The classifier as focal point has the highest number of instances in this concept class. Also, eyegaze seems to follow the articulators to highlight movement, which – in this concept class – means actual motion of the referent.

The concept class *Entity* can be distinguished by eyegaze focal points – it is the only concept class in which the remote referent occurs as the focal point. It is also the only concept class which contains examples of all the different focal points – classifier, referent, remote referent and implied object. Another distinguishing factor seems to be mouth and face actions - ‘blowing gently’ and ‘squint’ appear only in this concept class. *Entity* can also be distinguished by movement pattern - ‘line’ is significant in this concept class – it manifests with double the number of instances in comparison to the concept class *Event*. Furthermore, in all instances of ‘line’ as pattern, the movement indicates location and not actual motion of the referent.

CHAPTER 6 - Conclusion

6.1. Limitations of the study

Statistically not viable

This study is statistically not viable because of the small number of tokens (i.e. 50). Apart from this, I was unaware of the fact that I should have transcribed an equal number of classifiers from each concept class, given the nature of this study. Instead, I chose to transcribe the first ten classifiers in each video clip which resulted in an uneven number of tokens per concept class. Therefore this is not an inferential study, but rather a descriptive study and no valid generalisations can be made[4]. However, using this descriptive study as a basis, a large number of tokens could be analysed and, following statistics protocol, future studies with statistical significance can be conducted.

Time constraints

I initially simply used the totals of instances of features per concept class and then created pie graphs which I used as the basis for presenting and analysing the data. This

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[4] Interview, Prof. Peter Fridjhon. See footnote 3 on p. 183.

was conceptually incorrect because of the uneven number of tokens per concept class - I should have used bar graphs which represents proportional numbers. This means that what I initially wrote about my data was also invalid and I had to start again with the data presentation and discussion chapters.

As a result of time constraints, I had to remove a number of formational features that were in the original Excel documents, inputted with numerical values for instances of features. The following features should have been included in this study: Mouth aperture, eye aperture, eyegaze direction, movements of the body and torso as well as head movements. They will be included in further studies, with the benefit of hindsight.

Another shortcoming of this study is that it does not provide a comparison of lexical items and classifiers on the basis of formational features. Furthermore, the decision not to transcribe 'repeated' classifiers (as explained in Chapter 3) is likely to have prevented the identification of the meanings of certain mouth and face actions. For example, I noticed some examples of tongue protrusion in these classifiers. The ELAN files and data presentation do not always match, and onset and offset of different features are not accurate in ELAN, also a result of time constraints.

Technology and software

The 'Sign Lab' available for filming is very small, and there is hardly sufficient space for the camera-person not to intrude in the signer's space. It was virtually impossible to set up two cameras as was planned originally. The quality of some clips is not satisfactory and often data could not be transcribed in adequate detail as a result of low resolution. This also impacted on the quality and clarity of screenshots used in the dissertation. The end product of the filming should have been two clips per participants for a high resolution of the close-up of mouth and face actions.

6.2. Implications for future research

Despite the fact that this study by itself cannot be used for inferential purposes, it generated a number of potential research projects in relation to classifiers in SASL. The projects listed below could render statistically viable results with the benefit of hindsight.

1) An inventory of SASL classifier handshapes labelled from a semantic point of view
2) Handedness in relation to concept classes
3) Eyegaze focal points across concept classes
4) Eyegaze focal points and mouth and face actions
5) Eyegaze focal points and the number of hands and referents in a classifier (i.e. one-handed classifier, two-handed classifier with one referent and two-handed classifier with two referents)
6) Eyegaze focal points in figure and ground constructions in relation to the point of view of the signer
7) Obligatory combinations / occurrences of mouth and face actions for particular concept classes

8) Echo phonology
9) Tongue protrusion
10) An inventory of mouth gestures
11) A comparison of eyegaze function in SASL poetry and eyegaze function in SASL classifiers
12) A comparison of lexical items and classifiers based on the formational features
13) Classifiers and constructed action
14) A number of cross-linguistic studies based on (1)-(13) above

This exploratory study highlighted the many areas of SASL classifiers not yet researched. Although descriptive in nature, it forms the basis for an in-depth inferential study on classifiers in SASL. Such a study would not only contribute to the development of an SASL corpus, but also to collaborative cross-linguistic studies.

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