University of Brighton

Iconicity as a pervasive force in language: Evidence from Ghanaian Sign Language and Adamorobe Sign Language

By

Mary Edward

A thesis submitted in partial fulfilment of the requirements of the University of Brighton for the degree of Doctor of Philosophy

School of Humanities

University of Brighton

2021

Abstract

In this dissertation, I investigate various manifestations of iconicity and how these are demonstrated in the visual-spatial modality, focusing specifically on Ghanaian Sign Language (GSL) and Adamorobe Sign Language (AdaSL). The dissertation conducts three main empirical analyses comparing GSL and AdaSL. The data for the analyses were elicited from deaf participants using lexical elicitation and narrative tasks. The first study considers iconicity in GSL and AdaSL lexical items. This study additionally compares the iconic strategies used by signers to those produced in gestures by hearing non-signers in the surrounding communities. The second study investigates iconicity in the spatial domain, focusing on the iconic use of space to depict location, motion, action. The third study looks specifically at the use of, simultaneous constructions, and compares the use of different types of simultaneous constructions between the two sign languages. Finally, the dissertation offers a theoretical analysis of the data across the studies from a cognitive linguistics perspective on iconicity in language.

The study on lexical iconicity compares GSL and AdaSL signers' use of iconic strategies across five semantic categories: Handheld tools, Clothing & Accessories, Furniture & Household items, Appliances, and Nature. Findings are discussed with respect to patterns of iconicity across semantic categories, and with respect to similarities and differences between signs and gestures. The result of this study demonstrates that varied iconic patterns for different semantic domains emerge within the sign languages (and gesture) and provide valuable insight into the typology of sign languages and into the community-mediated interplay between sign and gesture in their shared access to the iconic affordances of the visual modality. The analysis of iconicity in the grammatical constructions expressing location, motion and action focuses on similarities and differences between the two sign languages in signers' telling of a narrative. The analysis shows that the expression of iconicity in the grammatical domain depends on different predicate types, e.g., classifier and lexical predicates and the use of signing perspectives. Although GSL and AdaSL do not show substantial differences in their use of predicate types and perspectives, we identify the possible language contact as reason for some novel structures in AdaSL. The third study investigates the different types of simultaneous constructions (SC) in GSL and AdaSL. The analysis indicates that GSL and AdaSL use different types of SC to almost the same degree. Some of the results from AdaSL were unexpected considering previous research on SC. The cognitive linguistics approaches to iconicity considers the different ways in which grammatical organisation mirrors experience. The framework perceives iconic structures to be instantiated by the meaningfulness of the phonological parameters and the meaningfulness is influenced by signers' experiential knowledge.

Declaration

I declare that this dissertation is an original report of my research, has been written by me and has not been submitted for any previous degree. The data presented in this work is entirely my own work and due references have been provided on all supporting literatures and resources.

Mary Edward

April 2021

Acknowledgements

All praise and thanks to Elohim. I am so grateful.

I would like to thank my supervisory team (Prof. Dr. Pamela Perniss, Prof. Sherman Wilcox, and Dr. Tim Wharton) for their academic guidance, insight, support throughout the period of my PhD. My PhD experience was a blend of UK-Germany supervision (Pamela), American supervision (Sherman) and UK supervision (Tim). I appreciate my amazing supervisors for the different roles they played in my life throughout the duration of my dissertation. I experienced immerse support from each in different areas of my stay in the UK. Thanks to Pamela for the amazing baptism into iconicity, hands on training in ELAN, giving feedback on the several conferences and papers that came out of my PhD, and the several times she had to be a nanny during our face-to-face supervision meetings. Thanks to Sherman for the lessons on cognitive approaches to language and for making me a reader of Langacker! I appreciate Tim for the many ways he supported me through his counsel, support, and effort to ensure that my stay in Brighton was worthwhile.

Many people contributed in different ways at the University of Brighton to ensure the progress of my PhD. I want to appreciate Prof. Raphael Salkie and Mr. Ken Turner at the School of Humanities (University of Brighton) for taking their time every year to go through my work and give constructive feedback. Special appreciation to the University of Brighton Doctoral College for my PhD studentship (*Thanks for making this dream a reality!*) and to all the staff of the Doctoral College (Past and Present) who were one way or the other involved in my PhD. To my colleagues at the University of Brighton Doctoral College, thank you for the friendship and the extra curricula activities that gave me a break from my busy academic (and mummy) life. At the final stages of my PhD, One World Nursery at the Moulsecoomb campus of the University of Brighton became a haven for my daughter. Thanks to all the teachers and the management team for your care and support.

These people in diverse ways contributed to the success of my academic journey. I am especially grateful to the late Francis Boison who taught me signing. I appreciate Dr. George Akanlig-Pare (Linguistics Department, University of Ghana) for the different ways he contributed to the success of my studies. Further, I want to appreciate all the lecturers at the Linguistic Department and English Department of the University of Ghana for a good foundational training. Thanks to Øyvin Andersen and Christer Johansson of the Department of Linguistic, Literary and Aesthetic Studies, at the University of Bergen.

This dissertation involved fieldwork and I worked with deaf and hearing consultants in different places in Ghana. In Adamorobe, I appreciate James Abresua and his family for hosting me and my family (my daughter and mum) throughout the period of my data collection in Adamorobe. James was very instrumental in recruiting both deaf and hearing people from Adamorobe to participate in my study. I am deeply grateful to the Deaf individuals in Adamorobe who took the time to participate in this project. My heartfelt thanks to Kofi Pare, Ama Obobia, Afua Kaya, Naomi Kwakyebea, Adwowa Agyirwa, Akosua Aboah, Akua Fiakobe, Kwesi Boahen, Kwame Ofori, Kwadwo Bosompra and Kwame Osae. I extend my heartfelt gratitude to the Ghanaian Sign Language (GSL) signers recruited from Medie/Nsawam; Adjei Sarpong, Edward Adumoah, Emmanuel Ofori, Francis Kwame Boison, George McFrazier Coffie, Grace Tawiah Boison, Obiri Francis Kwodwo, Patricia Amarquarye, Nancy Korkor, and Salima Issah Mohammed. I am deeply grateful to the late Francis Kwame Boison who played very instrumental role in recruiting all the GSL signers.

For the non-signing gesturers recruited from Adamorobe, I am deeply grateful to the following people for voluntarily taking part in this project; Freeman, Doris, Naomi, Sarah, Bismark, Kwame, Kofi, Nana Kwame, Sisi Nyanku, Veronica. I am also thankful to all the non-signing gesturers from Ketan-Sekondi; Agnes, Alfred, Elijah, Esther, Manfred, Paa Kwesi, Simon, Philomena, Ankomah and John.

Many other people played different roles in my life within the period of my PhD. I am thankful to all the members of New Life Brighton (Moulsecoomb) for their love, care, and support. I am particularly thankful to the Reberas (Julian & George) for their constant support and encouragement. I appreciate my auntie (Charlotte) and her family in UK for making me and my family feel so much at home. I appreciate all my friends in different parts of the world who in one way or the other encouraged me throughout this journey. Special thanks goes to Dr. Emma Asonye & members of SDELI, Stanley Babatunde & family, Cynthia Odue & family, Nda Boadi-Manu & family, Mr. Chukwendu & family, Lord Kavi & family, Dr. Austin Ablo, Dr. Esther Manu Barfo, Dr. Andrews Quarcoe, Mrs. Rosina Sheburah Essien, Wendy Kwakye Amoako, Dr. Gabriel Edzordzi Agbozo, Ishmael Adjei, Anastasia Nuworsu, Dr. Frank Tsiwa, Archibald Tagoe & family, Ntsiki Mgxabayi, Adora Udechukwu, Mrs. Gloria Frazier-Williams, Rebecca Ahemaa Danquah, Mrs. Beatrice Ofosu Yeboah, Nafisah, Mr. Michael Asante, Eunice Amoako, Alfred Bekoe, Mrs. Gertrude Sagoe and all the members of CDM-Europe.

I am highly indebted to my parents (Dada Simon & Mama Aggie) for the many ways they have contributed to my success. I am especially thankful for the investment of faith and determination which have been my major driving force. My fieldwork and data analysis would not have been possible if not for my mum who travelled with me to Adamorobe for data collection, and then to UK to take care of my daughter so I have enough time to annotate my data. I am forever grateful to my siblings (Mrs. Philomena Arthur, Esther Edward & Papa Kwesi Edward) who also became research assistants and nannies during my fieldwork. I am thankful to my brother (Henry), my mother-in-law (Ndaa), Malwine, Saviour and Mrs. Lucy Sarpong for the different ways they supported my studies.

My PhD journey was unique, interesting, and engaging at the same time. The support of my dearest husband (Michael Agronah) has been amazing. From day 1 of my PhD, he never ceased to push me to explore beyond my limits. From attending Linguistics Conferences with me, to reading my work and giving constructive feedback, his constant support helped to finish this dissertation in less than 4 years of full-time study with parenting duties. Finally, to my daughters, Selorm Agronah (who wrote the whole dissertation with me!) and Sena Agronah (who joined for the finishing touches!), you made my PhD journey unique and memorable. To my little family, you are loved, cherished, and adored.

Table of Contents

Abbreviations and transcriptions convention

Abbreviations

Sign languages:

ABSL	Al-Sayyid Bedouin Sign Language
AdaSL	Adamorobe Sign Language (Ghana)
ASL	American Sign Language
Auslan	Australian Sign Language
BSL	British Sign Language
Bura SL	Bura (Nigeria)
CSL	Chinese Sign Language
DSL	Danish Sign Language
DGS	*Deutsche Gebärdensprache*, German Sign Language
EthSL	Ethiopian Sign Language
GSL	Ghanaian Sign Language
HSL	Hausa Sign Language
HKSL	Hong Kong Sign Language
ISL	Irish Sign Language
ISL	Israeli Sign Language
JPM	*Polski język migowy*, Polish Sign Language
JSL	Japanese Sign Language
Kata Kolok	Kata Kolok (Bali)
KSL	Kenyan Sign Language
KSL	Korean Sign Language
LaSiBo	Bouakako Sign Language
Libras	Brazilian Sign Language
LIS	*Lingua Italiana dei Segni*, Italian Sign Language
LIU	*Lughat al-Ishāra al-Urdunia*, Jordanian Sign Language
LSF	*Langue des Signes Françaises*, French Sign Language
LSQ	*Langue des signes Québécoise*, Quebec Sign Language
MgSL	Magajingari Sign Language (Nigeria)
NanaSL	Nanabin Sign Language (Ghana)
NGT	*Nederlandse Gebarentaal*, Sign Language of the Netherlands
NicaSL	Nicaraguan Sign Language
NSL	Nigerian Sign Language

NZSL	New Zealand Sign Language
SASL	South African Sign Language
SSL	Swedish Sign Language
DSGS	*Deutsch-Schweizerische Gebärdensprache,* Swiss-German Sign Language
TİD	*Türk İşaret Dili,* Turkish Sign Language

General:

CL_E	Entity classifier
CL_H	Handling classifier
CL_L	Limb classifier
Gest	Gesture
HS	Handshape
LH	Left hand
Loc.	Location
$Loc._R$	Location on the right side of sign space
$Loc._L$	Location on the left side of sign space
$Loc._{down}$	Located down
$Loc._c$	Located at the centre
$Loc._{up}$	Located up
Mov.	Movement
$Mov._{right}$	Move from right
NMM	Nonmanual markers
Orn.	Orientation
RH	Right hand
SASS	Size and shape specifier
SSE	Sign Supported English

PART 1

INTRODUCTION

Chapter 1

Introduction

1.0 General Introduction

Sign languages are the natural languages used by Deaf communities all over the world. They involve the manipulation of the hands, in conjunction with facial expressions (and sometimes the body) to convey meaningful information. People's perceptions about sign languages have over the centuries changed from being *regarded* as pantomimes, mimetics, gestures, etc., to being recognised as full-fledged human languages delivered with the hands, the body, and the face, and perceived by the eyes (and sometimes by tactile means by the deafblind). Sign languages are not ad-hoc gestural communication that are developed on the spur of the moment to aid communication. Sign languages fulfil all the requirements as full-fledged human language and share features with spoken languages across the main linguistic levels of analysis. Signed and spoken languages exhibit similar properties of language structure, i.e., both have phonology, morphology, semantics, syntax etc. (Sandler & Lillo-Martin, 2006; Pfau, et al., 2012). However, there are some differences with respect to what exactly we can represent with sounds as compared with signs, and these differences are modality-specific. Modality refers to the mode of production and perceptions of the language, either signed or spoken. In other words, the perception of human languages via the ears or the eyes and production via hands or vocal tract (predominantly) is dependent on the modality, i.e., signed or spoken. The oral cavity is limited in the extent to which users can manipulate it to show space, location, action, or time. On the other hand, the visual modality permits the expression of visual-spatial information depicting space, location, action, or time.

Human languages can be articulated orally (speech) or manually (sign language). The visual modality is also used in spoken language communication, notably the use of co-speech gestures. Similarly, signed language typically involves the use of articulators other than the hands, notably movements of the mouth (mouthing and mouth gestures). In recent studies, iconicity has been demonstrated to be a design feature of human languages, both signed and spoken languages (Perniss, et al., 2010), and this is contrary to Hockett's strict arbitrariness as a design features of human language (Hockett, 1960). Both sign and speech have iconic and arbitrary components. The argument expressed here is that human languages are not strictly arbitrary.

Sign languages have become the accepted languages for Deaf communication and education in most nations of the world. Prior to this acceptance, there were attempts to educate deaf students with speech and the mode of education relied on the oral approach (or oralism). The infamous Milan Conference of 1800 on Deaf education concluded that oralism (speech) was better than manualism (signs) and therefore banned the use of sign languages in schools. The long battle for sign languages as the languages of instruction for Deaf education proved futile in the early 20th century as psychologists, educators and some linguists maintained that sign language is “harmful for intellectual and educational development” (Wilcox, 2015, p. 667). The acceptance of sign languages as a medium of education in America and most European nations came in the late 20th century. Meanwhile indigenous Deaf communities (around the world) used local sign languages for intra-community communication even when Europe and America still battled with the acceptance of sign languages in schools.

There is no universal sign language that is used by all Deaf groups and communities all over the world. There is, however, International Sign (IS) which is a contact sign variety used at international meetings to be accessible to different signers with different language background (Supalla & Webb, 1995). Different societies, nations and communities have sign languages that are distinct from each other. For example, American Sign Language (ASL) is different from British Sign Language (BSL) in lexicon and grammar, as well as in the fingerspelling alphabet. Moreover, within a particular country, there are differences in the sign languages used by different Deaf communities. In Ghana for instance, Adamorobe Sign Language (AdaSL), which is an example of a rural sign language, is distinct from Ghanaian Sign Language (GSL), which is an urban sign language. AdaSL is an indigenous sign language which emerged in the 18th century and it is the language for both deaf and hearing signers in Adamorobe. GSL on the other hand emerged in 1950s as the language for deaf education in Ghana.

Since the scientific study of sign languages began in the 1960s, much research has been done on sign language documentation and description. Sign language research in the past was based on spoken language research and linguists discussed the linguistics of sign languages in relation to what has been found in spoken languages (Sandler & Lillo-Martin, 2006). Thus, linguistic research on sign language was based on what has already been found in spoken languages to the neglect of what has not been discovered for spoken language but existed in sign language. Although this approach is not wrong in itself, it limited sign linguists to what existed in spoken language and ignored the particularities of sign languages that are not shared with speech (e.g., the grammar of the face, mouthing, mouth gestures etc.). From phonology to grammar, sign linguists developed theoretical arguments originating from what has been done for speech (sound). A better approach to sign linguistics is delineating signs from speech and analysing them in their own right.

Research on the linguistics of sign language has seen few decades (about six decades) but sign linguists have over the years conducted much intriguing and ground-breaking research on sign language linguistics. So far, research has been carried out on different aspects of sign languages including general linguistic description as well as acquisition and processing. Aside from linguists, social anthropologists have also discovered several sign languages that were previously unheard of and remained local legacies. For example, the recent discovery of Magajingari Sign Language (MgSL) in Magajingari community in Kaduna North in Nigeria (Asonye & Edward, Forthcoming). Just like spoken language research, there is the tendency for some sign languages to receive more attention than others. Sign languages used in homes and villages stand the risk of endangerment because of the following reasons: lack of users, gradual decline in their domains of use, lack of documentation, etc. For most moribund sign languages in the world there is a dearth of linguistic research and language revitalisation programmes. The lack of academic research on several indigenous African sign languages has made it difficult to compare these sign languages. AdaSL is an example of an indigenous African sign language. Although linguistic research on GSL and AdaSL started in the 1980's, earnest research begun in the 2000s as both local and foreign linguists got involved in the description of their linguistic features. The earliest linguistic research on Ghanaian sign languages were conducted by Frishberg (1987). Over the years, few linguists have explored aspects of the linguistics of GSL and AdaSL including resemblance-based mappings (*iconicity*) in AdaSL.

Chapter 1 is arranged as follows: §1.1 gives information on GSL and AdaSL and considers certain typological information. §1.2 outlines three different perceptions of Deafness in Ghana. §1.3 gives details of the possible language contact between GSL and AdaSL, and between the sign languages and surrounding spoken languages. §1.4 outlines the linguistic research on GSL and AdaSL. §1.5 considers the vitality of the sign languages (GSL/AdaSL), i.e., their ability to thrive and the potential threats that put them at risk. §1.6 outlines the linguistic research on different sign languages in Africa. Finally, §1.7 outlines the scope of the thesis presenting the different parts and their range of analyses.

1.1 Sign Languages in Ghana

Ghana is an English-speaking country[1] (de facto official language) with about sixty to eighty local languages[2] (Dakubu, 2015). The only recognised sign language for Deaf education in Ghana is Ghanaian Sign Language (GSL). Although GSL is used for Deaf education (in Deaf and Inclusive schools) and other formal and informal activities relating to Deaf people in Ghana, it is yet to be declared an official language in Ghana. In addition to GSL, there are several village and home sign systems that are used in various homes and communities-which do not form a part of GSL, e.g., Adamorobe Sign Language (AdaSL) and Nanabin Sign Language (NanaSL); these are village sign languages. Village sign languages develop within small communities or villages with a high incidence of hereditary deafness (Meir, et al., 2010). In Ghana, Nanabin Sign Language (NanaSL) emerged within a family with a high incidence of hereditary deafness in Ekumfi in the Central region of Ghana. Although NanaSL has few users as compared to AdaSL, it cannot be classified as home sign system since it is used by a group of Deaf people. Home sign systems are developed based on gestures in the homes of deaf people and are only used within the family for communication (Torigoe & Takei, 2002; Coppola & Newport, 2005). Coppola & Newport (2005) define home sign system as the gestural communication that often arises spontaneously when a profoundly deaf child grows up within a hearing family where none of the family members knows a conventional sign language and the deaf person is not in contact with other deaf people who use sign language. Although there have been no detailed studies on home sign systems in Ghana, several encounters with deaf people who grew up in predominantly hearing homes indicates that different gestural communications are used in homes.

1.1.1 Ghanaian Sign Language (GSL)

GSL is the sign language of the urban Deaf community and the language used in Deaf education in Ghana. Deaf people who have not gained formal education or Deaf students who attend mainstream schools (without sign language interpretation) are only introduced to GSL

[1] Ghana is located between three French-speaking nations and the Gulf of Guinea (the sea). The nation itself takes prides in its English legacy left by Britain through colonisation. Although French nations surround Ghana and French as a language is studied in some schools up to the Junior High School level, the number of Ghanaians who actively communicate in French is below average compared to the number of French-speaking nationals (surrounding nations) who speak English.

[2] The number of languages in Ghana remains a debate. While some linguists list about 45 languages, others have up to 60 to 80 local languages that are used. This debate is because of the inconsistencies in defining languages and dialects of a language.

by other GSL users in the community.[3] The number of people who use GSL as either a first or second language in Ghana is unknown. Linguistically, GSL is distinct from AdaSL, NanaSL and other home sign systems used in Ghana.[4] GSL developed from the sign language introduced by Andrew Foster in 1957 and it is representative of Ghanaian society and Ghanaian culture. Andrew Foster, a deaf African American missionary established 31 schools for the Deaf across Africa, trained deaf leaders, and introduced Total Communication, which embraced both American and indigenous signs (Kiyaga & Moores, 2003). Many researchers believe that Foster introduced ASL during his missionary work in Africa (Kiyaga & Moores, 2003; Nyst, 2007a)

GSL has an elaborate grammar just like any developed sign language. It is an urban sign language with an alphabet system. GSL and ASL use the same one-handed alphabet system. GSL also shares similarities with other urban sign languages like Nigerian Sign Language (NSL). Andrew Foster's engagement with Deaf education in Africa has contributed to some of the similarities shared by GSL, NSL and ASL since it is argued by some researchers that Foster introduced ASL to Africa during his sign language classes. The national television in Ghana uses GSL to interpret to deaf people and other users of GSL. The first dictionary for GSL was produced in 2001 and a new dictionary by McGuire & Deutsch (2015) is currently available.

Although there has not been systematic research on the similarities between GSL and ASL (i.e., how much GSL looks like ASL), researchers like Nyst (2010) considers GSL as an extended dialect of ASL. This assertion is shared by researchers like Kusters (2019). Indeed, the impact of Andrew Foster's sign language classes in Ghana and different African countries is the major contributor of Americanisms in many African sign languages. However, GSL just like many African sign languages have advanced to incorporate new structures that were not originally part of Foster's sign language lessons. Of important note is the fact the initial deaf individuals who took part in Foster's sign language lessons were not "languageless" as was quoted by Foster (Kiyaga & Moores, 2003). Most of these deaf individuals were using village or home sign systems before enrolling for the Foster's lessons. That is the first group

[3] When there are no GSL users around, these people communicate by home sign system and/or oral method and rely on lipreading.

[4] The 2020 database of GNAD has 11,000 registered membership out of an estimated 110,625 Deaf People in Ghana. (GNAD 07/04/2020). If the registered members are recruited from Deaf clubs and Deaf Education Institutions, then there are probably more Deaf people in Ghana who are either out of school, not involved in Deaf clubs or yet to be educated. Personal visits to villages around Medie revealed that most Deaf individuals in remote villages are less likely to be sent to school as compared to those in the towns and cities.

of students in Foster's classes probably used a hybrid version of the sign language introduced by Andrew Foster and their own indigenous signs.

1.1.2 Adamorobe Sign Language (AdaSL)

AdaSL is an indigenous village sign language used in Adamorobe community in the Eastern Region of Ghana. AdaSL is believed to have existed as far back as 1733 as a language used by both hearing and deaf people in Adamorobe (Okyere & Addo , 1994). The community is noted for its unusually high incidence of hereditary deafness: an estimated 1.3% of the total population which is a reduction from the 2% in 2001 (Nyst, 2007a). The reduction is attributed to the law instituted by their former chief that prevented marriage between two deaf people (Nyst, 2007a; Kusters, 2012a) and the migration of different people into the community (Edward, 2018a). Nyst stated that "former chief Nana Kwaakwa Asiampong II prohibited marriage between two deaf persons. It is not clear whether this was the result of the genetic counselling given in 1972" (Nyst, 2007a, p. 28). AdaSL is independent of GSL and of the surrounding spoken language, Akan (an indigenous Ghanaian language), though there is some influence of the Akan language on AdaSL structure (Nyst, 2007a). AdaSL is used by around 40[5] deaf people (adults and youngsters) in a community of about 3000 people representing 1.3% of the total population.

In a report by Miles (2004; 2005), deaf Adamorobeans were the first substantial historical group of African people known to have used a formal sign language and the record dated as far back as the 18th century. The history of AdaSL is scattered in stories that are either mythical or without historical records[6] (Nyst, 2007a; Kusters, 2012a; Kusters, 2012b; Okyere & Addo, 1994). The sign language in Adamorobe is older than GSL and has a long tradition of usage by both deaf and hearing people. Earlier research done in Adamorobe discovered that almost everybody in the village could communicate in the sign language (Frishberg, 1987). However, my current visits to the community indicates a decline in the numbers of hearing signers. There are currently more hearing people who do not

[5] The current headcount was done during a Christmas party organised for deaf people in Adamorobe on 31st December 2016. In attendance were 38 deaf people (33 adults and 5 children) and 2 were reported to be absent. The total number of people in Adamorobe is estimated as there was no information on the national archives per the 2010 census for Adamorobe's population. The current number was estimated out of approximations on the earlier figure.

[6] The formal discovery of the coexistence of deaf and hearing people in Adamorobe is very recent (in the 1970s). This may account for the reason the national archives may not have prior information about AdaSL before the 1970s.

communicate in AdaSL in Adamorobe due to migration and other socioeconomic factors (Edward, 2018a).

The education of deaf Adamorobeans takes place in GSL and this language contact has affected the use of AdaSL in Adamorobe. According Nyst (2007a), Kusters (2019), and Edward (2018a), the ubiquitous use of GSL in Adamorobe begun mainly with the education of the young signers in GSL.

1.1.3 Typological Considerations (GSL & AdaSL)

Sign languages have been shown to exhibit typological differences at distinct levels of linguistic analysis (de Vos & Pfau, 2015; Zeshan, 2006b; Zeshan & Perniss, 2008; Zeshan & Palfreyman, 2017; Perniss, et al., 2007). Linguistic typological study is aimed at classifying different languages according to their properties and structure. Zeshan (2006b) considers the following as some of the aims of typological studies; documentation of individual sign languages and the cross-linguistic studies of sign languages. According to de Vos & Pfau (2015 p. 282), "sign language typology investigates to what extent sign languages differ from each other and to what extent the attested differences mirror typological patterns previously identified for spoken languages". Typological research on sign languages has classified different sign languages into urban and rural dichotomies based on specific features of the sign languages (see Zeshan, 2006a; 2006b; de Vos & Pfau, 2015). de Vos & Pfau (2015, p. 280) were of the view that the linguistic diversity among rural sign languages shows that they should be considered "independent samples on par with other signed and spoken languages in cross-modal comparisons". In other words, de Vos & Pfau (2015) proposed that there is not enough evidence to consider rural sign languages as a specific type distinct from urban sign languages.

Urban sign languages refer to national sign languages and sign languages of education. Rural sign languages refer to sign languages that are used in communities with high incidences of genetic deafness and are typically used for communication between deaf people and between deaf and hearing people. One major difference between urban and rural sign languages is the size of the signing community; urban sign languages have quite large communities of use compared to rural sign languages. Cross-linguistic studies on rural sign languages have identified some lexical and grammatical variations among rural sign languages and these mirror to a large extent what has been identified in urban sign languages (de Vos & Pfau, 2015). Other research has also identified language specific patterns in some rural and urban sign languages. For example, Nyst (2007a; 2016a) found language-specific patterning for iconic size depiction in a rural sign language (AdaSL). According to Nyst, users of AdaSL prefer body-based depiction of size, using a finger, the hand, or the arm to represent an entity. Many urban sign languages (usually national sign languages and sign languages of education) have been documented and their basic linguistic features have been described, e.g., sign languages of the Americas, Europe, Asia, and some parts of Africa.

GSL and AdaSL are classified as urban and rural sign languages, respectively. GSL is the language of the deaf community in urban Ghana (and the language for Deaf education in Ghana). AdaSL is a village (rural) sign language used only in Adamorobe community. GSL is used by deaf dominant community in Ghana (and few hearing signers such as interpreters, teachers of the Deaf, CODAs[7] and SODAs); AdaSL is used by both deaf and hearing signers in Adamorobe. GSL has wider domains of use (education, media, formal and informal deaf-deaf communications); AdaSL has more limited usage and signers sometimes borrow from GSL to fill lexical gaps. GSL started as a language of education within the Deaf community, bringing deaf individuals together into schools for the Deaf, pioneered by Andrew Foster, whereas AdaSL began as the result of a high incidence of deafness and thus the presence of a consolidated population of Deaf people in Adamorobe village. Important to the current research is that cross-linguistic studies on different sign languages address "research questions about the parameters of variation that we can find across sign languages, about the range of variation that is displayed, and about patterns of variation" (Zeshan, 2006b: 676). In the paragraphs below, we shall consider some typological differences and similarities between GSL and AdaSL.

Phonological features have been described for both GSL and AdaSL (Edward, 2014; Nyst, 2007a). The basic articulatory parameters exist for both sign languages (see chapter 2, § 2.1 for a detailed description on the linguistic features of sign languages). GSL and AdaSL like many other sign languages make use of the hands, the face, the body, and the signing space. However, as noted by Nyst (2007a), in AdaSL, both the hands and the legs can be used as articulatory parameters. For example, certain lexical items such as FOOTBALL[8] and SHOE use the legs as either the active articulator or the place of articulation. On the other hand, GSL signers only used the legs in active articulation during *constructed action* or in narratives. Mouth gestures and mouthing expressions have been documented in many sign languages. Both GSL and AdaSL use mouth gestures and mouthing expressions. However,

[7] CODA refers to Child of Deaf Adult and SODA refers to Sibling/Spouse of Deaf Adult

[8] The glossing convention for sign language use small caps for signs.

from previous research (Nyst, 2007a) and from the current dissertation, AdaSL signers demonstrated a higher use of mouthings. Interesting to note is that whereas GSL mouthings recorded for the data were mainly in English, AdaSL mouthings were based on Akan (except the sign BIG which uses the Ga expression *agbo*).

One typological difference found in sign languages relates to the use of manual and nonmanual makers to express sentential negation (manual: negative particles; nonmanual: head movements). In both GSL and AdaSL, nonmanual sentential negation was expressed with a headshake. However, GSL uses other negative particles that were not identified in the AdaSL data (e.g., NOT, NEGATIVE).

Different sign languages express number differently. Number here specifically refers to counting not number marking. MacHadjah (2016) presents a detailed research on number marking in GSL. Both GSL and AdaSL use a cardinal system for number. In GSL, numbers 1-999 are one-handed, 1000 is two-handed, million, billion, trillion could be one-handed or two-handed depending on the variants used. AdaSL on the other hand uses the one-handed counting system for 1-5 and 6-10 use two-handed system. Most signers of AdaSL expressed 20 and above with variants including adding the toes (see Nyst, 2007a for details on AdaSL counting system).

GSL has colour signs for both primary and secondary colours. However, AdaSL has only three basic colours (WHITE, RED and BLACK) and these have the same sign but differentiated by mouthing (see Nyst, 2007a). In GSL, other colour terms such as ORANGE is signed by signing the fruit ORANGE (same in sign languages such as BSL and ASL). Whereas colour terms in AdaSL are least influenced by iconicity, in GSL, iconicity and initialisation play a role in colour terms. For example, BLUE, YELLOW, BROWN, PURPLE, VIOLET and PINK are distinguished by initialisation and location.

According to de Vos & Pfau (2015 p. 280), “kinship systems of rural signing varieties are among the most restrictive ever”. Nyst identified different kinship terms AdaSL, and these signs were based on iconicity. For example, “Grandparent: the fingers strike the hair above the ear, accompanied by the mouthing for WHITE thus ‘grey-hair’” (Nyst, 2007a, p. 98). MOTHER/WOMAN is signed by making a fist and touching the chest (iconic depiction of breast), MAN is signed by touching the beard etc. On the other hand, kinship terms in GSL are expressed mainly on the face or locations around the face. Few other iconic kinship terms such as CHILD/CHILDREN and BABY are not signed on the face. For example, MOTHER, FATHER, BOY, PARENT, GIRL, GRANDFATHER/GRANDMOTHER, UNCLE and AUNT are signed on or around the face. WIFE/HUSBAND is a combination FEMALE/MALE (signed on the face) and MARRY (signed in the neutral space).

Research has identified the distinct use of the signing space by rural and urban sign languages (de Vos &Pfau, 2015; Zeshan, 2006b). Rural sign languages have been investigated to use much larger sign space as compared to urban sign languages. This is true of GSL and AdaSL as the data analysed in this dissertation and from previous research on AdaSL have demonstrated that AdaSL use a larger signing space as compared to GSL. For instance, the signing space in AdaSL is not concentrated to the space above the torso only, but everywhere around the signer is a potential signing space (including the space around the legs). Nyst (2007a) also identified that in AdaSL, only *real* and *surrogate* spaces are used and did no record the use of *token* space to express motion and location.

Classifiers have been documented for many sign languages. Classifiers have been identified to be used in both sequential and simultaneous constructions in many Western sign languages including DGS (Perniss, 2007b). The use of handling, entity and limp classifiers have been documented for both urban and rural sign languages. However, the use of classifiers in a village sign language like AdaSL has been identified to be limited (Nyst, 2007a, 2007b). Of particular interest to this dissertation is the fact that for AdaSL, Nyst identified the absence of entity classifiers for motion and location and the absence of entity classifiers in simultaneous construction (Nyst, 2007a, 2007b). Classifiers use in GSL on the other hand, had not been investigated extensively prior to this dissertation, However, the relationship between GSL and ASL (and the presence of classifiers in ASL) led to the assumption that classifiers of different types can be found in GSL. However, the relationship between GSL and ASL has not been systematically investigated, and such correlations are made with caution.

Cross-linguistic studies of iconicity in different sign languages have demonstrated the pervasive nature of iconicity in sign languages. Signers use different scales, perspectives, and iconic mappings to depict resemblance relationships between the form and the meaning (see Dingemanse et al., 2020; Perniss & Vigliocco, 2014; Perniss, 2007a, 2012; Nyst, 2007a, 2016a; Wilcox, 2004; Edward, 2015a, 2020; Morgan, 2015). Furthermore, the pervasive use of iconicity in different sign languages has been documented for both the lexical and grammatical constructions. Previous research on iconicity in AdaSL include size and shape depictions (Nyst, 2007a, 2016a, 2016b) and lexical iconicity (Edward, 2015a, 2020). Nyst (2007a; 2016a) identified different ways AdaSL exhibit lexical iconicity through the *measure stick* signs, and the depiction of size and shape. Edward (2015a) identified the use of iconic signs to express time, cognitive and emotional terms, size & shape in AdaSL. Research on iconicity in GSL include Edward (2020) which discusses lexical iconicity in Handheld tools (part of this research). Edward & Perniss (2019) offer a preliminary analysis of iconicity in GSL and AdaSL grammatical constructions and identified structural similarities and differences (part of this research).

1.2 Perception of Deafness in Ghana

The 2010 census of Ghana did not record the number of people with deafness but rather recorded a disability of hearing and speech. Deafness is not a highly ranked disability in Ghana and out of the 3% of the total number of people with disability, hearing impairment and speech impairment affects 0.8% of the total population. Deafness in general is perceived on three levels: as a *medical issue, a spiritual* issue, or a *social problem (societal views)* in Ghana.

1.2.1 Medical perspective

In an interview conducted among selected deaf GSL users in Accra (2014)[9], about 80% claimed that a medical condition resulted in their deafness. While some attributed it to prenatal medical issues, most of the people interviewed claimed that postnatal sicknesses caused their deafness. Government and private institutions have established units that care and assist people that have problems with hearing (audiological units). Usually, in Ghana, the incidence of deafness is detected after the child is born and correctional treatment is given if possible.[10]

The interview identified most of the interviewees as post-lingually deaf and their deafness was attributed to childhood sicknesses. Eight of the interviewees were not born deaf; they became deaf through childhood sicknesses and the most common of the sicknesses was *measles*. Other sicknesses that cause deafness in Ghana are meningitis, fever, presbycusis, mumps etc. (Amedofu, et al., 2006). The medical condition of deafness in Ghana prevails over all the other attributes or presupposed causes of deafness. Deafness in Adamorobe is mainly genetic/hereditary, and not due to childhood illness.

[9] This was done by me and Alicia Wright, a former student from the University of Chicago from June 2014-July 2014. In all we interviewed about ten deaf people.

[10] Ghanaian Deaf community is generally against cochlear implants and this expensive operation is not done in the country. The most typical correctional measure is the hearing aid for deaf people with few decibels of hearing capacity.

1.2.2. Spiritual perspective

In contrast to the GSL signers who attributed their deafness to medical conditions, almost all the deaf AdaSL users who were interviewed claimed some witch or wizard contributed to their deafness.[11] There is another belief that parents who ate their tribe's taboo foods were punished by giving them deaf children. This information was gathered from personal conversations with deaf people and parents with deaf children. Lastly, some "traditional beliefs characterize deafness as a manifestation of a mysterious fate, perhaps God's will" (Kiyaga & Moores, 2003)

In Adamorobe, deafness is perceived as a curse and is attributed to spiritual attacks. The stories surrounding the history of deafness in Adamorobe are packed with mythical stories of spiritual encounters with gods, witches, breaking taboos etc. (Nyst, 2007a; Kusters, 2012a). The assertion is deeply embedded in the belief in spiritualism in Ghana (Kuwornu-Adjaottor, 2011; Sackey, 1999) and "ailments/misfortunes are believed to have spiritual causality and hence they need spiritual treatment" (Sackey, 1999, p. 66).

1.2.3 Social perspective

The societal ideology towards the Deaf differs from one community to the other. In Adamorobe, the Deaf are part of the community and some Adamorobeans attribute the popularity of their community to the presence of deaf people. The Deaf are socially welcomed and some have married hearing people in the community. However, most deaf-hearing marriages do not last, and the reasons are that some deaf people believe that their hearing partners cheat on them (see also Kusters, 2012a) and the language barrier between deaf and hearing partners (Edward, 2015b) indicating that not all hearing people from Adamorobe can sign.

Many communities in Ghana have diverse perceptions about deafness. Deaf people are welcomed and integrated, but they are more likely to marry other deaf people as compared to marrying hearing people. All the Deaf couples that were interviewed in Accra (urban) preferred to be married to deaf men or women as compared to marrying hearing people. Deaf women are more likely to marry hearing men compared to deaf men marrying hearing women. Deaf-deaf marriage is prevalent in Ghana and most of these unions result in hearing children with few exceptions (most deaf-deaf marriages in Adamorobe resulted in deaf offspring).

[11] Two deaf people in urbanised cities believe that their parents did not obey certain laws of the land and the gods punished them with deaf children. These were from Accra (the capital city of Ghana) and Sekondi (a metropolitan city located in the Western Region of Ghana). These were not part of the 10 interviewed earlier.

Different societies have different names for deaf people in Ghana and most of these names are regarded as derogatory by the members of the Deaf community. Among the Akan speakers, the local names associated to deaf, or deafness are *mumu,* or *itsiw*. Some parents view their deaf and hard of hearing children as *second* in comparison to their hearing children. In some communities in Ghana, deaf children do not access the same education available to their hearing contemporaries. Akanlig-Pare & Edward (2000) mention that deaf people in Adamorobe suffer from discrimination and stigmatisation through societal impositions that limit their freedom.

1.3 Language contact

One linguistic phenomenon in a multilingual community is language contact; the availability of two or more languages used actively in a community will ultimately lead to the languages having influence over each other. Defining this phenomenon in a simple term, "language contact is the use of more than one language in the same place at the same time" (Thomason, 2001, p. 1). Language contact gives rise to (partial/total) bilingualism and multilingualism. This section presents the language contact between GSL and AdaSL. In the language contact situation between GSL and AdaSL, GSL is the language with prestige and dominance, whereas AdaSL is a minority language used specifically in Adamorobe (see Kusters, 2019; Edward, 2015b). Therefore, we expect the language contact situation between the two languages to be asymmetrical with AdaSL users using the signs of GSL in their conversation. The influence of language contact on the representation of iconic structures in AdaSL will be discussed in chapter 9.

The users of AdaSL have had instances where they had to communicate with users of GSL and through this, incorporated some GSL signs into their sign language (Edward, 2015b; Kusters, 2019). The prestige accorded to GSL in Ghana is renowned among Deaf people who use village and home sign systems. The ability to communicate in GSL is important to aid communication among the general Deaf community in Ghana. In Adamorobe, most deaf adults in the community never had the opportunity to benefit from formal education but claimed to have minimal knowledge in GSL. Few older signers had been in contact with GSL signers and through this contact have gained minimal proficiency in GSL. For example, some adult AdaSL signers use the GSL finger alphabet to fingerspell their names. In daily communications among the users of AdaSL, GSL lexical signs for household items and other event-related signs appear in their conversations. AdaSL data taken between 2014-2018 show examples of borrowed signs from GSL.[12] The education of the younger deaf Adamorobeans in a nearby School for the Deaf is an important factor to consider in the language contact situation. Young signers of AdaSL are equal bilinguals in GSL and AdaSL and prefer to communicate with GSL among each and switch to AdaSL in conversations with adult signers.

AdaSL signers are also introduced to GSL through religion (specifically church meetings and religious discussions by Christian groups).[13] The only Deaf Church in Adamorobe operates mostly in GSL because of the death of the GSL-AdaSL interpreter; discussions with other interest groups are held in GSL because the leaders are not from Adamorobe. Therefore, the need to learn GSL is as important to the Deaf community in Adamorobe as the need to learn English in Ghana. In this dissertation, the expectation is that the language contact situation between GSL and AdaSL *might* affect the representation of iconic structures in AdaSL. Furthermore, the language contact has resulted in GSL sign names for all the deaf people in Adamorobe. AdaSL is very distinct from GSL and one reason is that GSL has an alphabet system which is not in AdaSL. Therefore, when AdaSL signers who have not received formal education (which is done in GSL) use GSL initialised sign names, we perceive the extent of the language contact influence. AdaSL has limited communication in terms of educational and technical terms. GSL signs are used to fill the gap created by the absence of AdaSL lexical items.

Researchers working on AdaSL have mentioned the infiltrating effect of the contact between AdaSL and GSL (Nyst, 2007a; Kusters, 2019; Edward, 2015b). More alarming is the possible endangerment of AdaSL which is anticipated as a result of this situation (Nyst, 2007a; Edward, 2015b). On the other hand, some researchers are of the view that AdaSL signers are just using GSL for "practical reasons" (eg. Kusters, 2014b) and therefore not endangering AdaSL. Irrespective of the stance taken, the obvious result of the contact between GSL and AdaSL is visible as "some deaf people found it pleasant to be able to use another language than AdaSL" (Kusters, 2014b, p. 152). The practical use of GSL in AdaSL includes gossiping about hearing people (Kusters, 2014b; Edward, 2015a) and the desire to be able to use another sign language as noted by Kusters (2014b). GSL use in Adamorobe is not limited to the young and educated signers but also to the adults. One interesting comment made by most of the adult signers is the fact that AdaSL signs are hard and difficult to be

[12] One older signer (early 70s) was exempted from this study because he borrowed more GSL signs than any of the signers. His preference for GSL lexical items shows his ideological stance towards AdaSL.
[13] For more insight into this, see Edward (2015b)

understood by outsiders (Kusters, 2019; 2014b). Thus, GSL serves as an alternate language to bridge the linguistic barrier between AdaSL users and the general Deaf community in Ghana.

There is another kind of language contact that influences both GSL and AdaSL. This is the contact between the sign languages and the spoken languages that are used in Ghana. The major contact between GSL and another spoken language is through the influence of English on the grammar and structure of GSL. In other words, some signers use Signing Supported English (SSE) that follows the structure of English. AdaSL, on the other hand, is influenced by Akan and other spoken languages used in and around Adamorobe. Hearing signers of AdaSL believe the sign language is just like Akan (Kusters, 2014b; Edward, 2015a) and Nyst (2007a) identified AdaSL sentences with the same structure as Akan.

1.4 Linguistic Research on GSL and AdaSL

Research on sign languages in Ghana begun in 1987 (Frishberg, 1987). Nyst (2007a) is an extensive descriptive work on Adamorobe Sign Language (Ghana). [14] Relevant for this dissertation is the fact that Nyst has provided a descriptive analysis of AdaSL (2007a) and in subsequent papers, explored certain linguistic features of AdaSL including iconicity. Kusters (2012a, 2012b and many others) have focused on Adamorobe community and the co-existence between the deaf and hearing people, a shared language (AdaSL), sociocultural issues and the notion of deaf space. Kusters has explored several areas of deaf ideology, marital prohibitions, deaf religious identity etc. While Nyst (2007a and others) and Edward (2015a and others) present linguistic descriptions of AdaSL, Kusters focuses on the anthropological perspective giving more room for human centred discussions as compared to language centred discussions. Majority of the earlier linguistic research in sign languages in Ghana focused on AdaSL. Currently, we have other research works that have investigated linguistics features of GSL (Edward, 2014, 2020; MacHadjah, 2016).

The next subsections under §1.4 will focus on linguistics research on sign languages in Ghana, specifically Ghanaian Sign Language and Adamorobe Sign Language. Majority of these research were pioneered by foreign linguists and anthropologists. Recently, Ghanaian researchers have become interested in sign language linguistic research and have produced works covering iconicity, language contact, language vitality, language documentation and other sociolinguistics issues (see Edward, 2020; Edward & Akanlig-Pare, forthcoming;

[14] For a detailed analysis of sign languages in West Africa, see Nyst (2010).

Asonye & Edward, Forthcoming; Edward, 2014, Edward, 2015a; Edward, 2015b; Edward, 2018a; Edward, 2018b, Asonye et al., 2020). Other works on GSL include an investigation on number marking (MacHadjah, 2016) and an ongoing research on size and shape constructions in GSL and AdaSL (Vidi Project, Leiden University).

1.4.1 Linguistic Research on Ghanaian Sign Language

Linguistic research on GSL is quite minimal. Although there is the tendency to consider linguistic features in ASL as similar to those in GSL (because of the history of GSL), it is not enough to view literature on ASL as same as GSL. This is because the relationship between ASL and GSL has not been systematically investigated. We do not know how similar or different ASL and GSL are linguistically. Therefore, this section will focus on linguistic research on GSL as opposed to considering what has been done for ASL (chapter 2 present review of literature on other sign languages including ASL). This section will not consider works on Deaf education, history of Andrew Foster and the problems faced by Deaf individuals as linguistic research.

The earliest linguistic research on GSL is attributed to Nancy Frishberg in 1987. This work distinguished GSL from AdaSL. The first linguistic documentation of GSL resulted in the first dictionary (Okyere & Boison, 2001) which was produced in 2001. The dictionary project was pioneered by the then leaders of the Ghana National Association for the Deaf (GNAD). This dictionary is currently out of print and some of the signs in this dictionary have been changed (e.g., changes in the articulatory parameters) and modified (less use of initialised signs) by the GNAD and therefore not all the signs in this dictionary are very representative of current GSL. Oppong (2007) is an updated GSL dictionary that has documented information on description of the signs. McGuire & Deutsch (2015) have developed a new print version of GSL dictionary that is a sequel to Okyere & Boison (2001). McGuire & Deutsch (2015) include most of the signs presented in Okyere & Boison (2001) and provides additional details about handshape, location, movement, and orientation. The dictionary is categorised according to different semantic categories and as such very useful for new learners of GSL. Other linguistic project on GSL include the first linguistic curriculum on GSL developed through funding from the British government in 2010. This project pioneered by Ulrike Zeshan, George Akanlig-Pare, Francis Boison and Marco Nyarko resulted in a couple of videos tailored to give practical lessons on GSL including phonology, morphology, and syntax. The initial documentation, curriculum development and teaching of GSL, has resulted in theses, papers, and presentations that investigates certain linguistic aspects of GSL. The following paragraphs in this subsection shall consider some of these linguistic research works on GSL.

Edward (2012; 2014) and Akanlig-Pare (2013) described some aspects of the phonology, morphology, and syntax of GSL. They developed comprehensive analysis on the main levels of linguistic analysis including phonology, morphology and syntax and compared it with spoken language. Specifically, the phonological descriptions have considered the Articulatory Parameters (Handshape, Orientation, Location and Movement), Nonmanual markers, Minimal pairs and Free variation based on recorded data taken from native GSL signers. The morphological description considered the simultaneous morphology of classifiers and verb agreement, and the sequential morphology of affixation and reduplication. Finally, the syntactic analysis investigated the different sentence structures and sentence types in GSL.

MacHadjah (2016) described number marking in GSL and working with students from a nearby School for the Deaf, he collected data from students representing ten regions of Ghana. MacHadjah's research identified several strategies that signers used to mark singular, plural, dual, paucal etc. The study investigated the phenomenon of number marking in GSL with the aim of presenting "an exhaustive description of how number is expressed on nominal categories and to show how sociolinguistic factors may affect the expression of number" (p. v). In his work, MacHadjah identified three strategies used to express number in GSL. These are lexical strategy (use of quantifiers, cardinal numbers, and conventional number lexicon), morphological strategy (use of affixation, co-articulation, reduplication, numeral incorporation and zero marking) and syntactic strategy (use of proform constructions and nominal number assignment within the verb phrase).

Recently, Edward has investigated different aspects lexical and grammatical iconicity in GSL and AdaSL (Edward, 2021, 2020, 2019a, 2019b, 2018c; Edward & Perniss, 2018, 2019). For example, Edward (2020) investigated iconicity in GSL (and AdaSL) in lexical items focusing on handheld tools. In this research, signers of (GSL) and Adamorobe Sign Language (AdaSL) were compared with rural gesturers (Adamorobe) and urban gesturers. Edward discusses signers and gesturers preference for instrument and handling strategies and the consistent use of iconic strategies across signers in each group. In a similar research, Edward & Perniss (2019) investigated the iconic encoding of spatial information in GSL and AdaSL. These comparative research works identified similarities and difference between GSL and AdaSL in the depiction of iconic lexical and grammatical constructions. The investigations of iconicity in GSL and AdaSL were taken from the preliminary analysis of the data for this dissertation.

1.4.2 Linguistic Research on Adamorobe Sign Language

The earliest mention of the term AdaSL was in Frishberg (1987), however, the most detailed linguistic research on AdaSL was done by Nyst (2007a). Since 2004, Nyst has made an enormous contribution to the linguistic research done on AdaSL, focusing on the general description of AdaSL to specific details like the expression of size and shape. Nyst's PhD dissertation describes in detail the phonology, semantics, expression of size and shape, expression of motion, kinship terms, expression of motion and location, iconicity etc. Other linguistic areas covered by Nyst include simultaneous constructions in AdaSL (2007b), possession and existence in AdaSL (2008), and size and shape depictions in AdaSL (2016a). Nyst's research on iconicity, expression of motion and location, simultaneous constructions, and size and shape depictions (Nyst, 2007a, 2007b, 2016a) in AdaSL are relevant for the current dissertation (considering the language contact between GSL and AdaSL).

Edward (2015a) investigated iconicity in AdaSL focusing on the expression of time, size and shape, directional verbs, emotive and cognitive signs. Edward concluded that different form and meanings mappings exist in AdaSL. The last paragraph of §1.4.1 give examples of current research on iconicity in AdaSL.

Annelies Kusters' work on AdaSL presents anthropological and sociolinguistic perspectives. Unlike Nyst (2007a) and Edward (2015a; 2015b) who perceive AdaSL as an endangered language, Kusters (2012a) is of the view that AdaSL is a thriving language because the users have positive views towards their language. She presents elaborate details on sociological and ideological issues and their effects on AdaSL and the signers. Kusters (2014a; 2014b; 2012a; 2012b; 2019) and Edward (2018a; 2015b) are important to the general understanding of the societal depiction of AdaSL especially from the sociolinguistic perspective.[15] Recently, Kusters has explored the language ideological assemblage in Adamorobe focusing on the signers' use of GSL together with AdaSL in Adamorobe (Kusters, 2019). Kusters explained that GSL is used mid-clause by both the adults and the young signers of AdaSL. Edward (2015b) also attest to the use of such lexical items in AdaSL discourses. Kusters and Edward list GSL signs such as ANGRY, KNOW, TIRED etc., to be used in AdaSL conversations.

[15] For further reading on Deaf culture and the livelihoods of Adamorobe deaf people, see some of the references from Kusters and Edward.

1.5 Vitality of GSL and AdaSL

A language's ability to thrive is largely dependent on the users of the language and its domains of use. The constant use of a language will ensure the language's survival, whereas the gradual decline in the use of a language will also mark the language as a possible candidate for endangerment. In every society, speakers/signers who are proud to use their languages try their best to preserve it and avoid possible encroachment that will lead to the loss of interest in using the language. GSL is a vital language and its domains of use makes it more viable to survive as a language used by the Deaf community in Ghana. It is used in all formal domains and as the language of instruction in Deaf institutions. Recently, some public and private tertiary institutions have started teaching GSL as an elective course or as a subject of study for hearing people. Free online mobile applications for GSL have recently been launched by the Ayele Foundation (n.d) and Leiden University's Lab for Sign Languages and Deaf Studies (2020) to facilitate the easy learning of GSL.[16] AdaSL on the other hand is used only in Adamorobe and is unknown to the wider Deaf community outside Adamorobe

Some Ghanaian linguists have gained interest in GSL and some linguistic research has been done in the Phonology and Morphology (Edward, 2014), Number marking (MacHadjah, 2016), lexical iconicity (Edward, 2020). AdaSL research started in the early 1980s and has seen several attempts to describe the language and give sociolinguistics information about the users (Frishberg, 1987; Nyst, 2007a, 2007b, 2010, 2016; Kusters, 2012a, 2012b, 2014a, 2014b, 2019; Edward, 2015a, 2015b, 2018a, 2018b; Okyere & Addo, 1994). However, as the research base of AdaSL increases, the more researchers identify the vulnerability of the language (Edward, 2015a, 2015b; Nyst, 2007a) or the vulnerability of the users of the language (Edward, 2018a; Kusters, 2012a; Kusters, 2019; Akanlig-Pare & Edward, 2000). Several comments are made by researchers in relation to AdaSL; (1) AdaSL is difficult to learn (Kusters, 2011), (2) AdaSL signing is hard (Kusters, 2019; 2014b), (3) AdaSL signers love their language (Kusters, 2012a), (4) some AdaSL signers will choose GSL over AdaSL (Kusters, 2019) and (5) AdaSL is at risk of being endangered (Edward, 2015a; Nyst, 2007a).

The major contributing factor to the gradual endangerment of AdaSL is the death of older users of the language. Other contributing factors include the high rate of immigrants to the community, which has gradually increased the total number of people in the community and thereby making the Deaf community in Adamorobe more minority than they were before (Edward, 2015a; Edward, 2015b; Kusters, 2012a; Nyst, 2007a). This is facilitated by the

[16] http://www.ayelefoundation.org/dictionary/
https://play.google.com/store/apps/details?id=com.ljsharp.gsldictionary&hl=en_GB

opening of job opportunities and the availability of lands for real Estate Developers[17] and farming purposes. The community had three mineral water companies as of 2016 and in an interview with a hearing signer (personal interviews conducted in September 2016) of the community, he stated that "the land has water" and that seems to have attracted the water companies. In 2007, Nyst reported that Adamorobe had one school, however the community can now boast of four other private schools in addition to a government basic school (personal surveys done in 2016).

The marriage law which for a long time prevented marriage between two deaf people has ultimately led to many childless marriages among Deaf couples (Kusters, 2012a; Nyst, 2007a; Edward, 2018a). Although some Deaf people defied the marriage law, they avoided having children after marriage. Again, migration of deaf people into different communities in search of work or for marriage (Edward, 2015b; Kusters, 2014; Kusters, 2012a; Nyst, 2007a) and formal education of the young deaf people into GSL have led to a gradual decline in AdaSL use. Finally, religious activities have contributed to the gradual shift to GSL (Edward, 2015b).

1.6 Previous Linguistic Research on sign languages in Africa

This section will give a background on the linguistic research on African sign languages. African sign languages can be grouped into urban and village sign languages and they have typological features similar to what was described in §1.1.3. In most cases, the rural sign languages are indigenous to the communities of use and the some of the urban sign languages begun as products of Deaf education and have incorporated linguistic items from other sign languages with the greatest influence being ASL as a result of Andrew Foster's educational tours across Africa. In this section, more emphasis will be given to sign languages used in Ghana as both GSL and AdaSL, the sign languages for the current dissertation are used in Ghana.

Research on sign languages used in Africa is quite recent as compared to research on American and European sign languages. As noted by Nyst (2010 p. 405) studies on sign languages in Africa (with focus on West Africa) are "very rare and for a number of countries information is completely lacking" while others have available "only bits and pieces of information". Asonye et al. (2020) reiterated the gradual endangerment of signed languages

[17] From 2016 to 2018 (during data collections) the following estate developers and businesses were found at Adamorobe; Elite Kingdom, Bessblock Factory, Beige Capital estate, Vaettel water company, Mobile water company and Maya water company.

used in Africa, which is claimed to be caused by contact with spoken languages, local laws, formal education, and other post-colonial ideologies. In other words, African sign languages are “gradually being battered by social and educational policies” and “apart from village sign languages, many African countries can also boast of national sign languages” (Asonye et al. 2020 p. 337). Coupled to the so-called linguistic genocide of African sign languages is the fact that African sign language linguistics is quite recent and not popular among African linguists.

Notwithstanding the late entry of African sign languages into the linguistic domain and the rarity of research on most sign languages in Africa, linguists have carried intriguing and ground-breaking research on the different linguistics domains. Most of the research on African sign languages were carried by hearing or deaf foreign linguists and a handful of deaf (or hearing) African linguists. Much of the earlier research on the linguistics (and sociolinguistics) of African sign languages were carried out by foreign linguists Frishberg, 1987; Schmaling, 1997, 2003; Nyst, 2016a, 2016b, 2012, 2010, 2007a, 2007b (and many others); Kusters, 2019, 2015, 2014; 2012a, 2012b, 2012c Morgan, 2017). For instance, since 1999, Nyst has investigated sign languages in Ghana, Mali, Burkina Faso, Benin, and Cote d’Ivoire. In fact, most African universities do not have the linguistic study of sign languages and the few that run such programmes tend to be more hearing students centred than deaf centred. The remaining paragraphs in this section will present linguistic research on different African sign languages.

On sign languages used in Nigeria, a handful of research has been identified. The first comprehensive account of a West African sign language was produced by Constance Schmaling (1997) on Hausa Sign Language (HSL), the language used by deaf people in the Hausa-speaking areas of northern Nigeria. In this work, Schmaling did a descriptive analysis of HSL and a detailed introduction of the deaf community in Kano. Schmaling’s work on HSL is an important research on sign languages in Africa as it became the foundational material for subsequent research on African sign languages. In addition to Schmaling’s works on HSL, other researchers have investigated both indigenous and school-based sign languages used in Nigeria (Asonye et al. 2018; 2020; Asonye & Edward, forthcoming; Blench & Warren, 2006). Both Schmaling (2003) and Asonye et al. (2020) considers the impact of foreign education and ASL on both the indigenous and school-based sign languages in Nigeria. Blench & Warren present a brief report on Bura Sign Language used in Northeast Nigeria.

Akach (2010) considered the application of South African Sign Language (SASL) in a Bilingual-Bicultural Approach to educating the Deaf. He contextualised the challenges of deaf education in South Africa and pinpointed that the issue of sign language in a bilingual-bicultural education for the deaf in South Africa is a complex matter. Aarons & Morgan (2003) examined SASL and some of the possibilities that the language offers in the use of *classifiers* and the creation of *multiple perspectives* on an event. They identified the use of *constructed action* and *simultaneous* perspectives which could be shifted back and forth in an utterance. Penn & Reagan (1994) investigated the properties of SASL and concluded that the language has a high degree of lexical diversity but a common syntactic and morphological base for all the different varieties.

Lutalo-Kiingi (2014) investigated the linguistic structure of Ugandan Sign Language (UgSL). His work produced a description of the morphosyntax of UgSL as an attempt to describe the morphosyntax of an African sign language. Morphosyntactic domains investigated in this work include number & quantification.

Other research on African sign languages includes a description and analysis of the basic phonological components of the Kenyan Sign Language (KSL) lexicon used in the southwestern region of Kenya (Morgan, 2017). Morgan's research contributes to discussion in three domains; the descriptive domain, the methodological domain, and a theoretical contribution (comparing how different models of sign language phonology can account for the sign types in KSL). Morgan (2015) also discusses lexical and phonological variation in KSL in two types of signed words: compounds and iconically motivated words, at different stages of conventionalisation and argued that form-meaning matching of iconic elements may be as central to sign languages as are the phonological elements. In other research, Hwang et al. (2017) investigated patterned iconicity in different semantic categories and KSL was one of the languages investigated (based on a KSL corpus by Hope Morgan).

One other African sign language that has received academic attention is the Ethiopian sign language. Admasu & Raimond (2010) have investigated Ethiopian Sign Language (EthSL) recognition using Artificial Neural Network. Duarte (2010) researched on the Mechanics of Fingerspelling and concluded that EthSL "fingerspelling system requires the use of simultaneous morphology to represent a linear string of Amharic fidels" and "[t]his is in contrast to ASL and other Western signed languages" which use mainly single-segment signs sequentially to represent English letters in the same order (Duarte, 2010 p. 19). Tamene (2017; 2016) present different sociolinguistic studies on EthSL. For example, Tamene (2017) touches on multiple aspects of Deaf lives in Ethiopia and identify that members of the

Ethiopian Deaf community show positive attitudes towards the use of their sign language but there are still gaps in the support ad recognition of EthSL. These gaps according to Tamene poses a threat to the vitality of the language.

Other research on African sign languages have been done for countries like Mali (Nyst, 2015; Nyst et al., 2012) and Cote d'lvoire (Tano, 2016; Nyst & Tano, 2016). Tano (2016) dissertation on Bouakako Sign Language (LaSiBo) described some aspects of LaSiBo and compared it with AdaSL. Tano focused on the phonological description of LaSiBo, and studied other lexical domains such as kinship, colour, numeral, monetary system, and time.

1.7 Scope of thesis

The thesis is divided into 5 parts, and each part concentrates on specific discussions and topics. Part 1 presented in this chapter gives the general introduction to the thesis. Part 2 encompasses chapters 2, 3 & 4 and these present the preliminaries including literature review, the theoretical background, and the research methodology. Chapters 5, 6, and 7 represent part 3 and these focus on the data analysis. Chapter 5 presents the analysis of lexical iconicity with focus on the similarities and differences in lexical signs representing five semantic categories. Chapters 6 & 7 present the analysis of the language data with focus on domains of iconicity and the systematic differences and similarities in iconicity in grammatical constructions. Part 4 (chapters 8) compares the theory with the data and analyse the various strategies used by signers of GSL and AdaSL using cognitive approaches. In other words, part 4 presents a cognitive analysis of the strategies mentioned in chapters 5-7 (and in the preliminary chapters of the work). Part 5 (chapter 9) presents the summary and conclusion and outlines the contributions of this research work.

The focus of part 2 is to set the background for more in-depth discussion in subsequent parts. The reader is also introduced to spoken language iconicity. Chapter 2 begins with a review of sign language linguistics and earlier works on iconicity in language; the domains of iconicity; the representation of iconicity; the different linguistic and cognitive strategies that are employed by users of languages and the focus of the dissertation. This is followed by an overview of the enterprise of cognitive linguistics (CL) in chapter 3. Very important to this discussion is the CL notion of *construal* that encompasses several themes (specificity, focusing, prominence, perspective, etc.). Other discussions on *cognitive iconicity* as postulated by Wilcox (2004) (i.e., its tenets and principles) are highlighted and explained. Chapter 3 presents the conceptualization of the sign articulators which is relevant for the cognitive discussions in part 4 (chapter 8). Finally, a description of the research methodology and the methods used in this dissertation are presented in chapter 4.

The first section of part 3 presents the analysis of lexical iconicity comparing GSL and AdaSL signers (and then with non-signers). The visual-gestural modality contributes to the ineliminable presence of iconicity in the lexicon of sign language. Chapter 5 compares lexical similarities and differences between GSL and AdaSL with data elicited with images of Household tools and objects. Relevant in part 3(a) are the iconic strategies (including *handling, instrument, entity, tracing, measuring, presentable action* etc.) signers used to depict these tools and objects that represent five semantic categories (Handheld tools, Clothing & Accessories, Furniture & Household items, Appliances and Nature). Important in the discussion on lexical iconicity is consistency in using the iconic strategies across signers and across language groups. The lexical data from signers is compared with gestures of non-signers to identify the similarities and differences in preferences of iconic strategies for sign and gesture. The lexical results from part 3(a) support previous studies on lexical iconicity in the visual-spatial modality. For example, signers use of specific strategies for different semantic categories aligned with other studies on lexical iconicity.

The second section of part 3 compares signers' expression of location, motion and action using narratives of the Pear Story. In the visual-gestural mode of sign language, event narratives rely extensively on spatial depictions. The iconic use of space in spatial constructions (e.g., using classifier predicates, constructed action) is discussed in GSL and AdaSL. Most importantly, chapter 6 focuses on the iconic strategies and perspectives used by signers to depict location, motion and action events, signers' choice of perspectives in narrative events and the strategies that are used in *prototypical* and *non-prototypical* alignments[18] (strategies and perspectives). Finally, chapter 7 presents comparative data on signers' use of simultaneous constructions (SC). The specific iconic strategies signers employ in SC to express location, motion and action are presented. This chapter also addresses signers' depiction of events, referents, and animate/inanimate representations through SC. Some of the results in part 3(b) (iconicity in grammatical constructions) do not corroborate findings from previous research on AdaSL. However, the research methodology used (stimulus material) and language contact are hinted at as possible indicators of this lack of corroboration.

[18] To be explained in chapter 6.

Part 4 addresses the nature of iconicity with cognitive linguistics approaches. The analysis in this part compares theory (cognitive perspective) with data (GSL and AdaSL). A qualitative analysis on iconicity as the relation between construals of real-world scenes and construals of form is conducted in part 4. Some of the topics discussed in parts 2 and 3 are revisited and compared with the data from the sign languages. Part 4 argues that the knowledge of language is experiential, and the individual and community experiences contribute to the differences and similarities with linguistic units. In other words, signers' ability to choose one iconic form over the other is as a result of our cognitive abilities to represent linguistic forms with meaningful phonological forms.

Part 5 presents the conclusion of the dissertation. It gives a summary of the various domains investigated in the thesis and outlines the theoretical and methodological implications of the dissertation. Part 5 argues that the emergence of entity classifiers for motion event in the AdaSL data could be as a result of language contact (through borrowing), the nature of the stimulus material (choice of video) or an expression of a diachronic change taking place in AdaSL.

Returning to part 1, I have given the background information regarding GSL and AdaSL (both linguistics, social demographics, and sociolinguistics). Presented in part 1 is a brief introduction to the linguistic notion of iconicity, the typological classification of GSL and AdaSL and the language contact between GSL. These topics in part 1 have been presented to inform the reader of the trend of discussion that will be expected in subsequent chapters considering all the background information provided. This dissertation presents the analysis of a structured research tailored to give adequate information on the strategies for iconic mappings (lexical and grammatical domains) in urban and rural sign languages (GSL and AdaSL) using picture and video elicitation tasks.

PART 2

PRELIMINARIES

The chapters in part 2 provide the preliminary background of the dissertation. Chapter 2 provide a background of sign language linguistic research and iconicity. Chapter 3 provide an overview of the cognitive linguistic framework and the general discussion of iconicity based on cognitive perspective. Finally, the research methodology for this dissertation is described in chapter 4 highlighting the approaches for data collection, data analyses and the use of quantitative and qualitative research methods for the data analyses.

Chapter 2

Sign Language Linguistics and Iconicity in language

2.0. Introduction

Plato's Cratylus presented the question of whether names for things "look like the thing it stands for or is quite indifferent to such things" (Simone, 1995, p. vii). The question of arbitrariness and iconicity has been an age long debate among linguists and the discussion of this topic relates heavily to the works of De Saussure and Peirce. De Saussure was of the view that there is "arbitrariness of the sign" (*l'arbitraire du signe*) because the connection between signifier (word/sign) and a particular signified (concept) was arbitrary. To Saussure, language is arbitrary and linguistic forms of human language do not match up to the reality. In other words, /dɒg/ does not match up to a four-legged animal. Peirce on the other hand postulated that the sign (linguistic unit) has three categories; icon, index, and symbol: i.e., Pierce discussed all kinds of relations including the resemblance relation between form and meaning (icon). The icon refers to a sign that resembles something and there emerges the notion of iconicity. Over the centuries, the Saussurean paradigm of *l'arbitraire du signe* has been accepted as the *received view* and linguistic works have been produced to hold on to this fact. This view so held above every other that it prevailed even in defining the design features of human language; arbitrariness is quoted as one aspect that makes it a full-fledged language in contrast to other communication systems (Hockett, 1960).

Although the history of linguistics has demonstrated a prevailing notion of language as arbitrary only, several approaches to linguistics have demonstrated the reality of linguistic iconicity and the obvious symmetries between linguistic form and the perceived experience. The study of linguistic iconicity is usually limited to structure preserving and one-to-one connection between form and meaning referred to as *isomorphism*. The term isomorphism refers to "the one-form-one-meaning relation describing correspondences of elements and relations" (Ramat, 1995, p. 122). Further, the idea that there should be a one-to-one correspondence between the linguistic code and the perceived experience (isomorphism) gives language a tri-partite relation. This tri-partite relationship could also hold for non-iconic mappings. For example:

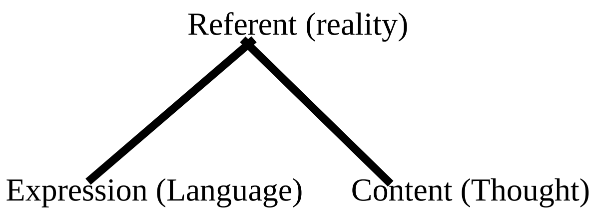


Figure 2.1 Language relations

For a long time, sign language linguists avoided the discussion of iconicity because "admitting the existence of iconicity in sign languages was admitting that sign languages were not real languages, certainly not as real as spoken languages whose forms were supposedly arbitrary" (Valli & Lucas 1995: 6, c.f. (Wilcox, 2004, p. 121)). In fact, Frishberg was of the view that iconicity in sign language grammar erodes over time and that "ASL now is replacing its icons with symbols" (Frishberg, 1975, p. 718). These views on the frivolous nature of iconicity in sign language relegated iconicity to the background.

Earlier discussion at the Milan Conference[19] made claims like "[o]ral speech is the sole power that can rekindle the light God breathed into man" (Lane, 1984:393, c.f. (Wilcox, 2004, p. 121)). Therefore, advocating iconicity as a design feature of sign languages became controversial because of the opposition faced by sign linguists; first on the acceptability of sign language as a full-fledged human language and second, that sign languages were mere pantomimes. However, iconicity in language goes beyond pantomimes and mimetics, it is a collaborative relationship between the form (phonology) and the meaning (semantics) of the sign in a conceptual domain (symbolic structure) that shows a relationship between real world actions and the linguistic representations (Wilcox, 2004).

Two concepts are relevant in the linguistic theory of iconicity and these are imagic (or imagistic) iconicity and diagrammatic iconicity. These two concepts were first developed by Peirce and he referred to these two as hypoicons (Pietrandrea & Russo, 2007). Images have perceptual features that are common with the object of reference and diagrams represent a diagrammatic relation of parts of the object. Imagic iconicity is prevalent in sign languages and it deals with visual perception between the sign and what is being referred to. Diagrammatic iconicity is concerned with structural (or relational) similarities between the sign and the referent.

This chapter is arranged as follows: §2.1 considers sign language linguistics by presenting a review of the main linguistic levels of analysis. §2.2 introduces iconicity in spoken and signed languages and gives detailed information to enable the reader to understand iconicity from both spoken and sign language perspectives. §2.3 presents an introduction to the cognitive reality of iconicity in sign language (and it precedes discussions

[19] The Milan Conference in 1880 brought on board Deaf educators from different countries. The resolution of the Conference was that oral education was better than manual (sign) education. The President of the Milan Conference, Giulio Tarra quoted that "[g]esture is not the true language of man which suits the dignity of his nature. Gesture instead of addressing the mind, addresses the imagination and the sense" (Lane 1984:393, c.f. Wilcox 2004:121).

in chapter 3 and chapter 8). §2.4 to §2.6 present a review of the main levels of iconicity relevant for this dissertation. §2.4 looks at lexical iconicity, §2.5 considers space and iconicity and §2.6 considers simultaneous construction in sign languages. § 2.7 presents the focus of the dissertation. Finally, §2.8 presents the summary of the chapter.

2.1 Sign language linguistics

The linguistic study of the internal structure of sign language began after the monograph of William Stokoe that studied the formational structure of signs (Stokoe, 1960). After Stokoe's monograph, several linguists have conducted other research on the internal structure of sign languages of the world; for example, Valli, et al., (2011) on ASL; Johnson & Schembri (2007) on Australian Sign Language (Auslan) and Sutton-Spence & Woll (1999) on BSL. The linguistic structures of sign languages have been compared with that of spoken languages (Sandler & Lillo-Martin, 2006). However, when we compare signed and spoken languages, we must present linguistic structures and rules that are specific to their modality representation (Wilcox & Wilcox, 1995). The modality difference between signed and spoken languages demands a comprehensive approach to do a comparison. Although basic linguistic features like phonology, morphology and syntax are shared by both signed and spoken languages, modality restrictions apply to how each linguistic feature is revealed. The rest of this section will present a review of the main linguistic levels of analysis of sign language linguistics.

2.1.1 Phonology

Defining sign language phonology, Brentari stated that it is "the level of grammatical analysis where *primitive structural units without meaning* are combined to create an infinite number of meaningful utterances" (Brentari, 2002, p. 59). This definition is general to phonology as defined within the structuralist views of language. In the cognitive linguistics view, the structural units of the sign are either meaningful or meaningless depending on the closeness of the form to the meaning. The formational properties of signs are built on four distinct articulatory parameters and these are the Handshape (HS), Movement (Mov.), Location (Loc.) and the Orientation (Orn.)[20] (Stokoe, 1960; Battison, 1978). The hands are the active articulators for manual signing and the nonmanual markers rely on the face, the mouth, and other bodily expressions.

[20] In subsequent mention, I will use the abbreviation in parenthesis to refer to articulatory parameters.

Handshape (HS)

The hands are the basic articulatory organs in sign language. Handshape (HS) basically refers to the shape of the hand used in signing. The HS parameter in sign language is the most versatile phonological parameter. This versatility is caused by the availability to use the hands to create many distinct shapes. From one handed HS to two handed HS, signers can create simple and complex signs using the hands. The individual fingers can be bent, wiggled, spread etc. HS variations exist across sign languages because there are different handshape inventories.

HS parameter is relevant for the dominance and symmetry conditions. The dominance condition states that when only one hand moves, the hand will have the same HS, or the non-dominant hand's HS is a simple, unmarked HS. The dominant HS is the active articulator, and this refers to the right hand for right-handed signers and the left hand for left-handed signers. The non-dominant HS is the hand that is acted on in two-handed signs in which only the dominant hand moves. The symmetry condition states that when both hands move, the HS of the two hands should be the same. There are several handshapes in GSL and AdaSL (see Figures 2.2 for GSL and 2.3 for AdaSL). The alphabet and number handshapes are not the same as the handshape inventory (phonologically speaking) in a sign language. There are overlaps between the HS inventory and the alphabet and number HS, and letters of the alphabet HS are often used as a convenient way of naming HS of the HS inventory (see Figure 2.2). Important to note in relation to HS is that there are also signs in AdaSL that rely on other parts of signer's body as the active articulator. For example, the foot is used in signing FOOTBALL, the toes sometimes added in counting higher numbers, the body for signing CHAIR etc.

There exists a considerable amount of iconicity in the HS parameter. Iconic HS have resemblance relationship between the form and the meaning. On the other hand, some HSs have non-iconic relationships and do not evoke any form-meaning resemblance relationship.

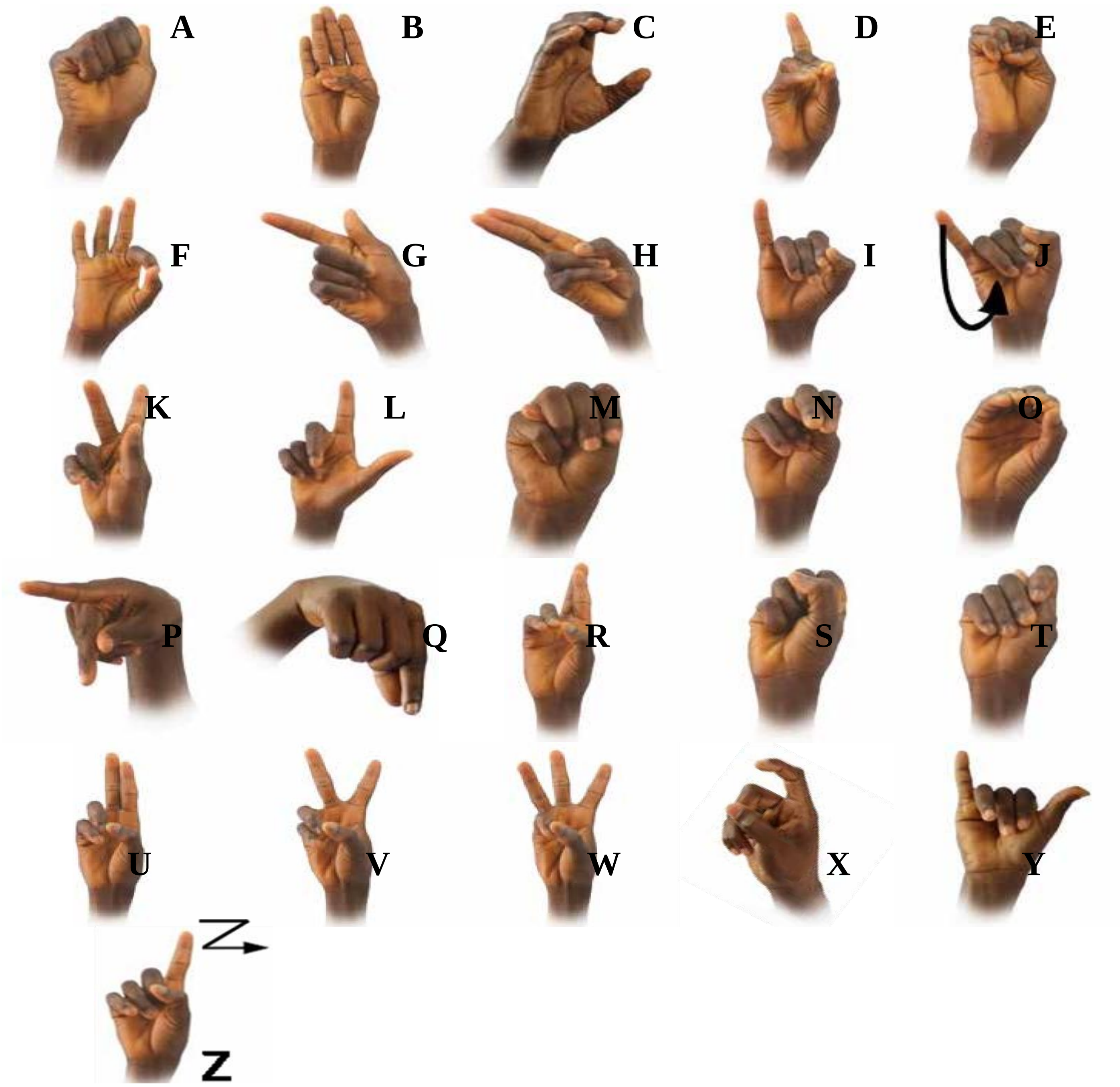


Figure 2.2 GSL alphabet Adapted from McGuire & Deutsch (2015, p. 2)

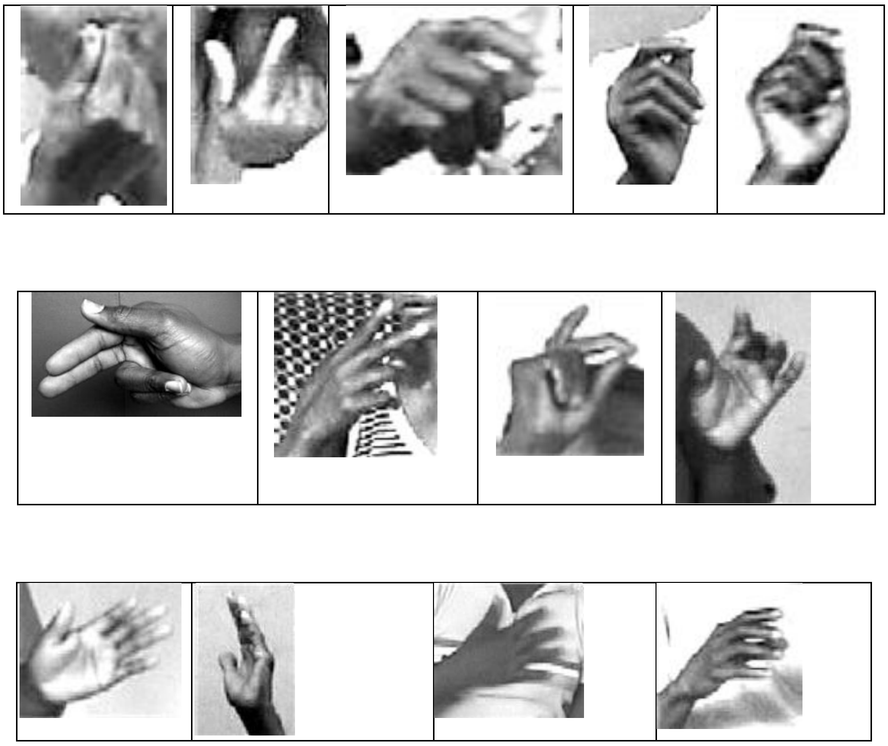


Figure 2.3 Different Handshapes in AdaSL. Figure reprinted by permission of the author (Nyst, 2007a, pp. 57-58)

Location (Loc.)

The location (Loc.) is used to refer to the places on the signers' body or in the space around signers (signing space) where signing takes place (or where we place the HS). Signing space is the area in front of the body or the locations on the body where signing is restricted to. It usually starts from the head (or the space above the head) to the waist. It is generally the space that is visible to the interactants in a sign communication. Sign locations vary from language to language. Although Loc. is usually limited to specific locations on the body and in space, AdaSL has other signs that are located outside the more general signing locations. These include locations such as the rump (SYRINGE), the knee (for some sign names). The location of signs in GSL and AdaSL can either be body anchored or in neutral space (see Figure 2.4 for examples of body-anchored signs in GSL and AdaSL). Location can be iconic or arbitrary whether it is body anchored or at a neutral space. There are some signs that tend to represent themselves, i.e., pointing to the mouth to represent the mouth is known as self-symbolization (Wilcox, 2004). Self-symbolization has meaningful locations.

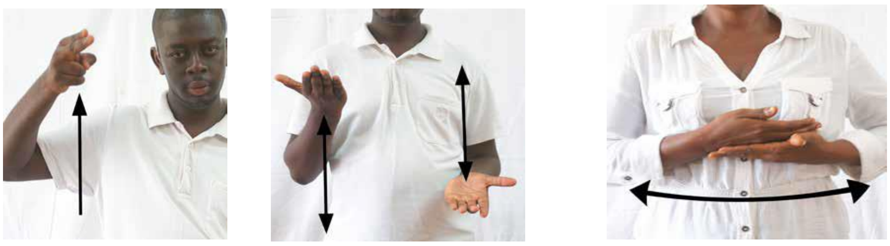
Johnston & Schembri (2007) distinguished between primary and secondary locations in sign language. They defined primary location as the locations on the body (or at the neutral space above, in front, or by the side of the part of the body) and secondary location as the non-dominant hand as the place of articulation.

chest- WOMAN head- COMB rump- SYRINGE cheek- MOBILE PHONE

Figure 2.4 Different locations in AdaSL and GSL

Movement (Mov.)

Movement (Mov.) refers to the movement of the hands in signing. Movement may involve the HS moving towards the signer, away from the signer, straight, curvy etc. The movement could involve one hand or two hands and this can be described with the dominance and symmetry conditions explained above. In GSL and AdaSL two handed signs involved in different movement patterns at the same time are rare and this aligns with the dominance and symmetry constraints proposed by Battison (1978). Movement is employed both in lexical signs and classifier predicates expressing existence, location, movement, action of an entity. Movement can be categorised into path movement and internal movement (Johnston & Schembri, 2007). Path movement is the movement from one location to the other and internal movement involves changes in handshape and orientation. Johnson & Schembri listed 10 major types of path movement and these are up, down, up & down, sideways, side to side, away, towards, back & forth, horizontal circular and vertical circular. Figure 2.5 present examples of signs with path movement from GSL.



HIGH (up) MAYBE (up and down) BABY (back and forth)

Figure 2.5 Examples of path movements in GSL. Images adapted from McGuire & Deutsch (2015)

Internal movement includes changes in the handshape and orientation, the change can cause HS to close, open, spread, bent, hooked etc. Examples of signs with internal movement include UNDERSTAND ("S" hand on your temple and flick open the index finger) and SPREAD

(O HS of both hands touch the mouth then spread your hands forward while opening your fingers) in GSL as shown in Figure 2.6. Internal movement and path movement can be combined in sign creation.

UNDERSTAND SPREAD

Figure 2.6 Examples of internal movements in GSL. Images adapted from McGuire & Deutsch (2015)

Orientation (Orn.)

The orientation (Orn.) parameter refers to the direction of the palm in signing. Orientation as a phonological parameter in sign language linguistics was added by Battison (1978). The orientation of a signer can be upward (BOWL), downward (TABLE) or away from the signer (PAINTBRUSH) as exemplified in Figure 2.5. There are some signs that are differentiated by the orientation of the palm. For instance, CHILDREN and THINGS (GSL)[21] in Figure 2.7 are differentiated by orientation. CHILDREN is signed with the palm oriented downward and THINGS signed with the palm oriented upward. All parameters (HS, Loc., Mov., and Orn.) are contrastive and these contrast produces minimal pairs which are different in just one parameter.

BOWL (upward) TABLE (downward) PAINTBRUSH (away) CHILDREN (downward) THINGS (upward)

Figure 2.7 Different palm orientations

2.1.2 Morphology

Morphology deals with the analysis and description of the internal structure of words/signs. Morphemes are the basic unit of meaning and are used to create words and signs. A

[21] Images for CHILDREN and THINGS adapted from McGuire & Deutsch (2015)

morpheme can be free or bound. Free morphemes in sign language can stand on their own and bound morphemes would have to attached to another bound morpheme or a free morpheme. The internal structure of signs may be monomorphemic (one morpheme), and others are a combination of two or more morphemes.

The morphology of sign languages has been widely studied over the years (Aronoff, et al., 2005; Johnston, 2005; DeMatteo, 1977). The existence of lexical and sub-lexical levels of organisation in sign language permit morphological analysis to be done (DeMatteo, 1977). Furthermore, studies on sign language morphology have demonstrated that sign languages have mechanisms for developing complex word-internal structures like compounds, affixes, reduplication etc. (Morgan & Woll, 2007; Aronoff, et al., 2005; Valli, et al., 2011; Kubuş, 2008; Edward, 2014). Generally, derivational morphology (sign /spoken languages) creates new words while the inflectional morphology adds grammatical information to the units that already exist. The following paragraphs will discuss some morphological processes in sign language.

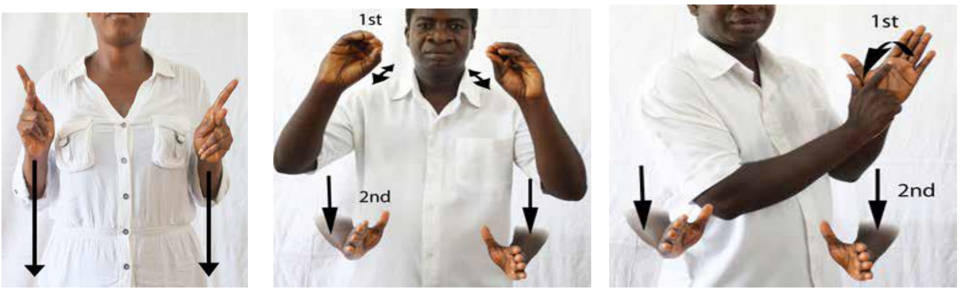
Classifier handshapes are morphemes that express particular configurations. Classifiers are morphemes with a non-specific meaning, they represent salient characteristics of the entities they denote (Zwitserlood, 2012). An example is the index finger  which is the classifier for long thin entities like person, pole, tree etc. (see Figure 2.13). When these morphemes or handshapes are combined with motion, location etc. to form complex predicates that show or express information about the size and shape, handling, location and movements of referents they are known as *classifier predicates* (Perniss, et al., 2007).[22] Classes of classifier predicates include (1) entity classifiers which shows the handshape representing the entity as a whole and depicting either size or shape; (2) handling classifiers where the hand shows how the referent is manipulated or handled (see (Perniss, et al., 2007; Emmorey, 2003)); (3) limb classifiers where the handshape represent the limbs (legs, feet, paws etc.).

Another example of the complex morphology of sign language is verb agreement also known as directional verbs. Signers encode person and location by creating or establishing meaningful locations in sign space. The verb moves from one meaningful location to another

[22] In other words, classifier predicates involve handshapes and movement morphemes combined in certain ways to depict a figure, a figure at a location, or in motion, the path of the figure etc. Another approach to the analysis of core and classifier signs is through Construction Morphology as discussed by Lepic & Occhino (2018).

(Morgan, et al., 2006). GIVE is an agreement verb and uses syntactic locations to mark person and location.

Affixation is the addition of affixes to a sign base and it is an attested morphological process in signed languages. In sign language morphology, derivational affixes are added to create new words. In GSL, the agentive marker is a derivational affix attached to verbs to create nouns. Examples include the following: TEACH+PERSON=TEACHER, LAW+PERSON=LAWYER as exemplified in Figure 2.8. In GSL, the agentive marker undergoes morphophonological changes when it attaches to the base, i.e. the handshape changes. The P-HS for PERSON changes to a flat HS (a variant of B-HS) when attached to the verb to create the noun.



PERSON TEACHER LAWYER

Figure 2.8 PERSON in citation form and as an affix. Images adapted from McGuire & Deutsch (2015)

Reduplication is another morphological process that occurs in signed languages. Reduplication comprises a repeated movement (see CHILDREN and THINGS in Figure 2.7). Reduplication may also be derivational and result in a change in the grammatical category of the word (i.e., noun-verb derivation e.g., CAR from DRIVE in GSL).

CONCEPTS	**SINGULAR**	**PLURAL**
THING/ THINGS	The B handshape moves once or twice.	The B handshape move several times.
	VERB	**NOUN**
DRIVE (verb) CAR (noun)	S handshape of both hands which is moved as if controlling a sterling wheel. DRIVE is signed with a larger movement than CAR. Drive is also modified with forward and back movement and facial expressions.	S handshape of both hands is moved as if controlling a sterling wheel. CAR has a smaller movement than DRIVE.

2.1.3 Syntax

The syntax of sign languages has been shown to display many characteristics found universally in spoken languages (Sandler, 2010; Aarons, 1994). Sign languages have word classes like nouns, verbs, adjectives, adverbs, determiners, preposition etc. Complex and simple constructions exist in sign languages and linguistic rules are applied “to create sentences of ever increasing complexity” (Sandler, 2010, p. 9).

Syntactic information is presented both manually and nonmanually in sign languages. Manual information depends on the linguistic arrangement of signs whereas nonmanual syntactic information depends on facial expression, eyebrow raising, shrugging of the body etc. In GSL, for example, Wh- words appear last in a sentence and this applies to many sign languages of the world (where specific signs are rendered last in a string of signs). Also, negative constructions can be syntactically represented either manually (by the sign NOT) or nonmanually (by a head shake) in GSL (Edward, 2014).

The nonmanual markers (NMM) in sign languages rely on facial expression and the position of the body. NMM include tilting of the head, shrugging of the shoulders, eyebrow raising, head nod etc. Also, Question forms and Declarative sentences in GSL are differentiated by using facial expressions. For instance, the sentence, “It is finished” realized in GSL as FINISHED can either be a question or a declarative sentence depending on the signer’s facial expression and other nonmanual makers used. Head nod will indicate affirmation in the AdaSL and GSL (Edward, 2014).

2.1.4 Semantics

The semantics of language makes languages meaningful. Distinct types of meaning can be associated to sign language grammar; referential, social and affective meaning, hyponymy, synonymy, antonymy, converseness, metaphor, expressive, descriptive, metonymy etc. (Valli, et al., 2011; Johnston & Schembri, 2007; Taub, 2001; Wilcox, 2000; Wilcox, et al., 2003). Natural sign languages are not artificial sign systems or sign codes for a spoken language. Signs have a direct relationship to concepts/meaning in the same way that words have a direct relationship to concepts/meaning (Johnston & Schembri, 2007).

Lexical items have different relationships and in sign language, part/whole relationship (synecdoche) and metaphor are widely used. Part/whole relationship are expressed in signs which represent an object using a part of it to represent the whole (using the whiskers to represent a CAT in Figure 2.12). Metaphors have extended meanings that take items from a semantic domain and express it terms of another. For example, FORGET in Figure 2.12 is an example of metaphor in GSL. Both part/whole relationships and metaphors are iconic representations in sign language. Metaphors in sign languages rely strongly on iconicity and Meir (2010) refers to these as conceptual metaphors. These conceptual metaphors involve the mappings between two domains. According to Meir, these “two domains are two conceptual fields, usually one more abstract than the other” (Meir, 2010, p. 875). The concrete domain is often drawn from our sensorimotor experience and the abstract domain from our subjective experience.

2.2 Iconicity in spoken and signed language

Recent linguistic investigations have demonstrated that the ubiquitous influence of iconicity is present in both spoken and sign modality but more productive in sign languages (Occhino, 2016; Perniss, et al., 2010; Wilcox, 2004; Taub, 2001, Dingemanse, et al. 2020). Linguistic research on iconicity in language has been done extensively for spoken and signed languages. In spoken language, iconicity has been discussed in relation to phonological iconicity (Fischer, 1999), morphological iconicity (Bybee, 1985), and iconicity in syntax (Givón, 1985). In sign language, the discussion on iconicity has focused on lexical iconicity (Padden, et al., 2013; Kimmelman, et al., 2018; Hwang, et al., 2017) and other grammatical levels of iconicity (Özyurek & Perniss, 2010; Wilcox, et al., 2003; Perniss, 2007a). An investigation of iconicity in spoken language will help understand structural and modality differences between spoken and signed languages. The remaining parts of this section will review examples of previous research on spoken language and sign language iconicity. The detailed information given in this section will enable the reader to understand iconicity from both spoken and sign language perspectives and to make comparisons where necessary. Furthermore, the discussion of iconicity in sign language presented in this section will give general examples of iconicity in sign language.

Users of language use several means to express iconicity in their languages. For spoken language, this is largely dependent on the sound pattern, the morphology, and the syntax. Several linguistic strategies are employed by users of language to mark iconicity both within the verbal and sign domains. For instance, in spoken language, iconicity exists in onomatopoeic sounds like *bang*, *tweet*, *buzz* etc. and in sign language, a resemblance relationship between the object and its referent like  HOUSE in GSL (handshape resemblance to the roof of a house). Although spoken language has less iconicity than signed language, Taub pointed out that spoken language shows many other kinds of motivation in its patterns of form and meaning (Taub, 2001) as will be discussed in §2.2.1.

2.2.1 Iconicity in spoken language

Phonological Iconicity

The first and most cited evidence of iconicity in spoken language is phonological iconicity (Fischer, 1999; Masuda, 2007; Schmidtke, et al., 2014). The evidence of phonological iconicity in spoken language is seen in onomatopoeia, ideophones, mimetics, expressives etc. (Schmidtke, et al., 2014; Perniss, et al., 2010; Dingemanse, 2012; Edward, 2015a), and these are perceived as sound symbolisms. The existence of these linguistic features reiterates the idea that some speech sounds are motivated to reflect real-world actions or sounds (e.g. ideophones, onomatopoeia etc.). Phonological iconicity is classified into two; direct phonological iconicity and indirect phonological iconicity (Masuda, 2007).

Direct phonological iconicity refers to the group of words commonly known as onomatopoeia and includes the linguistic expression of animal sounds, human sounds, and other external sounds. Direct phonological iconicity can be made of non-lexical and lexical words; non-lexical does not produce a recognisable lexical structure and lacks the structure to be an accepted word in the language (basically sound effects like *bzzzz, brrrrr*, (Masuda, 2007)). Indirect phonological iconicity refers to sounds that do not refer to any acoustic signal (i.e. their iconic processes do not involve direct correspondence) and they express sensation, movement, feeling, size or colour such as *teeny-weeny* (Masuda, 2007). Fischer (1999) presents phonological iconicity based on auditory iconicity, articulatory iconicity, and associative iconicity. Auditory iconicity refers to non-lexical and lexical onomatopoeia; articulatory iconicity refers to the role of vowels in determining the sizes (e.g. in Akan, /ia/ represents small size- *fĩaa/tĩaa/hwĩaa* "slim/lanky"; /a/ represents large size- *kakraa yantamm*- "huge/big/vast" (Edward, 2015a) and associative iconicity refers to sound clusters (Phonesthemes or phonaesthesia) that do not mirror sounds but share association (Fischer, 1999).

Onomatopoeic sounds are depictive of sounds and although different languages render these sounds differently, there exist between them an amount of imagic iconicity. Imagic iconicity in spoken language deal with mimicking of sounds in the real world whereas imagic iconicity in signed languages deals with visual perception between the sign and what is being referred to. Phonological iconicity is reflected in the use of onomatopoeic sounds that tend to mimic sounds depicting moving or colliding objects. According to Schmidtke, et al., (2014) onomatopoeia sometimes express imitating the emotional impression that such movement or collision may have on us. Examples of onomatopoeic words; *bang* (pertaining to a loud noise), *tweet* (chirp of a bird), *cock-a-doodle-doo/kikirki/cocorico/ kokoroko* (pertaining to cock crow) etc.

Phonaesthesia as a type of phonological iconicity (associative iconicity) refers to the systematic pairing of form and meaning in language. Phonesthemes are those things that exhibit phonaesthesia. Phonesthemes in English include the following: "-ack *whack, crack* (denoting forceful); gl- *glow*, *gleam*, *glitter*, *glint*- relating to vision and light of low intensity; wr- *write*, *wriggle*, *wrist*- denoting twisting; sn-, *sniff*, *snore*, *snob* etc. relates to the nose" (Perniss, et al., 2010, p. 8).

Another dimension of phonological iconicity in spoken language is *phonemic contrast* (Schmidtke, et al., 2014). Phonemic contrast refers to the iconicity relations between sound and size, sound and shape and sound and affect (Schmidtke, et al., 2014). For example, "English speakers systematically associate the back vowel /a/ with largeness, but the front vowel /i/ with smallness" (Schmidtke, et al., 2014, p. 2) and in Akan ideophones, open vowels like [a, ɛ] show that the entity is vast or big; round vowel [u] shows massiveness and the nasal diphthong [ĩa] depicts slimness, lanky etc. (Edward, 2015a).

Ideophone refers to "a vivid representation of an idea in sound" represented by "a word, often onomatopoeic, which describes a predicate, qualificative or adverb in respect to manner, colour, sound, smell, action, state or intensity" (Doke, 1935, p. 118). Research on ideophones has been done for African, Asian and other languages and these include Bantu languages (Doke, 1935), Ewe (Ameka, 2001), Dagaare and Manderin (Bodomo, 2006), Akan (Edward, 2015a; Agyekum, 2008), Siwu (Dingemanse, 2011; 2012) etc. Ideophones in African and Asian languages have iconic sound relations for size, shape, colour, touch smell, vision, movement etc. (Edward, 2015a; Dingemanse, 2011; Bodomo, 2006). Edward (2015a) and Dingemanse (2011) report that ideophones in Akan and Siwu can relate to touch, smell, vision, movement, size, shape, and sound for sound. The Table below represents examples of ideophones taken from Akan (Edward, 2015a), Siwu (Dingemanse, 2011) and Dagaare (Bodomo, 2006) and these languages are spoken in Ghana.

Table 2.2. Examples of iconic ideophones

Akan		**Siwu**		**Dagaare**	
Ideophone	**Meaning**	**Ideophone**	**Meaning**	**Ideophone**	**Meaning**
ngaangaangaa	cry of a baby	suuu	continuous burning sensation	gbàngbàràng	thing falling down

kãikãikãi	sound of a bell	tsɔ̀kwɛtsɔ̀kwɛ	sawing	vàrkpàrà	in a messy way
kɔkɔɔkɔ	knock on a door	wòsòròò	rough	gàrmànà	spread across a surface
nahanaha	smoothness	saaa	cool sensation (continuous)	bɔ̀nggɔ̀lɔ̀ng	of a fat and unwieldy mass
fĩaa/tĩaa/hwĩaa	slim/thin/lanky	gɔdɔrɔ	crooked	bìlbàlàà	of a huge item lying down

Morphological Iconicity

Research on iconicity in the morphology of spoken languages has been carried out by several linguists (Bybee, 1985; 2011; Dressler, 2005; Waugh, 1994; Wheeler, 1993; Müller, 2005). Waugh (1994) stated that the lexicon is more iconic than is generally believed and that there is isomorphic relationship between the parts of words and the meanings that are attached to them. The order of morphemes in words are based on the iconic motivations, and derivational morphemes are closer to the root which they are attached to as compared to inflectional morphemes (Bybee, 1985). For example, noun inflection markers in Icelandic meet iconicity requirements in that there is a correlation between the form of the inflection marker (i.e. its position in the sonority hierarchy) and its function (referring to the degree of specificity of its feature make-up) (Müller, 2005). Bybee (2011, p. 11) identified that “the more relevant a morphological category is to a verb, the closer its marker will occur in respect to the stem”. Figure 2.9 shows an iconic hierarchy of different morphological categories and their closeness to the verb stem based on their relevance.

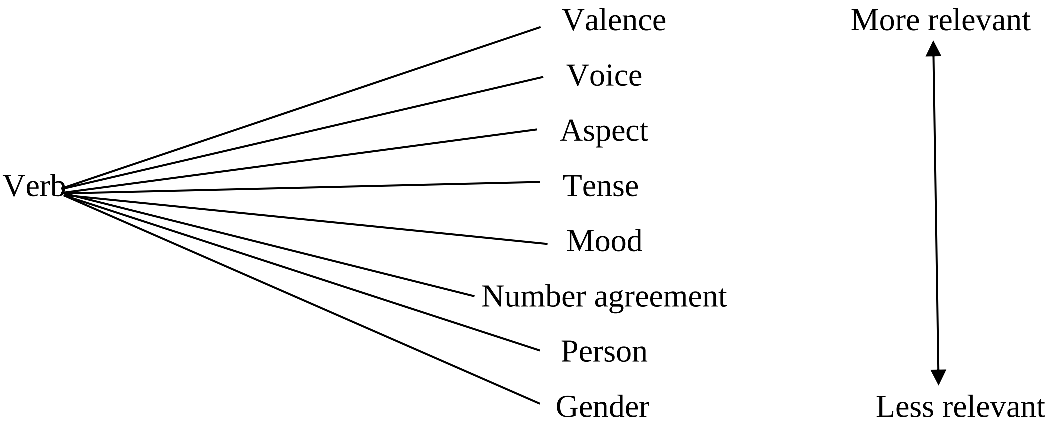


Figure 2.9 Iconicity in morphological categories

Bybee's (2011) question was to find out how grammatical categories are expressed and their relevance to meaning. In morphological iconicity, it is realised that the grammatical categories; valence, voice, aspect, tense, mood, number agreement, person agreement and gender agreement will be closer to the verb in this order. Using data from 50 unrelated languages, Bybee's work presented diagrammatic iconicity found in grammatical categories. Diagrammatic iconicity is concerned with linguistic forms that provide schematic structural correspondences between forms and meaning (Dingemanse, et al., 2015). (In sign languages, diagrammatic iconicity is manifested in the structural (or relational) similarities between the sign and the referent). Bybee's work identified that morphology was more regular, productive, predictive, and transparent within the grammar of the selected languages. For example, one of the morphological conclusions drawn from Bybee (2011) is that languages that code aspect inflectionally have more regular and transparent grammar.

Iconicity in Syntax

Research on the syntax of spoken language has demonstrated that there is diagrammatic iconicity in syntax. Diagrammatic iconicity in syntax is "of a more purely structural kind" (Fischer, 1997, p. 67) and because "language is used to represent reality, linguistic structure may reflect the structure of the physical world as human beings perceive it" (Tai, 1993, p. 153). Givón's (1985) work on iconicity in syntax presented the iconicity meta-principle in syntactic structures. The iconicity meta-principle states that "all other things being equal, a coded experience is easier to store, retrieve and communicate if the code is maximally isomorphic to the experience" (Givón, 1985, p. 188). In syntax, iconicity is demonstrated in word order and topic assignment and we "attend first to the most urgent task" (Givón, 1985, p. 199). Also, important in the discussion of iconicity in syntax is the coding principle formulated by Givón which states that; "the closer two concepts are semantically or functionally, the more likely they are to be put adjacent each other lexically, morphotactically or syntactically" (Givón, 1985, p. 202). Therefore, iconicity involves the pairing/matching of the conceptual distance with temporal distance in speech delivery (Givón, 1985).

The syntax of the grammar of most languages exhibits five iconic motivations: order motivation, distance motivation, separateness motivation, juxtaposition motivation and the reduplication motivation (Tai, 1993). When the order of linguistic expressions corresponds to their order in the conceptual world, we have *order motivation*: i.e. "the relative word order between syntactic units is determined by the temporal order of the states which they represent in the conceptual world" (Tai, 1985, c.f. (Tai, 1993, p. 159)). An example is Julius Caesar's famous speech; *veni vidi vici*- I came, I saw, I conquered. *Distance motivation* postulates that the "linguistic distance between expressions corresponds to the conceptual distance between them" (Haiman 1983:783, c.f. (Tai, 1993, p. 161)). *Separateness motivation* states that "the linguistic separateness of an expression corresponds to the conceptual independence of the object or event which it represents" (Haiman 1983:783, c.f. (Tai, 1993, p. 161)). *Reduplication motivation* states that, "the reduplication of a linguistic expression corresponds to the reduplication in our conceptual world" (Tai, 1993, p. 166). *Juxtaposition motivation* is "used to express part-whole or close kinship relationship" (Aikhenvald, 2019, p. 10) and such arrangements of linguistic items are used to reflect or make sense in the conceptual world.

2.2.2 Iconicity in sign language[23]

Iconicity is generally defined as the resemblance relationship between the form and the meaning of a linguistic expression. Valli, et al., (2011, p. 5) state that in linguistic iconicity, the "form of the symbol is an icon or picture of some aspect of the thing or activity being symbolized". For example, the sign HOUSE in GSL is a picture of the roof of a building and the sign WOMAN in AdaSL is iconic of a woman's breast. The resemblance relationship is the mapping of the mental representation of the articulatory forms represented as  for HOUSE and  (touching a meaningful location) for WOMAN, to a mental depiction of the concept in an individual's experience (Wilcox, 2000). From the review of literature, we have identified that different types of iconicity exist in sign languages and signers employ the diverse possibilities afforded by the different domains: i.e., the hands, the head, and other parts of the body in depicting iconic structures. For instance, the signer's body can be *conceptualised* as a human body (Meir, et al., 2013) with the head representing the head, the hand as hands etc. The visual affordances, the availability of the hands, the body, and features like facial expression in the visual-spatial modality affords a high degree of iconicity as has been indicated in the works reviewed in this chapter. From lexical to the grammatical domains, iconicity is more pervasive in sign languages as compared to spoken languages.

As stated above, sign languages are governed by rules just like spoken languages and these rules include phonological, morphological, syntactic, discourse and grammatical rules. These rules that define what is accepted in the language and what is not are usually discovered by linguists. That is, "it is the job of linguists to discover what the rules are and

[23] The examples presented in this section fall under the category of lexical iconicity.

how the system works" (Valli, et al., 2011, p. 3). Signers might be able to identify some of these rules. For example, signers might identify basic rules and structures of their individual sign languages. In the same way, signers may identify iconic signs in their sign languages as more iconic than iconic signs in other sign languages. For instance, Occhino, et al., (2017) conducted a study with deaf signers of ASL and German Sign Language (DGS), asking signers to give iconicity ratings[24] for iconic signs in both sign languages. Signers of ASL rated ASL signs as more iconic to DGS signs and vice versa. In other words, iconicity lies in the consciousness of people. People make iconic structures, not languages. The construal of iconic signs and structures will form an important part of the description of iconicity in GSL and AdaSL in this dissertation. Languages are described by people and the presence of conventional linguistic signs that are iconic are identified by language users or linguists.

Linguistic study of iconicity has been undertaken on several sign languages within Europe, America, Asia and Africa (Perniss, 2007a; Perniss, et al., 2010; Wilcox, 2004; Taub, 2001; Su & Tai , 2009; Padden, et al., 2013; Edward, 2015a; Edward, 2020; Nyst, 2016a). Research done on iconicity in sign languages has described specific patterns in iconic representation. As stated earlier, AdaSL signers prefer body-based depiction of size (Nyst, 2016a). Meanwhile, users of many urban sign languages represent size by depicting distance in space e.g., distance between two fingers or between the two hands (see Perniss (2007a) on DGS).

Sign language uses visual-gestural communication, and the presence of iconic and non-iconic signs are conspicuous to sign linguists, i.e., conventionalised signs can be iconic or non-iconic. Iconicity here is defined as the resemblance relationship between the form (phonology) of a sign and the meaning (semantics). The affordances of the visual-gestural parameters, the need to represent conceptual experience and the quest to be as economical as possible (Haiman, 1985) are some of the reasons that motivate iconicity in sign languages. Taub defines motivation as the "language-external forces that can influence the nature of linguistic items" (Taub, 2001, p. 10). For example, in DGS, the expression of distance is demonstrated by how signers map the space between one hand and the other (Perniss, 2007a). The iconic representation of distance, size, shape, movement, location etc. in sign language is afforded by the visual-gestural modality.

[24] Iconicity ratings (iconicity as a scaler substance that comes in degrees) is one of the construals of iconicity discussed by Dingemanse et al. (2020).

The abundance of visual imagery in sign language and "the impressive variety of iconic and metaphorical forms in signed languages" (Taub, 2001, p. 2) is relevant for linguistic studies. Iconicity permeates through the visual spatial modality of sign language, the visible structures of the signs but "there are many different possible iconic representations of a single visual or auditory image; for example, one could represent different parts of the image, use different scales or perspectives, or preserve different levels of detail" (Taub, 2001, p. 8). For instance, BIRD is represented by the beak or the wings in ASL, GSL, Finnish Sign language (FSL) and AdaSL (see Figure 2.15). The icon preserves some aspects of the item's (being depicted) physical form (e.g., shape, sound, temporal structure, etc.) and this resemblance becomes the concrete sensory image (Taub, 2001). In other words, an iconic linguistic item can represent a concrete physical referent, e.g., BIRD in AdaSL resembles the wings of a bird.

Bellugi & Klima (1979) presented different iconic representations of the sign TREE in three sign languages (ASL, Danish Sign Language (DSL) and Chinese Sign Language (CSL)). Each of the sign languages uses a distinct conceptualization of the articulators to represent the crown and the trunk of a *tree*. Comparatively GSL and AdaSL use a similar strategy to ASL to represent tree.[25] On the other hand, Swedish Sign Language (SSL) and Japanese Sign Language (JSL) use another iconic strategy where tree is visually depicted by tracing (using the hands as drawing tools). In these different strategies, the relationship between the meaning and the visual image of the sign is not the determinant of the sign forms because they are different. However, "neither are the forms unrelated to the meaning" (Taub, 2001:8) and iconicity is manifested irrespective of the form of the representation. Important to note here is that the iconic mapping relies extensively on the meaning, i.e. a sign is iconic when the form (phonology) has a resemblance-based mapping relationship with the meaning (semantics) and this relationship can represent real-world objects, ideas and events with signs. TREE in ASL, JSL, SSL, GSL and AdaSL (Figure 2.10) relies on two distinct iconic strategies (hand as object and hand as a drawing tool).

[25] The depiction of tree with the hand as the entity or object seem prevalent in different sign languages. In the online sign dictionary spreadthesign, most of the represented sign languages used the hand as object strategy for TREE.

ASL JSL SSL GSL AdaSL

Figure 2.10 TREE in ASL, JSL, SSL,[26] *GSL and AdaSL*

The conceptualization of the handshape, movement, location, and orientation in sign languages motivates iconicity in the structure of the sign. Signed language has the visual resources to depict an image or a concept more explicitly than spoken language. There is a relationship between the *signifier* and the *signified* (as is the case for any lexeme, arbitrary as well as iconic). It is obvious that the sign EAT in several sign languages of the world would map out the action of putting something in the mouth of the signer. Different sign languages indicate EAT with a HS that moves towards the mouth and HS may differ across sign languages. There is a direct link between the signifier and the signified and the action directly maps to the visual action of putting food in one's mouth.

Not all signs are iconic, however. There is quite an amount of arbitrariness in the lexicon of a sign language; the visual representation of some signs might have no direct correlation to the meaning. For example, the sign BLACK in GSL (also French Sign Language (LSF), see Figure 2.11) and SSL, do not seem to evoke the colour blackness (some iconic inferences can be made). In the same way, the sign APPLE in GSL and Polish Sign Language (PJM), are more arbitrary than iconic because there seem to be no form-meaning resemblance between the sign and apple (some argument on iconic semblance can be made). Comparing APPLE in GSL and PJM to APPLE in Icelandic Sign Language (ISL), the latter has iconic form-meaning mapping with the hand as hand (holding apple) strategy. Therefore, these two signs (GSL and PJM) can be argued to be arbitrary, or iconic depending on how signers construe the relationship between the articulators and the real-world entities.

[26] Images for ASL, JSL, SSL, ISL, LSM, JPM, LSF taken from spreadthesign https://www.spreadthesign.com/en.gb/search/
GSL images with white background taken from McGuire & Deutsch (2015) dictionary of GSL.

BLACK

GSL LSF SSL

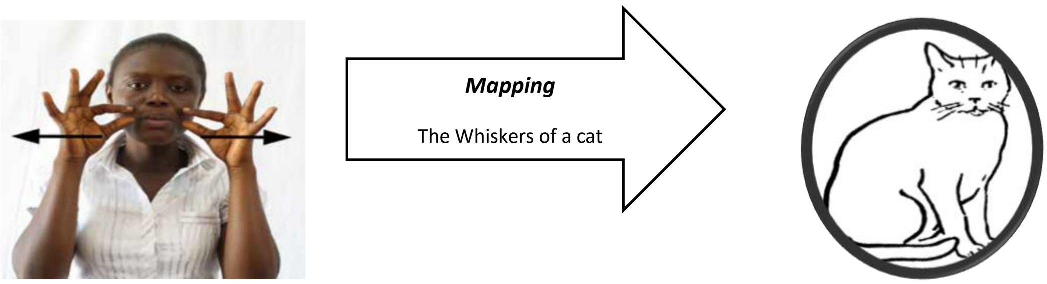
APPLE

GSL ISL PJM

Figure 2.11 BLACK and APPLE in different sign languages

The form and the meaning of non-iconic signs do not evoke any resemblance relationship. In some instances, the form and the meaning have other metaphorical extensions, and these are construed by real-world experiences and representing these on the sign articulators although iconic might not point to a tangible referent, i.e. the referent of the iconic sign may not represent a real world object as exemplified in FORGET in Figure 2.12 (contrasted with the sign CAT that point to a real world object). The metaphorical iconicity of FORGET is motivated by the location and the movement. These metaphorical signs according to Meir (2010) are built on double mapping in their basic form. For instance, the location at the head for FORGET is motivated because it is the place of our thoughts and the movement is iconic of wiping away/being gone, literally *thoughts wiped away*.

Linguistic form Resemblance Real world entity



FORM RELATIONSHIP MEANING

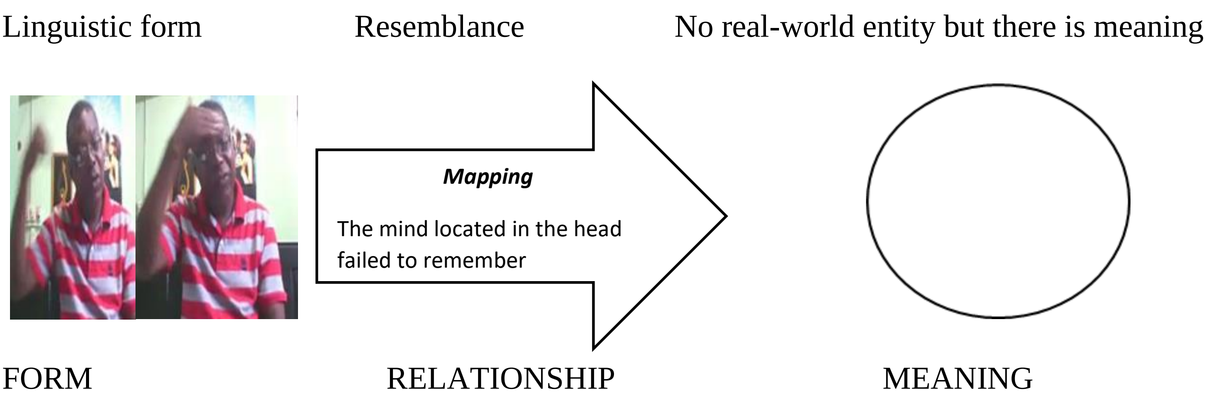


Figure 2.12 CAT and FORGET in GSL

Perniss, et al. (2010) presented examples from British Sign Language (BSL) to demonstrate iconicity in the BSL lexicon (see Figure 2.13). The signs CRY and AIRPLANE in BSL are perceived as iconic because they represent all or aspects of the idea that is represented; there is resemblance between the signs and their meanings. For example, Y-HS the handshape for AIRPLANE depicts the wings of the airplane and changes location by moving from one location to another depicting an airplane in flight. However, AFTERNOON and BATTERY are not perceived as iconic because the signs do not have a resemblance relationship with the meaning.

CRY (iconic) AIRPLANE (iconic) BATTERY (non-iconic) AFTERNOON (non-iconic)

Figure 2.13 Examples of iconic and non-iconic signs in BSL[27]

To recapitulate from the chapter 1, Nyst's thesis which gave a detailed description of AdaSL commented on iconicity in AdaSL and listed some strategies used by signers. However, the focus of the entire thesis was to present a general description of the language and not on iconic signs. In subsequent papers, Nyst has explored the notion of iconicity in AdaSL working on the data taken for her PhD. Edward (2015a) discusses iconicity in AdaSL focusing on specific domains such as size & shape, emotive & cognitive words, expression of time etc. However, none of these works did an in-depth research on both lexical and iconicity in the grammatical constructions in AdaSL. Based on previous research findings, especially

[27] Images from https://www.spreadthesign.com/en.gb/search/

considering the lack of entity classifiers for motion events in AdaSL (Nyst, 2007a), the very little use of simultaneous packaging in AdaSL (Nyst, 2007b), and the contact between GSL and AdaSL signers in the past and in more recent times, there was the need to investigate linguistic iconicity in GSL and AdaSL.

2.3 A Cognitive reality of Iconicity in sign language

The cognitive reality of iconicity implies our mental capabilities to link construals of form and meaning through the conceptualization of the articulators and this ability allows us to visually map and transfer the actions of the hands onto real-world events.[28] The minds of language users (our cognitive psychology) process the information by simulating the visual images (represented through conceptualization of the articulators) to the real-world entities that are located in space and time. The form of the sign represents the phonological reality of the sign, i.e. the HS-Loc-Mov-Orn[29] and these are conceptualised and discernible (see Wilcox, 2004). The articulatory parameters of the sign represent the conceptual properties that signers employ in representing real-world events.

The HS can be construed to represent the entity in whole, in part or how it is handled or manipulated, e.g. MIRROR- palms shaped like the referent; the location can be meaningfully linked to the referent, e.g. SPECTACLES- around the eye; movement can also be the associated action linked to the referent, e.g. BIRD- flapping of the hands; the direction of the palm can resemble the direction or referent, e.g. BOWL- the curved palms faces up (see Figure 2.14). The phonology of the sign maps an iconic relationship between the *meanings* that are conveyed. Other iconic mappings strategies will be discussed in detail in chapter 5 (Hwang, et al., 2017; Padden, et al., 2013; 2015; Kimmelman, et al., 2018). Figure 2.14 below shows examples of iconic signs from AdaSL and GSL.

BIRD-AdaSL SPECTACLES-GSL MIRROR-AdaSL BOWL- GSL

[28] Conceptualization of articulators will be discussed in detail in chapter 3, section 3.4.

[29] Recall that HS-Handshape, Loc-Location, Mov-Movement, Orn-Orientation.

Figure 2.14 Examples of iconic signs in GSL and AdaSL

In Figure 2.14, the AdaSL sign BIRD has a metonymic relationship with the referent: i.e., wings to represent the whole bird. As such, resemblance mapping can be drawn from the signs and the referent. The symbolic forms BIRD in AdaSL trigger a cognitive image of a bird although the sign represents aspect (wing) of the entity (part-whole/metonymy). *Metonymy* is a popular association in sign languages and some iconic signs are based on part-whole relationship. BIRD in AdaSL, triggers the mental image or real-world bird although the sign does not point to other aspects of the bird, i.e., beak, feathers, legs etc. Cognitively, the sign activates all these features of a bird. In as much as the sign has iconic intent, its representation is a structure that is socially accepted to represent a bird whether in flight, at motion, sleeping, eating etc. However, signers are aware that the sign has embedded meanings of all the attributes of a bird. We must also consider that a prototypical bird has legs, feathers, eyes etc. but these are not represented in this sign. ASL and BSL[30] represent 'bird' with the beak and this is also an iconic (metonymic) representation of the entity. Finnish Sign Language (FSL)[31] depicts 'bird' with a metonymic depiction of the wings just as AdaSL but uses a different phonological representation (see Figure 2.15).

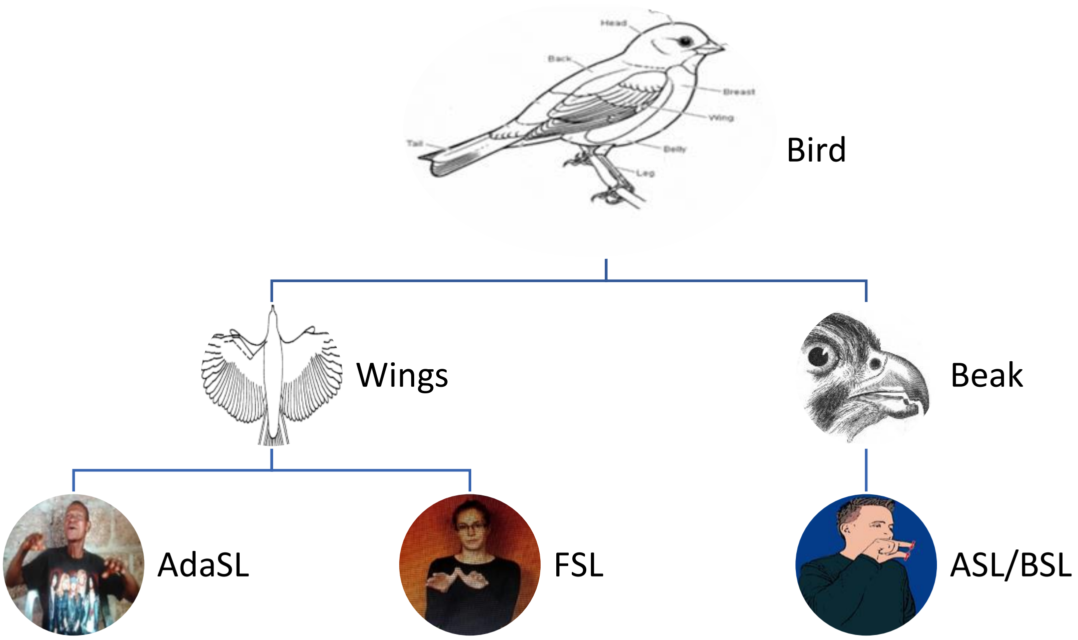


Figure 2.15. Bird with its parts and BIRD in AdaSL, FSL and BSL/ASL

[30] Image taken from https://www.british-sign.co.uk/
[31] Image taken from Spread the sign https://www.spreadthesign.com/en.gb/search/

In English the linguistic form /bɜ:d/ which represents a two-legged winged animal stands in an arbitrary relationship with its meaning. The meaning is the conventional idea or semantic content that is associated with the symbol. Thus, whereas the form of bird /bɜ:d/ stands in an arbitrary relation in spoken English, the form of BIRD as in AdaSL, ASL, BSL, GSL and FSL have a resemblance mapping. These examples support the position that the visual medium and the manual nature of sign languages offer a richer environment for the exploitation of iconicity as compared to speech (Meir, et al., 2013; Taub, 2001; Occhino, 2016).

2.4. Lexical Iconicity

This section will present a review of research on iconicity in sign language, focusing on works on lexical iconicity that are relevant to this dissertation. The review will focus on different iconic strategies beginning with Mandel's 1977 seminal paper to current research on lexical iconicity. Mandel's seminal paper influenced subsequent research on lexical iconicity in sign language (e.g. Taub (2001), Su & Tai (2009), Padden et al., (2013; 2015), Ebling et al., (2015), Kimmelman et al., (2018) etc.) Mandel's taxonomy of iconic devices in ASL presented a detailed classification of iconic devices employed by signers of ASL. Iconic devices refer to gestural resources that signers employ to encode form-meaning representations. These devices are used individually or combined in creating signs with iconic motivations. Iconic devices are available to sign languages because of the affordances of the modality. The presence of iconic devices in the visual modality contributes to similarities among sign languages which are unrelated, e.g., depicting objects by size and shape or using relevant parts of the signer's body to represent the object. The same manual articulators are employed by signers to represent ideas and objects. Mandel's taxonomy of iconic devices also points to the available resources that signers have at their disposal.

The basic iconic devices of ASL as mentioned by Mandel (1977) include the following: (1)*Metonymy* as explained in §2.3; (2) *Presentation*- The iconic device can be a presentation when the "signer presents an actual token of the base, whether by indexing it or by performing it" (Mandel, 1977, p. 96) (e.g. nose for NOSE, ear for EAR, head for HEAD etc.); (3) *Depiction*- This displays a picture of the base and can be *substitutive* or *virtual*. When the signer's articulator assumes the base of the entity through it shape, there is substitutive depiction (TREE-GSL). Virtual depiction involves the articulators leaving an imaginary trace of the shape of the object (HOUSE- GSL). *Sketching* and *stamping* are examples Mandel presented as kinds of visual depiction.

Although Mandel's iconic devices are not an exhaustive list, they point to wider classification of the linguistic forms. For example, different devices can be used to express metonymic relationships, e.g., virtual depiction, presentation, depiction etc. can all map a metonymic relationship between the form and the referent. Another set of devices to classify iconicity in sign language lexicon has been developed by Taub (2001). Taub's (2001) iconic devices overlap in many ways with Mandel's iconic devices. The devices presented by Taub are as follows; Physical entities represent themselves (signing MOUTH by touching the mouth), Shape of articulators represents shape of referent (BOWL in GSL), Movement of articulators represents movement of referent (BIRD in AdaSL), Representation of body parts (breast for WOMAN in AdaSL), Shape of articulators' path represents shape of referent (tracing the trunk for ELEPHANT in GSL), Locations in signing space represent locations in mental spaces (height agreement in directional verbs e.g. in GIVE to a child in GSL), Size of articulation represents size of referent (signing BIG and SMALL in GSL/AdaSL), Number of articulators represents number of referents (incorporating numbers, e.g. 3 MONTHS in GSL).

These devices by Taub share several features with Mandel's taxonomy of iconic devices. For example, Physical entities represent themselves (Presentation), Shape of articulators represents shape of referent (Depiction), Movement of articulators represents movement of referent (Metonymy), Representation of body parts (Metonymy), Shape of articulators' path represents shape of referent (Depiction). However, devices such as Locations in signing space represent locations in mental spaces, Size of articulation represents size of referent, Number of articulators represents number of referents, seem to mark out Taub's addition to the taxonomy of iconic devices. Furthermore, Taub (2001) developed the Analogue-Building Model of linguistic iconicity and this model has the following parts: Initial abstract concept - corresponding part of concrete source domain - schematic associated image - the image encoded- structure-preserving correspondences between. This is simplified as image *selection- schematisation* - *encoding*. According to Taub, signers select part of the image to be represented and then, the selected part is further schematised, and finally encoded to preserve iconic correspondent between the form and the referent. For example, in representing *bird* as a linguistic form, signers have the option to select from the many distinctive features of a bird; wings, beak, feathers, ability to lay eggs etc. Whereas BSL/ASL signers prefer the beak, AdaSL/FSL signers prefer or select the wings (see Figure 2.15). The selected image is further schematised: "the mapping between source and target domains has picked out certain aspects of the source domain as particularly relevant" (Taub, 2001, p. 112). Finally, the schematised image is encoded into a linguistic form by selecting the appropriate articulators that will also preserve the form of the schematised sign. For example, the thumb and index fingers can appropriately represent the beak of the bird and the sign is located in front of the signer's mouth; again, the two hands can adequately represent the wings of a bird, i.e., whether in flight or being flapped.

Other researchers have contributed to our understanding of language-specific patterning of iconic depiction in lexical items. For example, Padden, et al., (2013; 2015) showed that signers exhibit systematic preferences for the iconic representation of tools, choosing either an action-based (depicting how the object is held) or a perception-based (depicting dimensions of the object) strategy, and that this kind of *patterned iconicity* may serve the grammatical function of distinguishing between nouns and verb. Padden et al. (2013) presented a shared iconic patterning for lexical signs for handheld man-made artefacts in three sign languages (ASL, Al-Sayyid Bedouin Sign Language (ABSL) and New Zealand Sign Language (NZSL)) and proposed "that in sign languages handling and instrument forms are related as an example of *patterned iconicity*, where repeated use of an iconic strategy serves to identify members of a lexical group" (Padden, et al., 2013, p. 289). Patterned iconicity is a shared property of a group of signs, and *handling*, *instrument*, *object* strategies etc. are distinct ways in which signers' manifest lexical iconicity in sign languages. According to Padden et al. "the handling/instrument pattern in sign languages draws from broad, expressive abilities of human beings using visual-gestural resources" and "[t]hese abilities involve using the body and the hands to depict and represent objects in the human environment (2013, p. 290). Iconic patterning in different sign languages in linking forms that have related semantic properties according to Padden, et al., (2013) is relevant for typological research. The exploration of (bodily) resources for iconic representation was obvious among the people that participated in Padden et al.'s research work. In a related study, Padden, et al., (2015, p. 90) found that "ASL signers and non-signing gesturers use similar iconic strategies when naming tools".

Hwang et al., (2017) identified iconic patterns for the semantic categories of Tools, Animals and Fruits & Vegetable in eight sign languages (ASL, Japanese SL, German SL, Israeli SL, Kenyan SL, Ha Noi SL of Vietnam, Central Taurus SL of Turkey, and ABSL of Israel). They found recurring patterns for naming Tools with manipulation (*instrument* and *handling* strategies), Animals with *personification* and Fruits & Vegetables with *manipulation* and *object* strategies.[32] Hwang et al. (2017) refers to *instrument* and *handling* strategies jointly as *manipulation strategy* because they involve "the body representing the body of a human agent and an arm representing the arm of a human agent as it acts upon the referent" (Hwang, et al., 2017, p. 10). *Instrument* strategy is also substitutive as signer's articulator assumes the base of the entity through its shape (Mandel, 1977), and performs a canonical action related to the entity.

In Figure 2.16, *fork* (a) is represented with a *handling* strategy; that is the hand represents human hand holding or grasping an object. (b) demonstrated how *it* is used (*instrumen*t strategy); that is the hand depicts features of object and performs actions related to the object. (c) demonstrated how the entity looks (*object* strategy); that is the hand only shows features of object and does not perform any action. In these three depictions of fork, a cognitive reality of image-form-meaning-mappings can be assigned to all the three signs although the realisations are different. The articulators are conceptualised based on the strategy that is used. The example in Figure 2.16 shows that iconicity is not monolithic, and the conceptualization of signers and gesturers articulators depend on different iconic strategies. Patterned iconicity and Mandel and Taub's iconic devices are similar in their realisations, however patterned iconicity has to do with the different ways in which signers (and gesturers) use iconic mappings across different semantic domains.

a. Handling b. instrument c. object

Figure 2.16 Patterned iconicity Figure 2 on page 289, in "Patterned iconicity in sign language lexicons" - Padden, C.A. et al. in "Where do nouns come from?", Special Issue of Gesture 13:3 (2013), Haviland, J.B. - editor - (2013). Published by Cambridge University Press. Amsterdam/Philadelphia. Reprinted with permission from publisher.

[32] In this chapter and throughout the dissertation, the iconic (and non-iconic) strategies will be presented in italics and names of the semantic categories will be capitalised.

Another way of investigating iconicity in lexical categories is to focus on size and shape depictions. Nyst (2016a) concentrated on iconicity in size and shape depictions in AdaSL and her proposed model was the relation between the form and the sensory image. In a similar research, Nyst moved the research focus from signers to gesturers and investigated size and shape depictions used by four speakers of Anyi (Nyst, 2016b). Anyi is a Central Tano language spoken in Ivory Coast and Ghana (also known as Akan). Nyst (2016b) identified two categories of size and shape gestures: delimited space gestures and delimited body part gesture. When “the distance between two elements (usually the two hands or the thumb and one or more fingers) in space depicts diameter/width of a referent” we have delimited space gesture (p. 167). On the other hand, when “one hand holds or contacts the other hand or arm at a particular location” we have delimited body part gesture (p. 167). Comparing Anyi speakers with Dutch speakers, Nyst identified that whereas Anyi gesturers use delimited body part gesture, Dutch speakers did not make any use of delimited body part gesture. Thus, there is cross-linguistic variation in the use of iconic gestures by non-signers.

In summary, research on lexical iconicity in different sign languages (including AdaSL) and gesture (including Anyi gesturers) have demonstrated that varied iconic perspectives are relevant for discussions on form-meaning, or sensory image-meaning mapping relationships. Different approaches to lexical iconicity in sign or gesture have identified varied iconic strategies. That is, comparing sign to gesture, we are introduced to different scales, perspectives, and strategies of iconicity. Although these works cover a broad range of domains and languages, we are yet to have a comprehensive discussion on iconicity in an African sign language that focuses on other strategies in addition to size and shape depictions. Furthermore, a *systematic* comparison of lexical iconicity in sign and gesture (e.g., Padden et al., 2013; 2015; Nyst & Tano, 2016) has not been produced yet for Ghanaian signing and non-signing groups. Nyst & Tano (2016) focused on Bouakako Sign Language, AdaSL and gestures of speakers of Anyi (Côte d’Ivoire). They did not consider the gestures of speakers of a Ghanaian speech community. Although there is mutual intelligibility between Anyi and Akan (basically considered as one language), we cannot use gestures of an Ivorian speech community to describe gestures of a Ghanaian speech community. Also, being aware of the gestural substrate of Africa, a cross-linguistic investigation of different gestures would help to fully understand the nature of African gestures.

Nyst (2016b) and Nyst & Tano (2016) have discussed gestures in Anyi (Cote d’Ivoire) focusing on size and shape depictions but did not consider the different semantic domains. Iconicity in size and shape depictions documented for AdaSL (Nyst, 2016a) focused on the relationship between the sensory image and the form. A description of lexical iconicity considering the iconic strategies used by signers and comparing it with the gestures of non-signers in a Ghanaian setting is therefore relevant. Furthermore, concentrating on action-based and size and shape depictions of iconicity in lexical items provides a more comprehensive description of lexical iconicity. Finally, based on Nyst (2016a) and Padden et al. (2015; 2013), we identify that the lexical iconicity inter or intra sign languages can be discussed by focusing on the size and shape specifications or the different semantic categories of the lexical items.

2.5 Space and Iconicity (Iconicity in Grammatical Constructions)

The visual-spatial modality of sign language makes space worth exploring in relation to iconicity. An iconic description of spatial relationships in signed discourses deals with devices such as space to represent real world location, motion, and action. Space has grammatical functions in sign languages for the expression of location, motion, and action. According to Wilcox "[t]he fact that signed languages occur in space… takes on a potentially more interesting and important significance than it does for spoken languages." (Wilcox, 2002, p. 256). The visibility of the *signal* apparatus affords the sign modality expressiveness. Wilcox also pointed out that the objects and events in the real world are not directly represented by the sign articulators but are rather mapped through the conceptualization of the articulators (Wilcox, 2002). Research on space in sign language has revealed different manifestations and the use of space both for iconic and arbitrary depictions (Perniss, 2012; 2007a; Wilcox, 2002; Friedman, 1975; Liddell, 2003; 1995). Relevant to the expression of iconicity in grammatical constructions in sign languages is the signing space. The signing space represents the space in front, above and at the sides of the signer where signing is limited to. A typical image of the signing space is represented below in Figure 2.18. The image of the signing space depicted below is typical of urban sign languages as research on other rural sign languages have indicated the presence of a larger signing space spanning the thigh, the legs and even the rump (Nyst, 2007a; de Vos, 2012). The following paragraphs will review some of these research works focusing on the most relevant for this dissertation.

Figure 2.17 Signing space. Adapted from Nijen Twilhaar (2009)

In sign language, space does not just refer to the area in front of the signer; space is used to talk about *the park* with everything on it, *the farm* with all the trees and animals, *the school* with the buildings and the students, *the house* with the different parts etc. Signers use their hands and the space in front of their body to give iconic, topographic, depictive representations of these real-world scenes in sign space. Objects are construed with the hands representing the size and shape of the entities being depicted. Users of sign languages are aware of these affordances of space to make iconic inferences to events and things. In using classifier predicates, the hands and fingers are construed as entities moving in space: i.e., the articulators are conceptualised as real-world entities (hand as things) that are stationary, moving, or involved in some activities. In reality, hands and the fingers are not the entities in question; however, it is the conceptual ability of signers to convert the index finger and the middle finger to represent the legs of a person as in the two-legged entity classifier. The iconicity revealed in the two-legged entity classifier sign is that the form and meaning of this sign share the same conceptual domain, i.e., the phonology of this sign (the two fingers) and the semantics (the legs of a person) are construed to reflect a real person existing in the real world. Therefore, when signers use classifier predicates, the hands and the fingers refer to things, whereas movement refers to process or activities that involve the things (Wilcox, 2004).

Space affords signers the ability to characterise the referent based on location through locative expressions. Locative expressions usually express or show the location or place of a referent. Signers have the expressive ability to carry ideas, entities, persons, etc. through space and refer to the same ideas later in the conversation with pointing signs (or any sign that can be located or directed in space. Mandel (1977) refers to *this* as grammatical locations; a point in the signing space that serves as an anaphoric pronoun. Thus, the signer can keep an idea or entity at his right side and refer to it later in the conversation showing the syntactic and topographic use of space in sign language (Perniss, 2012). The idea can be a whole sentence, a project, a name, or something that has been mentioned earlier in the conversation. The syntactic use of space chooses locations in sign space arbitrarily to represent referents and the topographic use of space has meaningful referent-location associations in sign space (Perniss, 2012). Syntactic space can be used to compare two events/ideas that are not located in space in the real world. On the other hand, topographic space maps a real-world event/person etc. onto a signing space using different *perspectives*. This dissertation is more interested in the topographic use of space which is associated with classifier predicates. Examples of syntactic use of space will be given where necessary. Space can be used to trace the location of entities and this usage of space is referred to as "icons of spatial location" (Mandel, 1977, p. 77).

Research on perspectives in signing have resulted in different names used by different researchers to refer to the different viewpoints used by signers. Langacker (2008) calls perspective as the viewing arrangement.[33] Perniss (2007a) uses the terms character and observer perspectives to express signer internal and signer external viewpoints. Kocab et al. (2015) referred to the observer perspective as the diagrammatic space and the character perspective as the viewer space. Liddell (1995; 2000) uses the terms real and surrogate spaces for character perspective and token space for observer perspective. Observer/token space has been referred to as narrator perspective by Slobin et al. (2003). In this dissertation, character and observer perspectives will be used to refer to the viewpoints of signers; and real, surrogate and token spaces will be used in discussions about the nature of the spaces created by the character and observer perspectives. The signing space and signer's perspective are intertwined; the nature of the signing space created by signers determine the perspective. For example, Liddell's (1995) research on space in ASL identified three types of spaces (mental spaces); *real space*, *surrogate space*, and *token space*. Real space refers to visible elements in the signing space (e.g., *signer holds head and turns his head*) and surrogate space refers to invisible conceptual entities that are placed in the signing space (e.g., *signer stretches hand to give hat to an invisible surrogate who is at the same height as the signer*). When signer is an observer, the external diagrammatic space is used (token space). Token space uses a limited size of the signing space (Liddell, 1995).

Perniss (2012; 2007a) focused on the affordances of space and iconicity in sign language and one of the strategies for mapping spatial relationship focused on in these works

[33] Langacker's work did not focus on sign language per se but on the cognitive approaches to grammar.

is the use of classifier predicates. Perniss (2007a) identified that DGS[34] signers used classifier predicates in mapping location, motion, and action. Classifier predicates are 'morphologically complex predicate' that permit "structure-preserving mappings of the referent location and motion" (Perniss, 2007a, p. 4). Liddell (2003) introduced the term *depicting verbs* for classifier predicates and these depicting verbs encode meanings related to actions and states. Important for the discussions in this dissertation are the canonical positions of signer and addressee in sign language discourse that can be interpreted in their viewpoint and their focus. In Perniss' work, she identified that signer's viewpoint and the strategies used to represent location and motion could be aligned or non-aligned. For example, handling classifiers (see classifiers in §2.1.2) typically align with character perspective and entity classifiers typically align with observer perspective.

In sign language, "the iconic properties of the visual-spatial modality afford the possibility of mapping a scene viewed by the signer onto sign space as seen via the placement, orientation, and handshape of the hands" (Perniss, 2007a, p. 65). For example, signers of DGS use classifier predicates in mapping two entities and the location between these two is marked iconically through the space between the handshapes (Perniss, 2007a) in setting up a conceptual model to reflect the real-world event. Unlike DGS or ASL, according to Nyst, AdaSL has a large signing space projected in character perspective and lacking observer spatial projection (Nyst, 2007a). The use of classifier predicates (specifically entity classifiers) to map two entities supports Wilcox's claim that the objects and events in the real world are mapped through the conceptualization of the articulators (Wilcox, 2002). That is, the handshapes or the sign articulators do not directly represent the object in the real-world but take on some iconic properties of the depicted object.

The DGS example in Figure 2.19 indicates this iconic relationship; in the first example, the signer uses the two-legged entity classifiers to show two (human) entities standing close to each other. In the second example, the two-legged entity classifier represents the animate entity, and the upright entity classifier represents the tree. In these examples, we identify that the signer's handshape depicts some iconic properties of the depicted image: e.g., two-legged entity for human and upright entity for tree. Further, the construal of space can represent the real-world location where signers manipulate objects and events based on their location in space. The signer has space as a device to map out real-world into a conceptual model of how he perceives the setting.

[34] German Sign Language

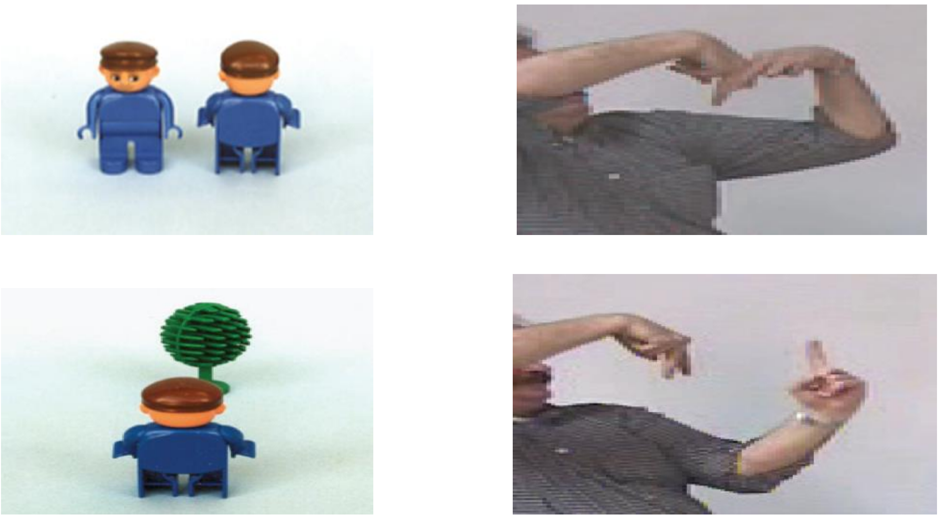


Figure 2.19 Entity classifiers for spatial location in DGS. Figure reprinted by the permission of the author (Perniss, 2007a, pp. 89, 142)

The discussions in the preceding paragraphs in this section focused mainly on location in sign space. Let us turn our attention to the discussion of motion and action representation in sign languages. Another interesting domain within language (signed and spoken) is event or action representation. The complexity of language to represent things happening in the real-world with language is demonstrated in different modality specific representations. There are some general assumptions on event representation in languages. Pederson & Bohnemeyer, (2010) stated that verbs describe actions or events and the roles that characterize the ways in which the participants are involved in the event. The representation of events in sign language according to Özyurek & Perniss (2010) rely on two types of events predicates: classifier predicate and lexical predicates.

Previous studies on event representation have identified the possibility of signers to use both lexical and classifier predicates. Lexical predicates refer to the citation form of the sign (the dictionary form of the sign). Lexical predicates include plain verbs (verbs that have not undergone modification); intensified verbs (verbs that have undergone modification) directional verbs (see §2.1.2); directionals (verbs with inherent movement). Classifier predicates can convey information about the figure, location, motion, and ground. Iconicity plays a major role in event representation in signed language (Özyurek & Perniss, 2010; Galvan & Taub, 2004). Classifier predicates can be classified into handling (HS represent the hand manipulating the object), entity (HS represent an entity) and limb (HS represent limbs) classifiers. Size and shape specifiers (SASS) are sometimes considered as subtype of classifiers. Although classifier predicates have been documented in many sign languages, Nyst (2007a) identified that in AdaSL narratives and spontaneous data, signers do not use entity classifiers and “AdaSL does not use a system of entity classifiers to express motion in space” (2007a, p. 195). Whereas both classifier predicates and lexical predicates give information about event representation, Özyurek & Perniss (2010) concluded that the availability of classifier predicates in sign languages makes event representation in sign language different from spoken languages because classifier predicates in sign language give other information pertaining “size and shape of referents, their location, motion, as well as to the way they are manipulated or handled” (Özyurek & Perniss, 2010, p. 103). Entity classifiers express both singular animate entity (as in Figure 2.19) and plural animate entities. For example, in GSL, to indicate specific number of persons, the upright entity classifier can be expressed as a plural entity classifier as exemplified in Figure 2.20 below.

RH: CL_E (3 boys) + signer (man) watch
LH: SEE

Figure 2.20 Entity classifiers expressing plural animate entities

Perspectives are relevant in event representation; signers take on different perspectives to express events in the sign space. As noted by Liddell (1995) signers make use of surrogate space (character perspective) or token space (observer perspective) to make parallel reference to elements within the real space (real-world). Research on different sign languages has demonstrated that signers can assume different perspectives at the same time in event representation (see (Perniss, 2007a; 2012; Özyurek & Perniss, 2010)). For example, Perniss identified the simultaneous use of perspectives in DGS narratives as signers took on blends of character/observer, character/narrator, observer/narrator etc. The perspectives the signer takes is relevant in event representation as it influences the presentation of the event. Both Özyurek & Perniss (2010) and Galvan & Taub (2004) elaborated on the role of perspectives and how they influence the event type. Character and observer perspectives (referred to as role shift/referential shift by (Galvan & Taub, 2004)) are available to signers as iconic resources. For AdaSL, Nyst identified “spatial projections in AdaSL appear to be restricted to real-size proportions, allowing both real space and surrogate space projections” (Nyst, 2007a, p. 196). That is, whereas, the token space or observer perspective have been recorded for many sign languages, in AdaSL, "no examples are found of the establishment of loci on a limited plane in front of the signer" (Nyst, 2007a, p. 195).

The absence of observer perspective and entity classifiers for motion events in AdaSL (Nyst, 2007a) contradicts what has been found in many sign languages. In other words, sign languages do not have uniform structures and there seem to be language-specific features that distinguish different sign languages. Comparing AdaSL with Kata Kolok (a village sign language), which uses entity classifiers to express motion events, we identify that even typologically related sign languages have language-specific devices and strategies. On the other hand, most research on Western sign languages have identified the use of entity classifiers to express motion (Perniss, 2007a; Wilcox, 2002; Özyurek & Perniss, 2010).

Other than classifier and lexical predicates, signers use their bodies as iconic devices in action or event representation. Meir, et al., (2013) described action representation in signed language focusing on the use of the body as an iconic device. The visual affordances of sign languages afford signers the potential to produce more iconic structures using the body. Meir, et al., (2013, p. 309) stressed two major points in iconicity: the way in which iconicity is grounded in human experience (embodiment) and the competition between iconicity and grammar. Earlier research concluded that iconicity is submerged by grammar[35] (Bellugi & Klima, 1979), but Meir, et al., (2013) is of the view that iconicity does not interfere with grammar because iconicity is interwoven into the grammars of sign languages. Relying on three different sign languages (ASL, Israeli Sign Language and Al-Sayyid Bedouin Sign Language), Meir and her colleagues argued that "in some cases the effects of iconicity on the grammar of a language is the result of the competition between different types of iconicity that languages exploit in order to organise their grammars and the need to resolve this competition" (Meir, et al., 2013, p. 310). Two iconic devices and strategies are listed in Meir et al. (2013): the *hands* and the *body*, although the writers focused on the *body*. Users of sign languages use the *body as an iconic* marker to represent diverse iconic signs. Meir et al., identified three different roles of the signer's body: (1). the signer's body represents a human body; (2). the signer's body represents the subject of the argument of a verb; (3). the signer's body represents the 1st person in pronouns and agreement verbs (Meir, et al., 2013). Out of these three, the body representing a human body is the most direct way in which the body can be used in iconic representation. In Meir et al.'s analysis, event/action representation can be

[35] Bellugi & Klima were of the view that morphological marking of intensification on certain statives in ASL, are not iconic. For example, VERY SLOW is signed with a faster movement that SLOW.

an embodied human experience where the signer takes on several roles. The Table below shows the role of the signer’s body in three verb classes.

Table 2.3 The roles of the body in the three verb classes (Meir, et al., 2013, p. 325)

Verb Class	Verbs denoting body involvement	Body-anchored verbs	Agreement verbs
Roles of body:	Body represent themselves	Body as subject	Body as 1st person
Stands in opposition to:	Other body parts (brush hair vs. brush teeth)	Hands and space, which represent the predicate	Locations in space, associated with non-1st person
Grammatical category involved:	Adverbial function	Argument roles	Grammatical person

In summary, different works on space and iconicity in sign languages have revealed specific strategies signers use to depict location, motion, and action. Classifier and lexical predicates are primarily used across sign languages. The signers’ body also represents the human body in a very direct way for iconic mappings. Classifiers (handing, entity, limb) and signing perspectives documented in different sign languages have demonstrated that entity classifiers are canonically used in observer perspective. However, for AdaSL, Nyst (2007a) identified the absence of observer perspective and entity classifiers for motion events. In the light of Nyst’s findings, comparing GSL and AdaSL is interesting considering the increased language contact between the two over the past few years.

2.6. Simultaneity in sign language (Iconicity in grammatical constructions)

Other researchers have also explored different ways in which signers depict information using multiple strategies simultaneously. When signers’ express aspects of the same event using two different strategies or express two or more event simultaneously, they use the modality expressiveness to depict such information or event. Cross linguistic studies on simultaneity in sign languages have identified several strategies of simultaneity in sign languages (Vermeerbergen, et al., 2007). In expressing location, motion and action, the visual-spatial domain offers signers the affordances to depict two or more aspects of the same events or two or more events simultaneously with classifier and lexical predicates. In Figure 2.19, the DGS signer depicts two referents simultaneously in both example 1 and 2. Whereas the simultaneous construction (SC) in Figure 2.19 shows location, there are other instances where signers show motion and action (see Figure 2.20- *Three boys **walking** and man **looking at them curiously***) with SC as will be seen later in chapter 7.

Vermeerbergen, et al., (2007) identified several strategies of simultaneity in sign languages. These include the following:

1. Using the two hands as parallel autonomous channels, where one hand encodes signs distinct from those on the other hand. Such SC present two complete signs or "one hand can hold the end-state of a sign in situ while the other hand continues to sign" (Vermeerbergen, et al., 2007, p. 1).
2. Mouthing of lexical items that are lexically, semantically, and syntactically distinct from the sign(s) they accompany.
3. Using manual (hands) and nonmanual articulators "other than the mouth, which can combine with each other or with manual and oral action" (Vermeerbergen, et al., 2007, p. 3).

Figures 2.19 & 2.20 are examples of strategy (1) using two hands as parallel autonomous channels. Examples of strategy (2) can be seen in AdaSL provided by Nyst in the same volume (Vermeerbergen, et al., 2007). For instance, the AdaSL sign BIG is simultaneously signed with the mouthing [abo], from *agbo*, the Ga word for 'big'. Strategy (3) occurs in many other sign languages represented in the same volume and examples will be given in chapter 7 of this dissertation. Figure 2.20 combines both strategy 1 and 3. The signer's facial expression (nonmanual articulators) depicts the mental state of the man depicted in the video (*looking on curiously*) at the same time, he uses the plural entity classifier (3 boys) and the lexical predicate (SEE) in autonomous representation. The expressive use of SC by signers indicates the economical use of the visual modality to represent location, motion, and action simultaneously. The discussion in chapter 7 will focus on strategies (1) and (3) as listed above.

Previous research on SC in AdaSL identified that AdaSL have less frequent SCs "than in the signed languages studied so far on this topic" (Nyst, 2007b, p. 142). The study on AdaSL also commented that "[n]ot only are fewer instances found, also the types of simultaneous constructions used in AdaSL appear to be limited" (Nyst, 2007b, p. 142). Furthermore, Nyst identified that in AdaSL, there is a restriction to real-size signing and the "absence of object or entity classifier predicates expressing motion or location in space" (Nyst, 2007b, p. 142) as well as the "absence of entity classifier expressing motion in simultaneous constructions" (Nyst, 2007b, p. 143). Nyst's study presented SCs involving the following:

a. Simultaneous combinations of a mouthing and a manual sign of size and shape
b. Simultaneous combinations of a colour mouthing and a manual sign
c. Bimanual simultaneous constructions. These constructions were classified under the following: Ground incorporation, a manual sign with a whole body sign expressing simultaneous events; discourse marking hold.

The conclusion from Nyst's study was that AdaSL "uses neither simultaneous constructions involving classifiers predicates expressing motion or location in space, nor simultaneous constructions involving pointing" and "[s]imultaneous constructions contrasting two concepts are not reported either" (Nyst, 2007b, p. 143). The occurrence of SCs in GSL had not been studied prior to the research presented in this dissertation. However, considering the relationship between GSL and ASL, we can infer that SC in GSL will not follow the same pattern Nyst found in AdaSL. Most importantly, considering the increased language contact between the GSL and AdaSL over the past few years, a comparative research is relevant to identify how SCs are expressed in the two sign languages.

2.7 Focus of dissertation

This dissertation seeks to provide a comprehensive account of iconicity in GSL and AdaSL focusing on lexical iconicity, spatial iconicity and simultaneous constructions using both object naming and narrative tasks. This dissertation contributes to the knowledge of iconicity in language by providing accounts of iconicity in GSL and AdaSL. The goal is to contribute to the general discussion on iconicity in sign language and give more specific details in two domains: (a) *lexical iconicity* and (b) *iconicity in grammatical constructions* using three empirical studies. The first study will investigate lexical iconicity focusing on the different iconic strategies used by signers (and gesturers) to depict selected lexical items in five semantic categories (chapter 5). The second study will investigate the expression of location, motion, and action (space and iconicity) in grammatical constructions (chapter 6). The third study will investigate the simultaneous use of iconic strategies and perspectives to depict location, motion, and action (chapter 7). The lexical and grammatical domains were chosen because of the role iconicity plays in representing lexical items, space and events in sign languages (Padden, et al., 2013; Padden, et al., 2015; Kimmelman, et al., 2018; Perniss, 2007a; Özyürek & Perniss, 2010) and the dearth of research in GSL and AdaSL in these domains. Finally, the dissertation offers a theoretical analysis of the data across the studies from a cognitive linguistics perspective on iconicity in language (chapter 8). This dissertation seeks to answer the following questions:

(1) *Are there systematic differences and similarities in how these domains are represented iconically in GSL and AdaSL*?

(2) *How is cognitive linguistic representation of iconicity revealed in cross-linguistic data of different domains*?

Theoretical lenses provide the tools for analysis, and in this dissertation, the Cognitive Linguistics (CL) approach to linguistic iconicity will be relevant for the discussion on iconicity. The theory has been used to discuss iconicity in different sign languages including ASL (Wilcox, 2004; Wilcox, et al., 2003; Wilcox, 2017; Taub, 2001), Brazilian Sign Language (Libras) by Occhino (2016) and Irish Sign Language (ISL) by Leeson & Saeed (2012). In the CL approach, "iconicity involves an intimate interrelationship between form and meaning" (Taub, 2001, p. 18), treating form and meaning as integrated on each level of linguistic structure. The connections between form and meaning within the CL approach are regarded as intimate and not separable. The linguistic concept encapsulates both semantics and phonology at every level of linguistic structure. Thus, form-meaning is intertwined in this approach and as such it is suitable for discussing issues of linguistic iconicity (since form-meaning resemblance characterises iconicity). The separation of form and meaning is the major divide between cognitive theories and other linguistics theories like the formalist theories (Chomskyian linguistics) and the structuralist theories (de Saussure[36] (2011), Firth (1955) and Halliday (1973).

The ubiquitous presence of iconicity in sign languages will be discussed in the dissertation and examples will be drawn from GSL and AdaSL to demonstrate that iconicity is not a *monolithic* phenomenon but reveals itself in different ways within and across domains, and in different ways between languages. Another important discussion in this dissertation is how the articulators are profiled depending on how signers perceive or think about the relation between the *construals* of form and meaning (and this is very important within the CL approach). In addition to being pervasive across languages, there is mounting evidence that iconicity plays an important role in language, contributing to both language acquisition and processing (Imai & Kita, 2014; Perniss & Vigliocco, 2014; Lockwood & Dingemanse, 2015; Vinson, et al., 2008) As the recognition of iconicity as an important

[36] This edition of Ferdinand de Saussure's Course in General Linguistics (1916) was translated by Wade Baskin in 1959 and edited by Perry Meisel and Haun Saussy in 2011.

property of language grows, it is important to understand the different ways in which form-meaning relationships exhibit iconicity across languages (Pietrandrea & Russo, 2007; Taub, 2001; Dingemanse, 2012).

2.8 Summary

This chapter's aim has been to undertake a review of some of the research done in linguistic iconicity in both spoken and sign language. An overview of research in iconicity in spoken and sign language demonstrates that iconicity is widespread within the phonology, morphology, and syntax of spoken languages and prevalent in the lexicon and the grammar of sign languages. Review of some of these works shows that the representation of iconicity in spoken and sign languages are driven by modality differences and the affordances of each language modality. For instance, while onomatopoeia (imagic iconicity) seems to be available in most spoken languages, there are different ways speakers use diagrammatic iconicity (morphological and syntactic iconicity). On the other hand, there is a high prevalence of imagic iconicity (visual resemblance between the sign and the referent) in the lexicon of most sign languages. Different researchers have proposed different strategies to outline imagic iconicity in the lexicon of sign languages. These different strategies are tailored to show the iconic relationship between the form of the linguistic sign and the referent or the associated meaning. Signers use a wide range of strategies that depict diagrammatic iconicity. Focusing on spatial relationships, the research works presented in this chapter have outlined various approaches to iconicity in grammatical constructions. Iconicity in the grammatical domain can be expressed with simultaneity where location, motion and action are expressed with two autonomous articulators (i.e., with two manual signs), a manual sign and nonmanual articulators across different sign languages. Furthermore, the review of research on lexical iconicity, spatial iconicity and simultaneous constructions demonstrates that the visual-gestural modality is very rich in iconic structures and sets the background for the discussions in subsequent data chapters.

The next chapter (3) introduces the enterprise of cognitive linguistics and shows how it is different from other approaches to the study of languages. The chapter also presents iconicity from the point of view of the cognitive linguist focusing on the nature of the form and the meaning.

Chapter 3

The Enterprise of Cognitive Linguistics

3.0 Introduction

In the early 1970s, a different approach for language analysis emerged that studied language as an integral function of the human mind. Cognitive linguistics (CL) is generally described as a *movement* or an *enterprise* because it is not a specific theory, rather the approach is guided by principles, assumptions and perspectives which have produced different theories (Evans & Green, 2006). Different approaches to the study of language have resulted in several frameworks, and each of these frameworks looks at language from a different perspective. While the structuralist framework views language as a form that can be studied without regard to meaning, functional theories of language propose that language (or grammar) is meaningful and this "meaningfulness of grammar becomes apparent only with an appropriate view of linguistic meaning" (Langacker, 2008, p. 4). Croft & Cruse (2004) presented three hypotheses guiding the Cognitivist approach to language; (1) language is not an autonomous cognitive faculty, (2) grammar is conceptualization (3) knowledge of language emerges from language use. These hypotheses and many others form the cognitive basis of CL that differentiate it from generative grammar. Developed in the 1950s by Noam Chomsky, generative grammar is a collection of formal rules (that exist as Universal Grammar innately in our minds) used to generate well-formed sentences in a language.

Under functionalist approaches, linguistic structures are best analysed and understood with reference to the functions they carry out. Cognitivist theories are also functional in their approach assuming language is an integral part of human cognition. Within CL, language performs two key functions: the *symbolic/semiological* function and the *interactive* function. The symbolic or the semiological function allows concepts or ideas to be symbolized by means of sounds and gestures and the interactive function of language implies the use for communication, expressiveness, and social communion (Langacker, 2008).

Chapter 3 is arranged as follows: §3.1 introduces Cognitive Linguistics (CL) and elaborates on how the CL approach to linguistic analysis differs from other approaches. §3.2 considers the relation between form and meaning and the nature of the iconic mapping in CL. §3.3 presents the notion of construal, the relevance of construal in discussing iconicity and the different classes of construal. §3.4 discusses the conceptual model for conceptualizing sign articulators. Finally, §3.5 presents the summary of the chapter.

3.1 Cognitive Linguistics

Since its inception, the CL approach has been used to discuss languages from both modalities (signed and spoken) and these discussions have been based on the cognitive abilities of the mind. The approach considers language as a conceptualization of the real world that is conventionalised by language users into sounds that develop into words, phrases, clauses, sentences, and other discourse pragmatic interactions. In signed language, the conceptualization of the real world onto the body and space involves the hands and other articulators that create conventionalised meaningful segments. In the cognitive linguistics approach, form and meaning are integrated on every level of linguistic structure and it is this integration that makes the approach very suited and relevant for linguistic motivation (Taub, 2001). This dissertation employs the CL approach in analysing resemblance relationships within the domains of iconicity relevant for this dissertation (chapter 8).

3.1.1 How does the CL approach to linguistic analysis differ from other approaches?

The Cognitive Linguistics framework differs from other linguistic approaches because language is assumed to reflect fundamental properties and design features of the human mind (Evans & Green, 2006). In this approach, grammar is conceptualised in the *conceptual domain*; i.e. “the general field to which a category or frame belongs in a given situation” (Radden & Dirven, 2007). In other words, the conceptual domain refers to the coherent organisation of our experiences. The mapping of linguistic expression in our conceptual domains corresponds to the neural mappings in the human brain (du Castel, 2015)

Prior to the CL approach to the study of language, the general notions about language were more structurally inclined. Structuralists were interested in describing the form of language; meaning was studied not as product of the form but as a separate entity. Proponents of structuralist approaches to language highlight features like duality of patterning (Hockett, 1960), which stresses that the phonological aspect of language is meaningless. Any attempt to consider the relationship between language form and meaning was avoided by the fact that the *signified* and the *signifier* have no resemblance relationship (De Saussure). The intimacy between the linguistic form and the meaning attached to the form was divorced in the structuralist views and grammar was not considered a communicative (interactive) function of language.

CL presents a different assumption in relation to grammar: it encompasses sound/sign (phonology) and meaning (semantics), and these are inextricably linked to grammar (Evans & Green, 2006). The notion of image schemas is relevant, and CL proponents claim that over a dozen image schemas appear in our everyday thinking, reasoning and imagination (Gibbs Jr & Colston, 2006). Image schemas are mental patterns that provide understanding of various experiences (Johnson, 1987). These image schemas are derived from our experiential structures and become informative in our understanding - thus, the term usage-based approaches. Usage-based models contrast with the traditional structuralist and generative models of grammatical representation (Croft & Cruse, 2004) because our knowledge of language is knowledge of how language is used (Evans & Green, 2006).

3.2 Form and meaning

3.2.1 The nature of form

The form, either spoken (oral) or signed (manual), is identified as full-fledged language used to perform multifaceted tasks. The design features of languages that have been described in the literature include the following: productive, discrete, cultural transmission, arbitrary*, and duality in patterning*[37] (Hockett, 1960). Another design feature of language that this thesis is built on is that language has iconicity (Perniss, et al., 2010) i.e. resemblance relationship between the phonological and semantic parameters in the conceptual domain. In the oral modality, the phonological representations are the sounds (phonemes) and in the visual-gestural modality, the phonological representations refer to the form of the signs (Handshape-Location-Movement-Orientation as described by Stokoe and Battison (Stokoe, 1960; Battison, 1978)).

In the CL approach, the form (phonology) of the language is intrinsically linked to the meaning and this relationship can be that of resemblance (iconicity) or arbitrariness. In other words, the coexistence of iconicity and radical arbitrariness in the lexicon and grammar of sign languages lie at the heart of the complex interaction between the requirements of the linguistic system and the pragmatic constraints which guide the interpretation of a linguistic utterance (Pietrandrea & Russo , 2007). Therefore, from the perspective of CL, we do not view phonological parameters (form) as meaningless building-blocks which belong to a universal set of formal units, but we consider phonological parameters as a formal unit in sign languages that arise from individual experience and exposure to multiple usage events

[37] *These features are the most debatable and have caused several bipolar discussions on their relevance as universal features of all human languages. Duality of patterning postulates that in human languages, discrete meaningless parts combine to form meaningful units. This language universal feature has been under scrutiny as more linguists discover that most languages have forms that have resemblance mappings. In other words, there are forms that are meaningful and this meaningfulness contribute to the general meanings of the linguistic unit.

(Occhino, 2016). For example, the sign TOOTHBRUSH in GSL and AdaSL, involves the index finger as the preferred handshape and this by extension is a conceptualization of the finger as the shape and the size of a real-world toothbrush. Form is therefore extracted from meaningful context and form is associated with all the meanings ascribed to the word (Occhino, 2016).

3.2.2 The nature of meaning according to Cognitivist theories

Meaning resides in the mind of users of language and cognitive grammarians agree that meaning is derived from the process of generating an idea about something (known as conceptualization). The term conceptualization is explained by Langacker (2008) to comprise the totality of the language experience including both sociolinguistic and psycholinguistic facets of language. Concepts refer to abstract ideas and conceptualization is the process or action of forming or generating ideas about something.

Abstract concepts are conceptualised by the total facets of the "mental experience". For example, the concept *boy* /bɔɪ/ is conceptualised to represent the object which is +human, +male, -adult. This means of attributing meaning to entities is referred to as the dictionary semantics. However, the same concept *boy* can be conceptualised to mean something that is not found in the previous associations. For example, *boy* can be used as an exclamation to show surprise or admiration as in the sentence "Oh boy! That is amazing!" In this sentence, *boy* does not carry the same meaning as +human, +male and -adult. The preferred meaning association by cognitive linguists is the encyclopaedic semantics which encompass all the attributes and thereby gives an open-ended body of knowledge. Linguistic meaning is conceptualised by the speaker and the addressee (Langacker, 2008).

3.2.3 The relation between form and meaning

As stated earlier, meaning is conceptualization and meaning consists of both conceptual content and the particular way language users construe that content (Langacker, 2008). The form is the phonological representation of the (expressed) language in the various modalities and meaning is the semantics of the form. Iconicity is form-meaning-mapping relationship that is based on resemblance between the linguistic form (concept) and the semantic/referent (conceptualised meaning). In signed language, this resemblance is usually taken as the presence of visible or visual traces in the form that is discernible from the referent. This definition of iconicity considers linguistic forms that are imagic or imagistic but there are other types of iconic relationships in languages that are based in diagrammatic representation (syntactic). For example, classifier predicates as seen in chapter 2 have non-specific meaning and they represent salient characteristics of the entities they denote (Zwitserlood, 2012). For instance, two upright entity classifiers may represent 2 animate entities (2 men) or 2 inanimate entities (2 trees). Thus, iconicity is revealed in the construal of the form-meaning relationship produced and understood by signers in their interactions (Occhino, et al., 2017) such as entity classifiers representing men or trees.

A model of iconicity formulated for sign language known as *Cognitive Iconicity* has been developed by Wilcox (2004; 2002), in which he defines cognitive iconicity as a distance relation between the phonology and semantics of symbolic structures. In the cognitive iconicity perspective, arbitrariness is reduced because “the phonological and semantic poles of signs reside in the same region of conceptual space” (Wilcox, 2004, p. 122). The phonological pole refers to the form and the semantic pole refers to the actual meaning given to the word. Pole here is used to depict the phonological and semantic representations. Form and meaning refer to the phonological and semantic representations respectively and these two representations (or poles) are located at the same domain (or symbolic unit). The form entails the phonological realisation of the sign; HS, Mov., Loc., and Orn., and these phonological parameters are relevant for the meaning of the sign.

Linguistic symbols have both phonological and semantic representations and the relationship between the phonology and the semantics could be that of resemblance or arbitrariness depending on the distance between the phonological and semantic poles. That is, if the form of the sign (phonology) shares resemblance mapping with the meaning, the sign is iconic, and the phonological and semantic poles are close together in this case. For example, in GSL and AdaSL, there is a resemblance relationship between the form and meaning of the symbolic unit, TABLE (see Figure 3.1) The similarity shared by GSL and AdaSL in the resemblance relationship is the flatness that is represented by both sign languages. This iconic relationship between the form and the meaning is represented by a phonological form that involves the palms tracing a flat surface (*virtual depiction*) or the palms acting as the flat surface (*entity depiction*). The iconicity in this symbolic unit is perceived by the meanings derived from the form (phonology) of the sign. That is, flatness is a typical property of a table (top). However, when there is no resemblance relation between the phonological and semantic poles, there is no iconicity; that is the two poles are distant from each other in the conceptual space. For instance, SHOE (Figure 3.2) in GSL stands in an arbitrary relationship with its meaning. In other words, the phonology (the form of the sign) and semantics (meaning) do not have any resemblance relationship.

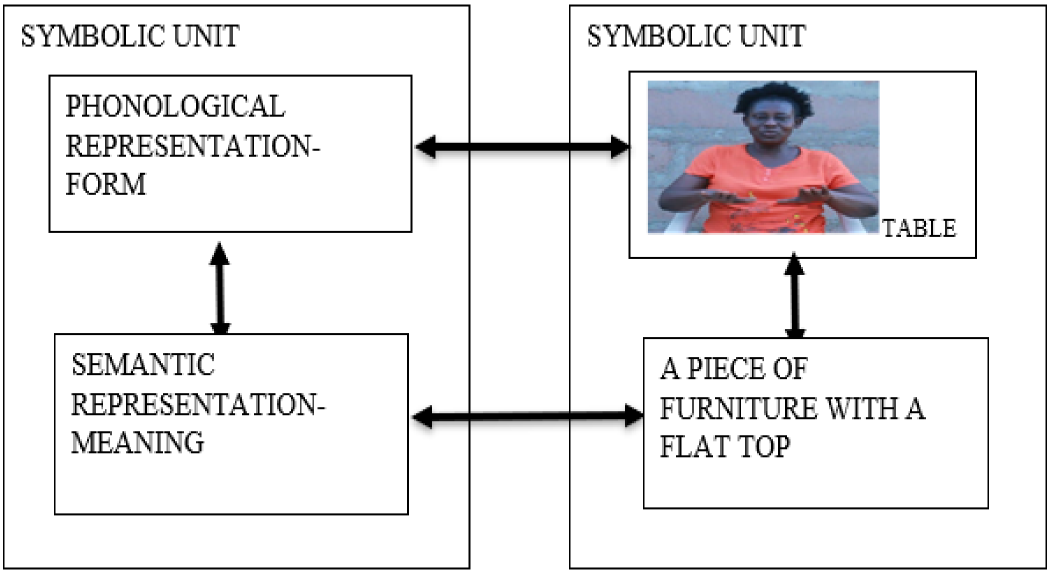


Figure 3.1 Phonological and semantic representations in an iconic relation, TABLE *in GSL*

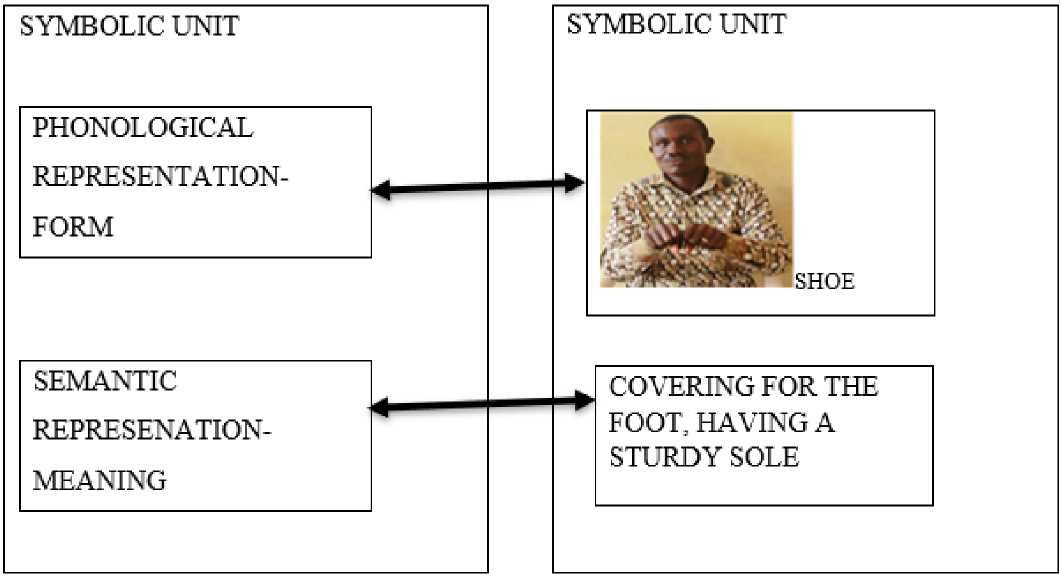


Figure 3.2 Phonological and semantic poles in an arbitrary relation, SHOE *in GSL*

The phonological representation (which consists of the articulatory parameters) represents the construals of form, and the semantics (which can have an arbitrary or iconic relationship) represents the construals of meaning. In the example of TABLE, the construals of form could be the flat surface or the legs of table, and the construals of meaning could be the tabletop or the table legs (or both) depending on the form(s) signers choose to represent. When the phonology and semantic poles are further apart, like SHOE as exemplified in Figure 3.2, iconicity is reduced and the sign leans towards an arbitrary notion. The iconic relationship extends beyond the visible (or imagistic) form-meaning mappings to the relationship between the linguistic representations of conceptual information/structure (Wilcox, 2004) in grammatical constructions (e.g., spatial iconicity).

3.2.4. The nature of the iconic mapping

The nature of the iconic mapping in language largely depends on the level of iconicity: phonological iconicity, morphological iconicity, iconicity in syntax etc. In this section, we shall concentrate on the nature of iconic mapping in sign languages. As demonstrated in chapter 2, iconicity is not monolithic and different iconic strategies are employed by language users to represent iconicity. In the grammar of sign languages, the availability of iconic devices makes it plausible to represent real life objects/entities and events using diverse iconic renderings. An example is the representation of *bird* in ASL, BSL, FSL, AdaSL and GSL in Figure 2.15. The 3-dimensional space and time in signed articulation affords sign languages the ability to represent *bird* based on specific characteristics of the bird.[38] The affordance of the visual-spatial modality is a motivation for iconic mapping in sign language.

One distinct feature of language is that users of different languages have different motivations for representing a concept with a given form. The motivation to represent real world structures with linguistic forms that share a resemblance relationship is as a result of language users' conceptual experience and real-world representation of these experiences. Motivation is the "language-external forces that can influence the nature of linguistic items" (Taub, 2001, p. 10); i.e. the motivation can be the need to preserve the structure of the image in the form of the sign, sociolinguistic observations, signers' preferences, the need to be economical etc. Whereas iconicity is "commonly identified as a motivation of the linguistic form, cognitive iconicity suggests an alternative view" (Wilcox, 2004, p. 141). The alternative view provided by Wilcox is that "iconicity is symptomatic of something more fundamental that unites both form and meaning" (ibid). In other words, the iconic mappings are the construals of the phonological and the semantic poles that are represented in the same symbolic unit (see figure 3.1). That is, the cognitive iconicity view suggests that the need to select iconic structures to represent linguistic forms is *symptomatic* of our cognitive abilities (Wilcox, 2004). Iconicity then becomes a symptom because it points to the organisation of our conceptual system.

3.3 Construal

A general definition for construal is that it "refers to our manifest ability to conceive and portray the same situation in alternate ways" (Langacker, 2008, p. 43). The meaning of an

[38] There are different names for bird in spoken languages. While most languages have arbitrary forms for the broad category of bird, there are probably many other languages that use forms with meaning resemblance to name specific types of birds.

expression is not just the conceptual content it evokes but also relevant is how the content is construed (Langacker, 2008). Verhagen (2007) states that the ability to construe a particular situation in alternate ways should, from a cognitive linguistic perspective, not come as a big surprise or require extensive justification. Occhino (2016, p. 198) puts it that "we construe the word in a way which is as true to our archetypal understanding as we possibly can, therefore the semantic and phonological poles often reflect these basic understandings". Construals of the world are reflected in linguistic forms and these resemble the conceptual structures they convey.

One of the major hindrances to the notion of iconicity in language has been that traditionally, linguists described iconicity as pictorial representation and any object/event that does not evoke pictures was not considered iconic (Wilcox, 2004). Cognitive linguists support the claim that iconicity in sign language goes beyond just *pictures in the air* but encompasses a relationship that exists "between two conceptual spaces" (Wilcox, 2004, p. 122) including the construal of the object/event. The two conceptual spaces refer to the phonology (form) and the semantics (meaning). This section will discuss construal in relation to iconicity. Iconic mapping is the construal of the phonological and semantic *poles* that are represented in the same *conceptual space*. Construal is relevant in both lexical and other grammatical domains. That is, when the phonological and semantic poles reside in the same region of conceptual space, it reduces arbitrariness, but when they reside in vastly distant regions of conceptual space, it increases arbitrariness (Wilcox, 2004).

Thus, a resemblance relation between form and meaning is the result of the closeness of form to meaning. For example, the forms of the signs LONG BROOM and COMB (see Figure 3.3) are iconic in AdaSL and GSL and as such there is closeness between the form and the meaning. The iconic representation relies on the conceptualization of the hands and the fingers to reflect the real-world event. For example, GSL signers profiled COMB with either *handling* or *instrument* strategies. AdaSL signers profiled LONG BROOM with a HS that depicted how the object is grasped or handled or hands that depicted features of *long broom* and performs actions related to it. The different profiled forms of LONG BROOM and COMB indicate the alternate ways signers portrayed the same object with different iconic strategies.

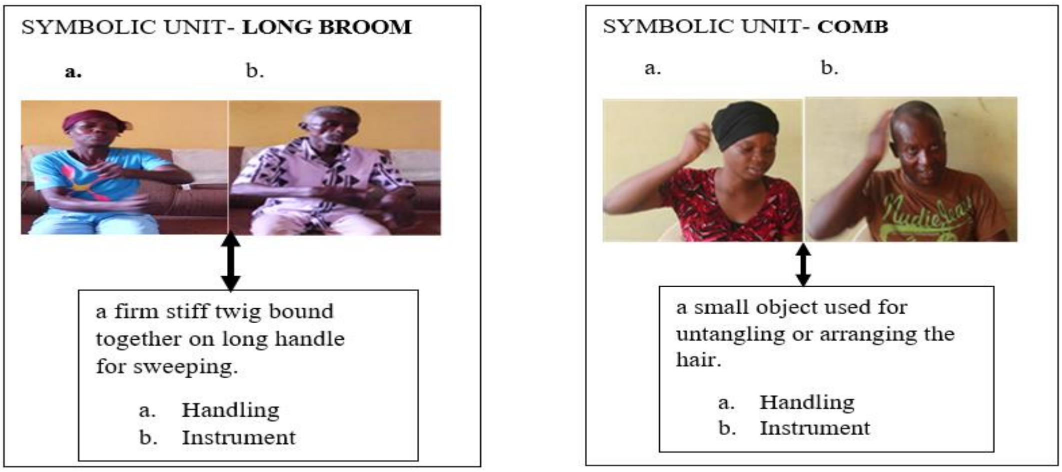


Figure 3.3 Construals of LONG BROOM *&* COMB *in AdaSL and GSL*

Construal is relevant in the representation of other grammatical structures. Signers construe spatial relations and events based on personal knowledge and experience. For example, GSL signers construed scenes in the Pear Story video (Chafe, 1980) based on their individual conceptual mappings of the scenes (the Pear Story was used for data collection, see chapter 4). For instance, one frame of Pear Story showed "*Boy and girl ride towards each other*" (*Boy rides from right to left, girl rides from left to right*) and this was profiled with different strategies as exemplified in Figure 3.4.

Figure 3.4 Construals of "boy and girl ride towards each other" in GSL

In Figure 3.4, the first two signers construed the scene profiling the hands as two human entities (with entity classifiers) moving towards each other and the 3rd and 4th signers construed the scene as two pairs of eyes watching each other (with the iconic lexical sign WATCH signed on both hands).

3.3.1 Why construal is important to iconicity?

Construal's relevance to linguistic iconicity is seen in how language users reflect their experiences through linguistic representation (semantic and phonological representation). The specific labels of construal (in the following subsections) are relevant to conceptualization of linguistic expressions to mirror experiential knowledge. For example, Tuggy acknowledges that human concepts to some degree are schematic and "schematicity relations arise when cognizers compare mental structures and perceive similarities between them" (Tuggy, 2007, p. 86). Signers of different sign languages employ different iconic structures to profile the same entity. However, we can associate similarities between these different iconic structures through perceptual experiences (e.g. TREE and BIRD in different sign languages exemplified in chapter 2) because the different iconic strategies point to the same object. There are specific classes of construal and these classes have been discussed by different researchers in the literature (Langacker, 2008; Langacker, 1987; Talmy, 2000; Croft & Cruse, 2004). For this dissertation, we shall focus on the classes discussed in Langacker (2008) including specificity/schematicity, focusing, prominence and perspective.

3.3.2 Specificity/Schematicity

In describing construal, specificity refers to "the level of precision and detail at which a situation is characterized" (Langacker, 2008, p. 55). The exactness, precision, details, maximum information, and the accuracy of the label is rendered as specificity. For instance, *the 10-year-old blonde girl* is more specific than *the young female*. *Schematicity* bears characteristics of the specified object. Hierarchical relationships can also be mapped within the schematic relationship in the examples below (i & ii): we see that the tail-end entities (on the right) have specificity in their descriptions. In other words, specificity increases as schematicity decreases. (Examples from (Langacker, 2008, p. 56))

i. rodent → rat → large brown rat → large brown rat with halitosis

ii. hot → in the 90s → about 95 degrees → exactly 95.2 degrees

Another relationship that can be discussed from the above levels of specificity is the creation of taxonomies, which represent the "hierarchies of conventionally recognized types" (Langacker, 2008, p. 56). The taxonomy of bird can be *categorized* from more *birdy* to the less *birdy* creatures and in this the robin will be *birdier* than the duck.

The specific construed properties of the articulatory parameters (phonological representation) and their similarities with the semantic structures are 'discovered' through specificity. For a better grasp of the construed iconic relations, specificity and schematicity are relevant for both the phonological and semantic poles. In AdaSL, schematicity and specificity is revealed in signs with more than one root morpheme. An example is a signer's representation of TELEVISION (Figure 3.5) construed as:

iii. square object (two index fingers trace the TV screen) + *entities moving* (two palms trace the movement on the screen) → *square object that has entities moving on it*

The level of precision and detail represented in the sign is specified by the two index fingers that create a square shape and the palms that move about. Iconicity in TELEVISION (AdaSL) is manifested through the conceptualization of the articulators[39] (the two index fingers *tracing* the TV screen and the movement of the two palms as *entities moving*). Television as a square object is a schematic depiction, and television as square object with entities moving on the screen increases specificity.

Figure 3.5 TELEVISION in AdaSL

3.3.3 Focusing

Another aspect of construal that is relevant for both lexical and syntactic levels of description is focusing. Focus deals with the selection of conceptual content for linguistic presentation, and its arrangement (metaphorically) into foreground vs. background (Langacker, 2008). The notion of focus "is a matter of degree" and "it is also relative to particular purposes, dimensions of structure, and levels of organization" (Langacker, 2008, p. 57). The background/foreground relationship is defined as "any case where one conception precedes and, in some way, facilitates the emergence of another" (Langacker, 2008, p. 58). Therefore, background knowledge will serve as the basis for understanding a linguistic form. Cognitive ability and experiential knowledge are required for the background and foreground relationship.

Focusing also entails *scope*, and this considers the access a linguistic expression affords to a particular set of cognitive domains, in general, or on a given occasion and also considers the extent of an expression's coverage (Langacker, 2008). Further, scope considers the domains that are accessed and the sections of the domains that are evoked for meaning. The domain can be the maximal scope or the immediate scope. Langacker (2008) made the

[39] Conceptualization of the articulators is discussed in detail in §3.4 of this chapter.

distinction maximal scope and immediate scope. Maximal scope is the full extent of an expression's coverage and immediate scope is the portion that is relevant for a specific purpose. For example, the *eye* has a maximal scope with the head or even the body and its immediate scope will be the face. That is, the *face* will be more highly activated than the head when the eye is mentioned. Scope as a relevant notion of focus is applicable in sign languages. For example, certain objects or events extend their coverage from the visible target to a wider domain relevant to understanding such expressions. For example, the lexical sign SUNDAY (Figure 3.6) in AdaSL is expressed as opening a Bible which is grounded in the general idea that deaf signers go to church on Sundays. In other words, SUNDAY has maximal scope with the Deaf church and minimal scope is the Bible that is used at the church. Other lexical items in GSL and AdaSL afford other cognitive domains to be assessed by signers. Examples in GSL and AdaSL are as follows:

iv. PLATE= round flat object + **EAT** (used by some signers of GSL and AdaSL)
v. BACKPACK= **SCHOOL** +hand holds imaginary backpack to shoulder (some GSL signers)
vi. DRESS= **LADY**+ tracing the dress on signer's body (some GSL signers)

Figure 3.6 SUNDAY in AdaSL depictive of opening the Bible at the church

Other examples of focusing/scope in the narrative task used for data elicitation in this dissertation (i.e. of the Pear Story) include a narration that referred to the man on the pear tree as deaf because he *could not hear* the boy lift and steal the basket of pears. The narrator considered the man's inability to hear (immediate scope) as a sign of *deafness* (maximal scope).

3.3.4 Prominence[40]

The linguistic ability to give more information and project an idea above others is *prominence*. The prominent information, idea, entity, concept is the focus in an expression. In other words, there is a relationship between focus and prominence. The prominent idea is

[40] Prominence is also referred to as salience (Langacker, 2008).

usually the most highlighted in the discourse. In the linguistic notion of iconicity, prominence and focus play very important roles; that is, whereas focus deals with the selection of conceptual content for linguistic presentation, prominence gives more information and projects one idea above the others. Two perspectives of prominence listed by Langacker are *profiling* and trajector/landmark alignment. Whereas the notion of profiling confers on participants the degrees of prominence, trajector is the most prominent participant and landmark refers to the participant that is given the secondary focus (Langacker, 2008). This dissertation focuses on profiling. In profilin*g*, the construed experience within the conceptual domain highlights some aspect of the scene against the conceptual base (Langacker, 2008). The conceptual base of an expression refers to all the domains that are accessed on any given occasion and this is broad construal (i.e. the maximal information given). However, when an expression is construed narrowly, "the portion put 'onstage' and foregrounded has the general locus of viewing attention" (Langacker, 2008, p. 66). As noted by Langacker (2008), the notion of profiling is prominent in the pervasive phenomenon known as metonymy. Profiling is relevant for both lexical and grammatical levels of iconicity.

The relevance of prominence as a label of construal can be exemplified with metonymy (part-whole relationship). An example is the metonymic relationship of the sign WOMAN in AdaSL (Figure 3.10). This sign represented by a fist handshape that moves from one breast (location) to the other portrays a meaningful location. The prototypical metonymic connection between the breast and WOMAN is iconic. The breast, however, does not look like a woman. The HS is a symbolic structure that has form and meaning and represents the shape of the depicted image of *breast*. The meaningful location shows the two breasts. The orientation and the movement of the HS are significant to the depicted image. The sign WOMAN profiles the woman, not her breast. This metonymic relationship is iconic. Further, the breast is one of the most visible distinguishing features of a woman and as such giving it prominence in the sign WOMAN is relevant for form-meaning resemblance relationship. Another example is the sign FRIDGE (refrigerator) that has a network of associations as exemplified in Figure 3.7. Signers' construal of fridge is based on what is given prominence in their conceptual mapping of fridge.

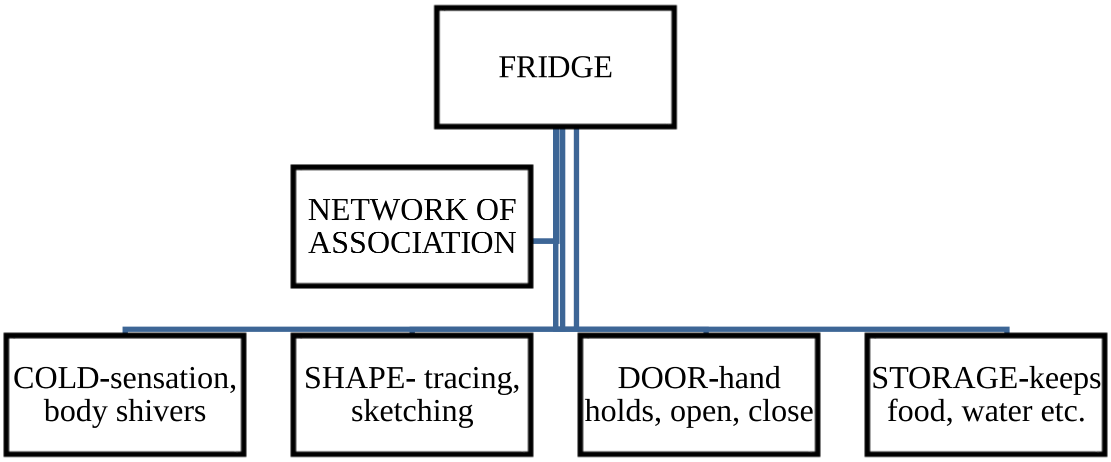


Figure 3.7 Network of Association

In the narrative tasks that provided data for this dissertation, motion and action events were given prominence as compared to location or static scenes (chapter 6). Signers mostly had a narrow construal by projecting motion and action events as compared to other locational information such the trees in the background, the vegetation, and the colour of the clothes. In other words, the domains accessed mostly by signers in retelling the Pear Story placed 'onstage' the dynamic aspects of the story as compared to the static scenes.

3.3.5 Perspective

In the words of Langacker (2008, p. 73), perspective "is the *viewing arrangement*, the most obvious aspect of which is the vantage point assumed".[41] The viewing arrangement is explained as the "overall relationship between the viewers and the situation being viewed". Thus, the viewers are the "conceptualizers who apprehend the meanings of linguistic expressions: the speaker and the hearer" (ibid). The viewing arrangement means the interactants/interlocutors can have a fixed domain or viewing, i.e. both perceive the same thing at the same angle. However, the viewing arrangement can be presented in diverse directions. The interlocutors can perceive the same thing but at opposite angles and an example is a mirror-like arrangement, where the left side of one person is the right side of the other.

It is also possible that the viewing point might represent an abstract location, a surreal environment or even a fictitious location. The perspectives are not necessarily static, because the interlocutors could be on the move and the viewing situation could change. When the

[41] Under the rubric of perspective, Langacker considers dynamicity, pertaining to how a conceptualization unfolds through processing time.

interlocutors are far apart from each other, the viewing perspective is known to the "viewer" alone. Important to the viewing location is the vantage point, and "the vantage point is the actual location of the speaker and hearer" (Langacker, 2008, p. 72).[42] Viewing arrangement extends beyond the visual domain. The difference between "I" and "the person reading this dissertation" or between "here" and "there" is one of different viewing arrangements. In this dissertation, perspective will be relevant for the analysis of iconicity in grammatical constructions. Important to be considered in this dissertation is the iconic representation from character and observer perspectives; that is, how signers present events in their conceptual location. When the signer takes on the character perspective, the signer assumes the role of an active character in the action/event. On the other hand, when signers assume the role an observer, the action is presented in the signing space in front of signer and the action is retold not performed, and the signer is external to the action.

3.4 Conceptualizing the Articulators

We depend on the formational parameters to identify whether a sign is iconic or not. However, it is important to note that iconicity is not primarily a transparent form-meaning mapping (Occhino, et al., 2017). The formational parameters "consist of a form- their physical realization (the shape of the hand, the body parts used as locations, the shape of the movement)" (Pietrandrea, 2002, p. 298). Thus, the formational parameters (which make up the phonological pole) have a conceptual relationship with the semantic pole. For instance, in GSL and AdaSL, the palm represents a flat surface (TABLE, MIRROR), the index/pinkie fingers represent a pointed object (HIGH-HEEL SHOE), or a small tool (TOOTHBRUSH- GSL & AdaSL, KNIFE-GSL), the arm represents stout objects like BOTTLE (AdaSL), TREE (AdaSL & GSL) etc.

This section will present various strategies signers use to conceptualise the articulators in signing structures that are iconic. This is an important discussion in this dissertation because the CL approach looks at how the articulators are connected depending on how signers perceive or think about the relation between the construals of form and meaning. There are strategies that users of sign languages employ in making iconic structures and these include iconic devices like *handling*, *instrument*, *tracing*, *entity*, *measure*, *indexing* or *pointing* (Mandel, 1977; Taub, 2001; Padden, et al., 2013; Padden, et al., 2015; Ebling, et al., 2015; Kimmelman, et al., 2018).

[42] Viewing arrangement is a presupposed vantage point (Langacker 2008:75).

The lexicon and grammar of sign languages use different iconic strategies to map form-meaning resemblance relationships. For instance, the meaningful phonological parameters of the signs BOTTLE and BOOK (in both GSL and AdaSL) have a semantic relation to the objects "bottle" and "book" in the perceptual world. Comparatively, entity classifiers are iconic depictions of real-world entities; that two *upright entity classifiers* can represent two upright entities (human, tree, pole etc.) in the perceptual world. In other words, "the incidence of iconicity in formational parameters is an important indicator of the incidence of iconicity" (Pietrandrea, 2002, p. 299) within the lexicon and grammar of sign language. The hands are the physical conceptualization of the form but not *always*[43] the actual form. For instance, the V-HS can be conceptualised to represent several iconic forms including pairs of things such as legs, eyes, tines etc. (Occhino, et al., 2017). The linguistic sign evokes all aspects of the sign's meaning although the HS selects and schematises what signers perceive as the most representative of the sign.

3.4.1 Conceptual model for conceptualizing sign language articulators

When the sign language articulators are conceptualised, the articulators can move about and interact with each other. Certain aspects of our conceptual abilities are linked to our perceptual experience (Wilcox, 2004). The conceptualization of the articulators of sign language as hands moving in space and perceived visually is important for conceptualization (Wilcox, 2004). As stated in chapter 2, the manual parameters for sign languages are the articulatory parameters i.e. Handshape, Location, Movement, and Orientation. Facial expressions and other gestural incorporation represent the secondary articulators in sign production. A key point to note is that the "articulators of signed languages do not directly represent events and objects in the real world… conceptualization of the articulators are mapped onto conceptualizations of the world" (Wilcox, 2002, p. 257). That is, the articulators take on some properties of the objects, events/action, spatial locations of the entities that are represented.

The grammar of sign language articulators has certain conceptual properties that are postulated by Wilcox (2004, p. 125; 2002) and relevant for conceptualizing sign articulators;

1. The hands are autonomous objects and manifest in the spatial domain.

2. Location is a dependent property, manifest in the spatial and temporal domain.

[43] The *hand-as-hand* iconic strategy employs the hand of the signer as the actual form in handling strategy.

3. Orientation is a dependent property of handshapes, manifest in the spatial domain.
4. Movement is a dependent property of handshapes, manifest in the temporal domain.

Autonomy and dependent relationships are demonstrated by the articulators. Explaining autonomy and dependency, Langacker is of the view that an autonomous structure has the potential to be manifested independently and a dependent structure requires the support of an autonomous one for its full manifestation (Langacker, 2016). The hands are autonomous objects and location, orientation and movement are dependents properties. Explaining Wilcox's conceptual properties of sign language articulators, we realise that the handshape can be an iconic representation of the object's form, size, shape, height, or the way the object is handled or manipulated. Therefore, the hand can refer to an object like a HANDBAG according to its size, or how it is handled. Further, the location of the handshape is very relevant to the iconicity revealed. The signs EAT or DRINK would be less iconic if they were located by the waist area of the signer. However, location is a dependent property, and its manifestation is based on the spatial and temporal domains. The orientation of the handshape can reduce or increase the distance between the phonological and semantic poles. For instance, the sign for BOWL in both GSL and AdaSL is realised with an open palm that faces upwards. However, if the orientation of the palm faces downwards, the sign can still be argued as being iconic, but it loses the shape of the bowl that is revealed with an upward orientation. The movement of the handshapes contribute to bringing the phonological and semantic poles closer. For example, the signs for GO and COME in GSL and AdaSL are differentiated by the movement and the perceptual iconicity is largely dependent on the direction of the movement (GO is away from the signer and COME is toward the signer).

Wilcox's framework also states that articulators have certain conceptual properties that are *discernible*, as they serve as channels for iconicity. The hands might refer to the physical objects that are composed of material substance residing in space. The objects have location and orientation just like the objects in space and the hands are autonomous objects that manifest in the spatial domain. Again, Wilcox compares the movement of the hands to events. Thus, movement might represent events but does not always have to. The events are processes and involve the transfer of energy. Very important to the discussion of conceptual properties in sign language is conceptual archetypes and these refer to "experientially grounded concepts so frequent and fundamental in our everyday life that the label archetype does not seem inappropriate" (Langacker, 2008, p. 33). This is discussed in chapter 8 §8.5.

3.4.2 Conceptualizing the Hands

The hands are the dominant articulators in most studied sign languages. The handshape feature of sign languages has either iconic or arbitrary connections. According to Wilcox, the "[h]ands are prototypical objects in interaction, either with other hands or other objects" (Wilcox, 2004, p. 125). The conceptualizations of the hand can represent the object by using the finger(s), the arm, or any portion of the hand. The relationship between the phonological and semantic poles of symbolic structures (linguistic units) are brought closer if the handshape (phonological pole), which is the construal of form, has a resemblance mapping relationship with the construals of real-world scenes (cognitive iconicity). Some handshapes are iconic by form and others are iconic only when they are used. While some handshapes represent the shape of the construed object (*virtual depiction*), others are substituted as the object itself (*entity depiction*). Also, the fingers and fingertips can be conceptualised to represent items of smaller sizes (see Tano & Nyst, 2018).

Iconic signs can involve one hand or two hands. Signs that involve the two hands with the dominant hand as the active articulator and the non-dominant hand as the passive articulator can create figure-ground relations (diagrammatic iconicity), which are themselves iconic. The conceptualised handshapes have iconic features of the real-world objects or events, which are discernible from the formational properties of the hands. Some conceptualised handshapes have specificity that "is necessary to describe specific construed properties" (Wilcox, 2004, p. 125) of the entity being represented (see Figure 3.8).

vii. SCISSORS - index and middle fingers conceptualised as the two blades of a scissors, i.e. the specific construed property of the object.

viii. TOOTHBRUSH- the index finger is related to the shape and size of a real toothbrush

ix. KEY- the handshape imitates the shape of the hand when turning a key into a keyhole

x. BOWL- the handshape is a conceptualization of the shape of a bowl etc.

xi. SMALL PEPPER- the delimited fingertip depicts the size of a small pepper.

SCISSORS -AdaSL TOOTHBRUSH-GSL KEY-GSL BOWL-AdaSL

SMALL PEPPER- AdaSL & GSL

Figure 3.8 Examples of iconic conceptualised handshapes

In addition to the above examples, the hands can be conceptualised to represent real-world processes and things through classifier predicates. Classifier predicates are polymorphemic forms that combine handshape, movement, location etc. to indicate a semantic category, size and shape, movement, spatial relationship etc. (Engberg-Pedersen, 1993; Wilcox, 2002; Perniss, 2007a). The classifier handshape has features of the depicted object, for instance, the index finger typically represents upright entities including humans and trees. The examples in Figure 3.9 are from GSL.

RH:	CL_E (basket)	CL_E (person)	CL_H (hold hat)	CL_E (person)
LH:	CL_E (ground)	CL_H (hold bicycle)	CL_E (person)	CL_E (ladder)

Figure 3.9 Examples of entity and handling classifiers in GSL

In CL framework, movement is a dependent property of handshapes, and dependent structures require the support of an autonomous (handshape) one for its full manifestation. The conceptualised movement represents the movement of the real-world entity that is being represented. For example, in Figure 3.9, stills 2 & 4 have movements that indicate the movement of a human entity from one location to another. The addition of movement to (classifier) handshapes embodies the experience from the real world onto the conceptualised articulators. The movement of the conceptualised hands can be iconic or arbitrary. When movement is iconic, it represents the real-world movement such as in Figure 3.9, stills 2 & 4 (human entity moves to a location/human entity moves up the ladder). Phonologically, movement and change in location occur together, i.e., a movement from one place to another will involve a change in location (location on the body or location in space). As indicated earlier the conceptualised handshape represents objects and the movement represents the action of the object.

Location as a dependent property of the hands represents real-world locations in iconic spaces. Iconic locations are meaningful, e.g., in AdaSL, the location for the sign MAN is the beard and the location for the sign WOMAN is the breast and these two locations depict specific biological features that differentiate between a man and a woman (see Figure 3.10). The conceptualization of location on the body or in sign space and the use of locative expressions can reposition a concept in conceptual space, e.g., a change in location in sign space represents a change in location in conceptual space. Locative expressions are signs that indicate the place or the direction of something or someone. Change in location is phonologically represented by a hand moving from one location to another.

WOMAN

MAN

Figure 3.10 Meaningful locations in AdaSL

The orientation of the handshape, which is a dependent property of the handshape, is an important construal of iconicity. Signers employ palm orientation in conceptualization of the articulators. The direction of the palm in iconic signs highlights the construals of real-world scenes that are mapped unto the construals of form. For example, the palms can profile a plate, mirror or the floor depending on the orientation. The construal of the orientation is significant in iconic signs because it is meaningful. As a dependent property of the handshape, orientation is manifested in the spatial domain.

3.5 Summary

This chapter introduced the cognitive approach to linguistic iconicity and discussed ways in which this approach is different from other approaches. Other important discussions in this chapter include form-meaning mappings from the cognitive perspective and the relevance of researching sign language iconicity with CL. The notion of construal, which is very relevant in the cognitivist theories, is given in-depth discussion focusing on important classes of construal that will be relevant for subsequent chapters in this dissertation. The chapter ends by focusing on how signers conceptualise the articulators and presents examples from GSL and AdaSL. Further discussion on the CL approach to the data for this dissertation will be given in chapter 8 and more examples will be drawn specifically from GSL and AdaSL with respect to signers' depiction of lexical iconicity and iconicity in grammatical construction.

The next chapter discusses the methodology used for the data collection, annotation, and transcription.

Chapter 4

Research Methodology

4.0 Introduction

Recent studies on research methodology for linguistic research have identified different approaches relevant for different linguistic fields (Litosseliti, 2018). Angouri (2018, p. 32) was of the view that “affiliation to certain epistemological approaches may influence the approach taken and methodologies selected”. For example, whereas comparative studies might rely on quantitative approaches, descriptive studies or thematic analysis mainly use qualitative approaches for data selection and strategies for data analysis. This dissertation compares the representation of iconic structures in two sign languages (using three empirical studies) and presents a discussion of the cognitive approach to iconicity in sign languages (based on the empirical studies). That is, the dissertation presents chapters that deal with both quantitative and qualitative analysis. Therefore, both quantitative and qualitative approaches are relevant for the analysis and the discussion of the data. It is therefore appropriate to state that this dissertation uses a mixed methods approach.

Mixed methods is defined as “research in which the investigator collects and analyses data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study or a program of inquiry (Tashakkori & Creswell, 2007, p. 4). However, the approach is used narrowly in this dissertation in the sense that only one set of data was used for both the numerical and thematic (descriptive) analysis. Considering other studies that have used this method, Tashakkori & Creswell (2007, p. 4) listed some ways in which researchers utilised the mixed methods approach in one or more of the following ways;

1. two types of research questions (with qualitative and quantitative approaches)
2. the manner in which the research questions are developed (participatory vs. preplanned)
3. two types of sampling procedures (e.g., probability and purposive)
4. two types of data collection procedures (e.g., focus groups and surveys)
5. two types of data (e.g., numerical and textual)
6. two types of data analysis (statistical and thematic)
7. two types of conclusions (emic and etic representations, ‘‘objective’’ and ‘‘subjective,’’ etc.)

Considering the above listed ways, this dissertation broadly follows no. 1 and 6; *two types of research questions (with qualitative and quantitative approaches)* and *two types of data analysis (statistical[44] and thematic)*. In addition, no.4 and 5 of the mixed methods approaches were narrowly considered; *two types of data collection procedures (e.g. focus groups[45] and surveys)* and *two types of data (e.g., numerical and textual)*. For instance, the lexical data and the narrative data used different elicitation procedures. The lexical data used pictures limited to 50 objects and the narrative data used videos for the elicitation. The analyses were based on descriptive and numerical differences and the same data (lexical and narrative) were used for both analyses. The research questions for this dissertation, "*are there systematic differences and similarities in GSL and AdaSL in representing iconically motivated lexical items and grammatical structures*? and "*how is the cognitive linguistic conceptualization of iconicity revealed in cross-linguistic data of different linguistic domains?"* will be answered in chapters 5, 6, 7 and 8. Chapters 5-7 present a quantitative analysis of the data focusing on a quantitative analysis of differences and similarities between GSL and AdaSL. On the other hand, chapter 8 presents a thematic or descriptive analysis of the themes listed in chapter 3 and the iconic strategies mentioned in chapters 5-7. This thematic analysis does not consider the numerical preferences. That is, chapter 8 makes descriptive interpretation based on what signers produced by relating the data to cognitive approaches to language.

The rest of this chapter will present the information on the data collection (§4.1); description of the stimulus materials (§4.2); research participants (§4.3); coding, annotation and transcription of the data for the relevant domains discussed in subsequent chapters (§4.4); how the quantitative and qualitative analyses were done (§4.5) and finally a summary of the data taken is presented (§4.6).

4.1. Data Collection

Data for this dissertation was collected between September 2016 and July 2018. Within this period, there was one major fieldwork trip with several visits to the different communities. The major fieldwork took place in Adamorobe and Medie between May 2018-July 2018. The

[44] This research used numerical inferences to identify signers (and gesturers) preferences. I did not run any statistical analysis in programmes such as R. Thus, statistical is used above referring to numerical analysis that identified proportions used by signers (and gesturers).

[45] Analysis from the focus group discussions are not presented in this dissertation as part of the data chapters, but some of the information are presented in the Introduction chapter (1) and in other papers and presentations that I have quoted in this dissertation.

fieldtrip resulted in videos of sign and gesture data; data consisted of productions of lexical items and narratives. Other data collected within the periods of research work include focus group discussions and other interviews. However, for this dissertation, the focus is on the lexical descriptions and the narrative tasks. Two signers from the communities helped to recruit the language consultants, and one hearing signer from Adamorobe helped to recruit non-signers in Adamorobe.

4.2. Stimulus Materials

The major stimulus materials used for the data collection are pictures of 50 Household tools and objects, and video vignettes of the Pear story.

4.2.1 Household tools and objects

50 selected Household tools and objects were used to collect lexical data from signers (and gesturers). The selection of the Household tools and objects was based on their availability to both language communities. Pictures were carefully selected to ensure that the images are not blurred, and that signers can easily identify these items. The choice of stimuli (pictures) was motivated by earlier research by Padden, et al., (2013; 2015) that used selected pictures of tools and objects to elicit data from signers and gesturers for a similar analysis. Pictures of basic Household tools and objects made the data collection easier because most of the adult signers of AdaSL that took part in this study cannot read. Further, the transition from concept (pictures/non-linguistic stimuli) to sign is relevant since this dissertation is not a translation study.

Pictures of the selected items were presented on a laptop screen and participants were asked to provide signs for the items in their sign language. Participants were given the opportunity to view the items before their signs were recorded. The pictures were shown on a white background to make the object clear and visible to the participants. Single images of each item were shown except for items that come in pairs like *shoes*. Drawing motivation from previous research (Padden, et al., 2013; Padden, et al., 2015; Hwang, et al., 2017; Kimmelman, et al., 2018; Hou, 2018), items from different semantic categories were added to the list. Items selected were in the following semantic categories: Handheld tools, Clothing & Accessories, Appliances, Furniture & Household items, and Nature. Below are the stimulus materials used for data collection.

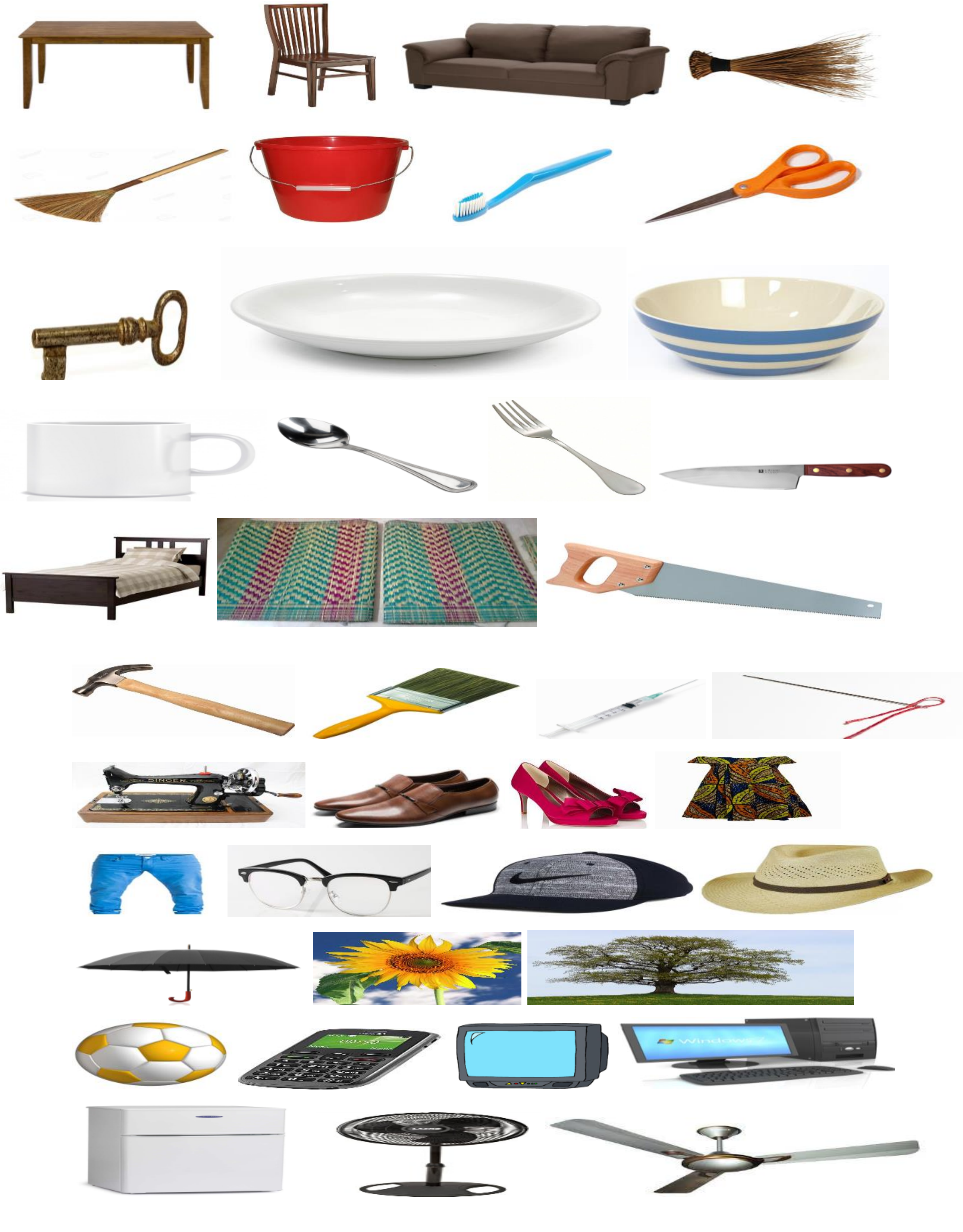


Figure 4.1 Stimulus pictures used for lexical elicitation task

4.2.2 Pear Story

The Pear Story was the second stimulus for the data elicitation, and it was chosen because signers from both language communities related to the story.[46] The Pear Story, a 6-minute film developed in 1975 by Wallace Chafe, shows a real depiction of human actions. The video shows a boy who steals a basket of pear fruits from a farmer and later gives three of the fruits to three other boys. Other actors involved in the video include a girl on a bicycle and a man with a goat. The Pear Story was appropriate to both communities because of the following: (1)The video is a real depiction of human action and real human beings were involved in the story (2) The events depicted in the story are not surreal and it involved activities that most of the consultants were used to (3) Most importantly, the Pear Story has been used for language elicitation tasks in several languages.

The Pear Story was divided into vignettes not longer than 1 minute 20 seconds; in total, six vignettes from the 5 minutes 55 seconds original video were created. This was done to facilitate retelling and to deal with memory limitations. Each vignette focused episodic break points and the length of the vignette enabled easy retelling of the story without missing vital information. The Pear story is very dramatic and the events in the story involved a lot of information about locations, motions, and actions, i.e., spatial and action information of the type that was of interest. The video vignettes were played for signers as many times as the signers requested to enable signers to memorise each vignette before retelling the story in front of the camera and other signers. Below is the summary of the division of the 6 vignettes of the Pear story.

---

[46] Other data was taken from the retelling of the German cartoons "Sendung mit der Maus" (featuring an animated mouse and elephant). However, these will not be presented in this dissertation.

1. A man on a tree picking pears. A pear fruit fall. The man descends from the tree using a ladder and empties the content of his apron into a basket. He cleans one pear (the one that fell) with his red kerchief that was tied around his neck.
2. The man dusts himself off and climbs up the ladder back to the pear tree. Another man appears dragging/pulling a goat. He passes under the pear tree and moves on with his goat. The man on the tree continues picking pears.
3. A boy riding a bicycle also passes under the tree. He stops when he sees the baskets of pears. He looks up to see if the man on the tree is watching. He carries one basket of pears to his bicycle and rides off. The man on the pear tree continues picking and does not see him carry off one basket of pears away.
4. The boy with the bicycle rides and passes by another girl on a bicycle. His hat falls as he turns around to look at the girl. He crashes into a big stone and falls. The basket of pears scatters on the floor. He sits up to clean his leg and examine his wounds. Three other boys standing nearby come to help the boy. They pack the pears back into the basket and help the boy up on his feet. The boy on the bicycle leaves, walking beside his bicycle. The three boys also walk on. One of the three boys had a tennis bat and he bounces a tiny ball attached to it. The boy with the bicycle walks on limping.
5. The boy with the bicycle limps along and the three other boys walk on in the opposite direction. One of the three boys sees the hat on the floor and signals to the boy with the bicycle to stop. He takes the hat, runs, and gives it to the boy with the bicycle. The boy with the bicycle gives him three pears. The other boy runs to his friends.
6. The other boy runs to his friends and distributes the pears. The boys walk on. The man descends from the pear tree and discovers that one of the baskets with pears is not there. He stands up and recounts the baskets. The three boys pass in front of him under the pear three each holding a pear fruit. The man watches them curiously.



Figure 4.2. Scenes from the Pear story

4.3. Participants

20 deaf signers were recruited for the study, 10 from Adamorobe (AdaSL) and 10 from Medie and Nsawam (GSL). Therefore, data from 10 signers each were analysed in both sign languages. 20 non-signers or gesturers were also recruited from Adamorobe (10) and Ketan-Sekondi (10). Initials and pseudonyms will be given to signers and gesturers based on the nature of their consent. All deaf signers were either native signers or early signers in their individual sign languages. A native signer in this dissertation is defined as a deaf signer with deaf parents and acquired sign language from birth. An early signer refers to deaf signer with hearing parents and acquired sign language in early childhood through deaf family/or in the community or from residential schools for the Deaf. The subsections below give detailed information about the participants.

4.3.1 Adamorobe (signers)

The signers or consultants from Adamorobe, which is in the Eastern Region of Ghana, are the following: AA, AdAg, AF, AK, EO, KB, KP, KO, KwBo and NK (4 males and 6 females). These consultants were selected based on willingness to participate in the study and they consented[47] to being part of the research before any data was taken. All the consultants from Adamorobe were born deaf to either deaf or hearing parents. Out of the 10 consultants, 8 had not received formal education (have never been to school, see Table 4.1) and 2 have had basic education (1 completed Secondary High School (SHS) and the other Vocational school). All the consultants were native signers of AdaSL and confirmed varying degrees of proficiency in GSL (see Table 4.2). Only 1 out of the 10 AdaSL signers was born in a dominantly speaking home and learnt AdaSL from the community while growing up. The others acquired AdaSL from other deaf family members (parents/siblings). All the 10 signers signed the 50 Household tools and objects and the Pear story.

Table 4.1 Educational levels of AdaSL signers. See Edward & Akanlig-Pare (forthcoming) *for more details*

No.	Formal education	Level if Yes
1.	No	
2.	No	
3.	No	
4.	No	
5.	No	
6.	No	
7.	No	
8.	No	
9.	Yes	Vocational
10.	Yes	SHS

Table 4.2 AdaSL signers' proficiency in GSL. See Edward & Akanlig-Pare (forthcoming) *for more details*

No.	Proficiency in GSL	Level	Place of acquisition
1.	Yes	Minimal	Interaction with other GSL users, personal training in the past, church meeting
2.	Yes	Low	Interaction with other GSL users, church meeting
3.	Yes	Low	Interaction with other GSL users, church meeting
4.	Yes	Low	Interaction with other GSL users, church meeting
5.	Yes	Low	Interaction with other GSL users, church meeting

[47] See Appendix for research consent forms

6.	Yes	Low	Interaction with other GSL users, church meeting
7.	Yes	Low	Interaction with other GSL users, church meeting
8.	Yes	Low	Interaction with other GSL users, church meeting
9.	Yes	High	School
10.	Yes	High	School

4.3.2 Medie/Nsawam (signers)

GSL signers who took part in the data collection are AS, EA, EO, FKB, GMC, GTB, OFK, PA, NK, and SIM (6 males and 4 females). All the 10 GSL signers were native or early signers of GSL, have had formal education (at least basic education) and could read and write English. The consultants consented to being part of the research work. Each consultant signed the 50 Household items and the Pear Story. To control dialectal variants among the GSL signers, all signers who took part in this study were from Medie and Nsawam, two geographically proximal cities and all the signers were known to each other (degree of familiarity) and some were members of the same Deaf Church. The choice of the locations is due to the large population of deaf people within Medie and Nsawam and the proximity of the two cities. Most of the consultants had migrated from other parts of Ghana to these cities for the purposes of work or marriage. Only one signer had deaf siblings (native signer), all the other signers were from predominantly hearing homes and had acquired GSL in early childhood (early signers).

4.3.3 Non-signers

A cross-section of non-signers were recruited from Adamorobe and Ketan-Sekondi for the purpose of comparing the lexical signs from the signers to the gestures of non-signers.

In Adamorobe, 10 non-signers were recruited (AF, DA, NM, SO, BO, BK, KO, NK, SN, VE), i.e., 5 males and 5 females. These non-signers were purposely recruited because of their inability to sign AdaSL, which is used by few (family and close friends of deaf Adamorobeans) of the hearing people in Adamorobe.

10 non-signers were recruited from Ketan-Sekondi (AE, AK, EE, EEd, MA, PKE, SE, PK, AM, JE), i.e., 7 males and 3 females. None of these participants had any knowledge in GSL or any sign language used elsewhere.

4.4 Coding and Annotation

Coding and Annotation of all data relied on the ELAN software (see Figure 4.3 for an example of lexical coding).[48] ELAN (Wittenburg, et al., 2006) is a language annotation software that was created at the Max Planck Institute for Psycholinguistics.

4.4.1 Lexical Signs (Household tools and objects)

The different semantic categories were all coded together and later sorted with Excel. The data was then analysed, and the analysis revealed the patterns preferred by each sign language. The factors that were considered in the coding of the data are:

1. The phonological representation of the sign- These considered the Handshapes, Movement, Location, Orientation and nonmanual markers; one-handed vs. two-handed signs (Johnston & Schembri, 2007; Battison, 1978).
2. Sign parts- This considered the number of sign components that make up the full lexical item. E.g., MIRROR in GSL was mostly signed as a two-part sign GLASS^MIRROR.
3. Iconicity type for iconic signs (*instrument*, *handling*, *tracing*, *entity*, *measuring*, *indexing* etc.) (Padden, et al., 2013; Padden, et al., 2015; Ebling, et al., 2015; Kimmelman, et al., 2018; Hwang, et al., 2017).
4. Figure and ground relationship- This considered signs that used two hands to represent the depicted item in relation to a related ground object (e.g., KEY- turning key in a door).
5. Motivated location- Where the use of location is motivated by specific use of the item (e.g., HANDBAG- hang on the shoulder).
6. Initialisation- This refers to the use of the handshape of the GSL alphabet representing the first letter of the English word of the sign's meaning (e.g., WATER- W-HS)

[48] URL: https://tla.mpi.nl/tools/tla-tools/elan/
Max Planck Institute for Psycholinguistics, The Language Archive, Nijmegen, The Netherlands

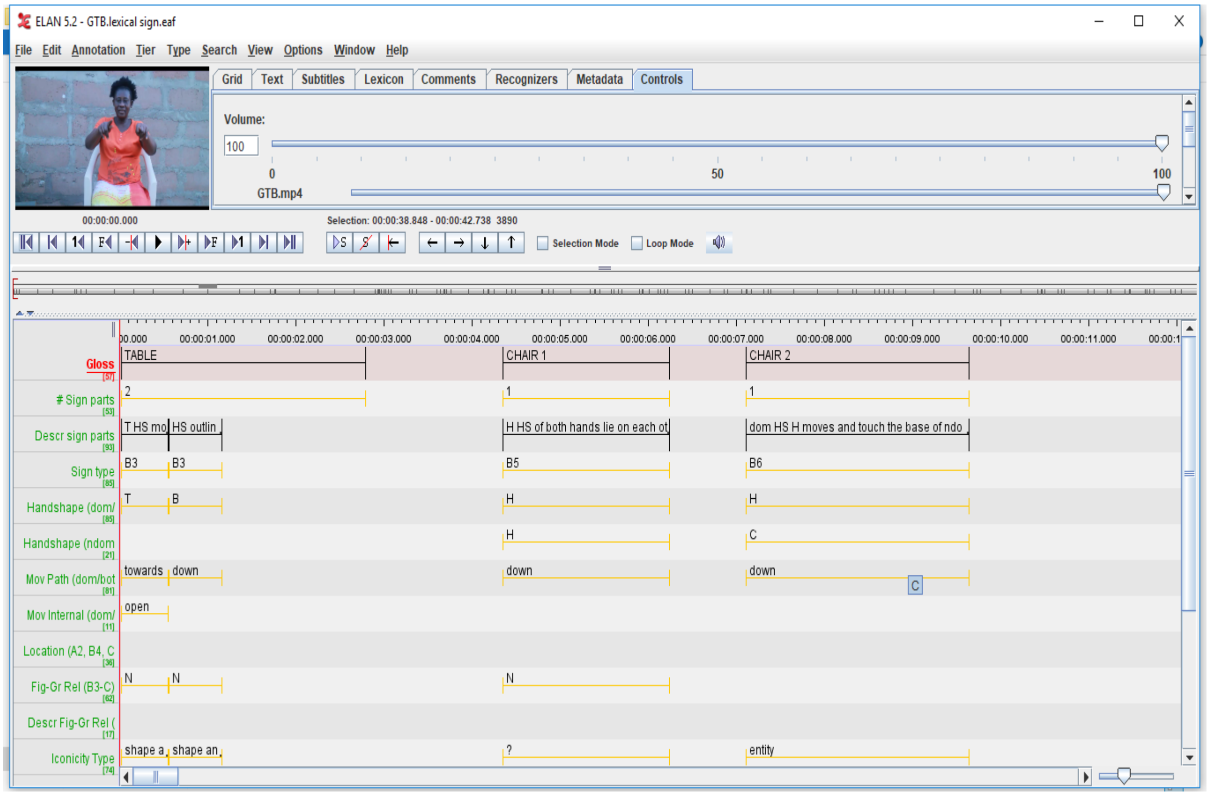


Figure 4.3. Coding of lexical items with ELAN

4.4.2 Spatial iconicity and simultaneous constructions (Pear Story)

The plot of the Pear Story is simple but filled with a lot of spatial information that is relevant for characterising iconic spatial representation for location, motion, and action. Furthermore, the Pear Story is packed with action and the video had both simple and complex scenes. Simples scenes refer to scenes that depicted a single event or location. Complex scenes have multiple events (one or two people doing different things at the same time) and multiple locations (people move from one place to another, or entities changed location). Signers were given the opportunity to watch the video vignettes as many times as they wished before retelling the stories to ease memory load and to ensure that signers present as much as possible the content of the story. Each retelling followed each video vignette after signers confirmed adequate grasp of information in the vignette. I went through the Pear Story and specifically identified individual scenes which were later labelled location, motion, and action. Figures 4.4 and 4.5 present examples of location, action, and motion scenes in the Pear Story. Scene 1 in Figure 4.4 identifies a location scene (static scene) and scene 2 in Figure 4.4 identifies action event.

Figure 4.4. Spatial representations

1. *Scene 1*- Scene of sloping hill with tree in foreground, ladder leaning against tree (on right side of tree) and basket on ground to right of tree. Ladder is between basket and tree. Man is standing at top of ladder in tree (this is hard to see). Other trees in background.
2. *Scene 2*- Boy is next to ladder and tree**.** Boy holds a pear and looks up.

Figure 4.5 Examples of dynamic events in the Pear videos

1. Event 1- Hands clasp pear.
2. Event 2- Man drags unwilling goat towards the hills.
3. Event 3- Two boys pack pears into basket. Boy (fallen) holds the bicycle. Other boy hitting a ball on a paddle.
4. Event 4- Two boys pick pears up. Boy (fallen) holds up the bicycle.

The narrations of the Pear videos were coded with ELAN (see Figure 4.6 for an example of coding of the Pear narratives). The Pear video narrations were numbered as part of the coding scheme developed for the analysis. The numbering facilitated easy comparison between signers of both sign languages. Below are the aspects that were coded, and the analyses were based on these.

1. Predicate type- The type of predicate used by signers. This considered both lexical and classifier predicates used. Lexical predicates were further categorised into plain verbs, locomotion verbs, directionals/directional verb, and intensified verbs. Classifier predicates were classified into handling, entity, and limb classifiers. Size and shape specifiers (SASS) were also considered. Other lexical signs identified include signs indicating an agent or a lexical object.
2. Event component- This considered the event components represented by each predicate. The categories of event include entity/figure, path, manner, and a combination of these.
3. Constructed action- The enactment of the action was considered based on the degree used. Overt constructed action referred to complete character perspective, whereas reduced and subtle were mainly in combination with either lexical or classifier predicates.
4. Perspectives- The different perspectives used by signers in relation to the predicate type were considered (character/observer/narrator and blends).
5. Spatial modification- The topographic and syntactic use of space by signers.
6. Simultaneity- Using two autonomous signs at the same time; two manual signs or a manual sign and nonmanual gesture. Simultaneity also considered the number of events and the number of referents represented.
7. Iconicity types- Iconicity strategies (*instrument, handling, tracing, entity, measuring, indexing* etc.)

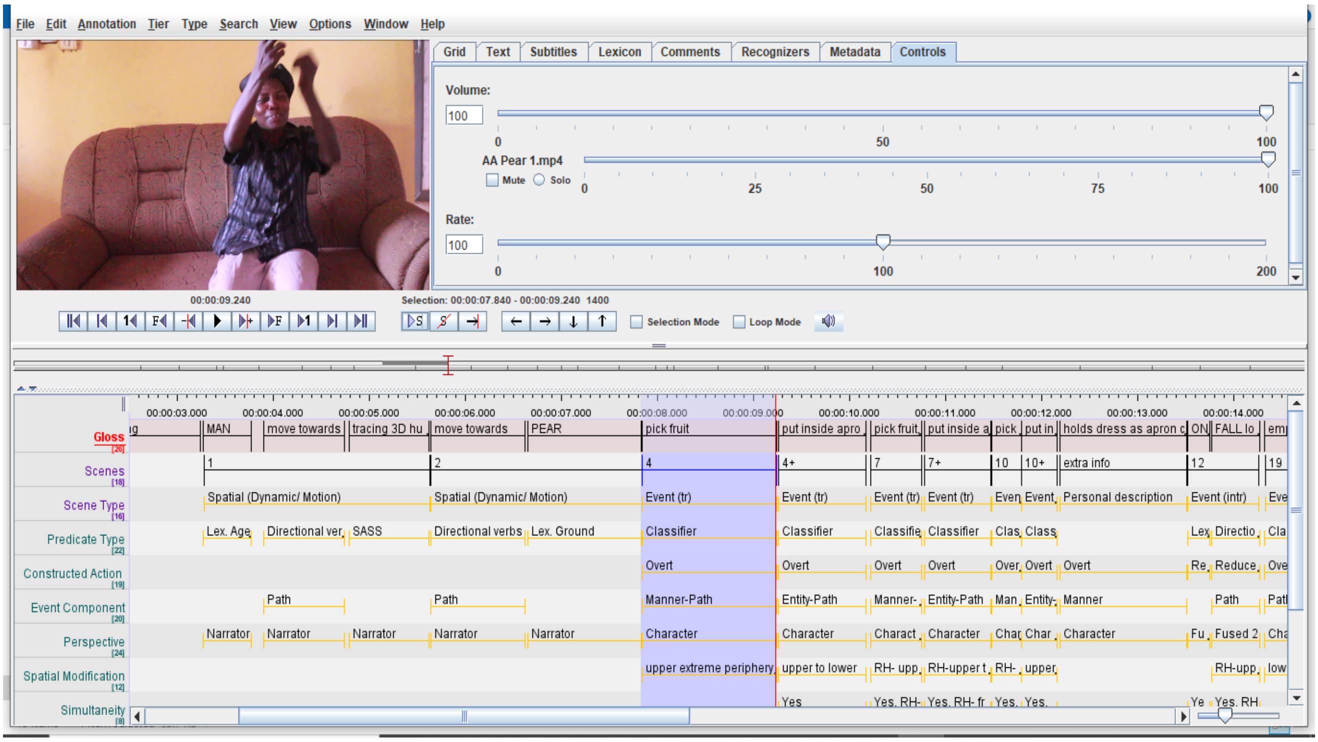


Figure 4.6. Coding of Pear story with ELAN

4.5 Working with data (Quantitative and Qualitative analyses)

As stated in the §4.0, both quantitative and qualitative approaches are used in the data analyses. The quantitative analysis compares GSL and AdaSL (and gesturers) for lexical iconicity and iconicity in grammatical constructions. The qualitative approach discusses the relevant themes that run through the dissertation using cognitive linguistics approaches. The paragraphs below discuss how the analysis is done in each approach.

Quantitative Analyses

The focus of the quantitative analyses are the three empirical investigations represented in the different domains (lexical iconicity and iconicity in grammatical construction). The presentation of the quantitative analyses focuses on the average means (proportions) of the strategies (iconic strategies, consistency, perspectives etc.) used by signers (and gesturers). Data is coded individually to allow discussion of group preferences and individual variations. For example, comparing lexical iconicity in GSL and AdaSL, the lexical data are quantitively analysed to identify the iconic strategies used by signers of both sign languages. That is, individual data from signers are compiled and the average means found for the specific strategies used across sign language group (or gesture group) is calculated. The results from the signers are compared to gestures used by non-signers. Other numerical analyses include consistency and agreement of use of the iconic strategies by signers, and figure-ground representation. The discussion of the lexical data in chapter 5 focuses on the similarities and differences in the use of iconic strategies by GSL and AdaSL signers and compared with non-signers.

The Pear Story videos are analysed quantitatively to identify the differences and similarities between GSL and AdaSL in depicting location, motion, and action information. The comparison depends on similarities and differences between both sign languages in the choice of predicate type, event components, constructed action, spatial modification, perspectives, simultaneity, and iconicity types. Chapters 6 compares the different strategies each sign language used to express location, motion, and action. Chapter 7 compares signers' use of simultaneity focusing on the preferred strategies for depicting simultaneous constructions.

Qualitative analysis

The sections in chapters 5-7 also present descriptions of the iconic strategies, predicate type, spatial modification, perspectives, simultaneous constructions, and iconicity types. Chapter 8 presents a detailed qualitative analysis of the data (Household tools & objects and the Pear Story) focusing on the key concepts discussed in the data chapters and chapter 3. The cognitive linguistic approach is used for the qualitative discussions in chapter 8.

4.6. Summary of data taken

This section presents the total data taken for this research. A total of 40 signed videos of 50 lexical items were collected from the signers and gesturers. Another 120 vignettes (6 vignettes per signer) comprising description of the Pear Story videos were collected from both GSL and AdaSL signers. The tables below show the stimulus materials, the participants involved in signing and the approximate number of items described.

Table 4.3 GSL signers

	50 Lexical items	**Pear stories (6 vignettes)**
Participants	10 signers	10 signers
Total descriptions	500 items	10 full retellings of the story (60 videos)

Table 4.4 AdaSL signers

	50 Lexical items	**Pear stories (6 vignettes)**
Participants	10 signers	10 signers
Total descriptions	500 items	10 full retellings of the story (60 videos)

Table 4.5 Non-signers

	50 Lexical items (rural)	**50 Lexical items (urban)**
Participants	10 non-signers	10 non-signers
Total descriptions	500 items	500 items

PART 3(a)

LEXICAL ICONICITY

The visual-gestural modality contributes to the ineliminable presence of iconicity in the lexicon and grammar of sign languages. The first analysis of the data compares lexical similarities and differences between GSL and AdaSL with data elicited with images of Household tools and objects. Relevant to part 3(a) are the iconic strategies (including *handling, instrument, entity, tracing, measuring, presentable action, body* and *indexing*) that signers use to depict these tools and objects in the 5 semantic categories represented (22 Handheld tools, 11 Clothing & Accessories, 9 Furniture & Household items, 6 appliances and 2 Nature items). Another important discussion on lexical iconicity is consistency in using the iconic strategies across signers and across language groups. Findings are discussed with respect to patterns of iconicity across semantic categories, and similarities and differences between sign and gesture. The analysis shows similarities and differences in the use of iconic strategies for specific semantic domains by signers. Comparing GSL and AdaSL with other sign languages, similarities can also be identified here in the preferred iconic strategies for different semantic categories. Of particular note is that gesturers in Adamorobe use strategies for Handheld tools more similar to AdaSL and different from what has been found for gesturers in other research. The results in part 3(a) demonstrate that varied iconic patterns for different semantic domains emerge with sign languages (and gesture) and provide valuable insight into the typology of sign languages and into the community-mediated interplay between sign and gesture in their shared access to the iconic affordances of the visual modality.

Chapter 5

Lexical iconicity in GSL and AdaSL

5.0 Introduction

The affordances of iconicity in sign languages contribute to different sign languages having similar signs for the same object. The visual-gestural modality contributes to the ineliminable presence of iconicity in the lexicon of sign language. There have been several studies on lexical comparisons in different sign languages. Some of these sign languages that have been studied have a shared history i.e. one sign language was used to teach deaf people in the other nation (McKee & Kennedy, 2000); user(s) of one of the sign languages was/were one of the pioneering teacher(s) of deaf education in other nations (Al-Fityani & Padden, 2008); deaf students were originally educated in another country and borrowed their sign language (Aldersson & McEntee-Atalianis, 2008), sign languages are used in geographically adjoining countries, and signers share a second language (Ebling, et al., 2015). Other research on lexical comparisons in different sign languages has looked at unrelated sign languages. For example, Padden, et al. (2013) compared American, Al-Sayyid Bedouin and New Zealand Sign Languages; Parkhurst & Parkhurst (2003) compared Spanish, Northern Ireland, Finnish and Bulgarian Sign Languages; Kimmelman, et al. (2018) compared Russian, French, American, British, Spanish, Italian, German, Polish, Brazilian, Turkish, Portuguese, Czech, Lithuanian, Swedish, Greek, Romanian, Latvian, Estonian, and Icelandic Sign Languages; Hwang, et al. (2017) compared ASL, Japanese, German, Israeli, Kenyan, Ha Noi of Vietnam, Central Taurus of Turkey, and AL-Sayyid Bedouin Sign Languages.

This chapter presents a comparative analysis of lexical iconicity in GSL and AdaSL. The analysis of signers' data is further compared with gestures of non-signers (also known as silent gestures) to identify if both signers and non-signers use the same form-meaning associations for resemblance mappings across different semantic categories. The research questions for this chapter focus on the similarities and differences in GSL and AdaSL in the lexical domain. The following questions are relevant to this chapter:

1. What are patterns of lexical iconicity in GSL and AdaSL for the semantic categories of Handheld tools, Clothing & Accessories, Furniture & Household items, Appliances, and Nature?
2. How consistent is the use of iconic strategies across signers in each group for each semantic category?

3. Comparing signs with gestures produced by hearing non-signers of the surrounding communities, are there similarities and differences in preferences of iconic strategies for sign and gesture?

Chapter 5 is arranged as follows: §5.1 presents strategies for iconic mapping. §5.2 presents a quantitative analysis of the different semantic categories (Handheld tools, Clothing & Accessories, Furniture & Household items, Appliances, and Nature) and a quantitative analysis of signs coded as *not clear* and *non-iconic* across the different categories. §5.3 presents both quantitative and qualitative analysis of the encoding of figure-ground relationships across the semantic categories. §5.4 presents quantitative analysis of consistency and full agreement across all semantic categories. §5.5 compares data from signers with data from non-signing gesturers. §5.6 gives the summary and discussion and, §5.7 presents the conclusion of the chapter. The rest of this introductory section gives background information on research on lexical iconicity in sign languages.

Unlike historically related sign languages like BSL, Auslan and NZSL (McKee & Kennedy, 2000) or GSL and ASL (Edward, 2020), GSL and AdaSL are unrelated and the history behind each sign language differs (see chapter 1 §1.2). Therefore, we are not dealing with cognates but with different signs from two different sign languages. However, language contact between the two sign languages over the past few years has caused AdaSL signers to borrow few signs from GSL. For this dissertation, signers were asked specifically to sign in their own sign languages to minimize the presence of borrowed signs. Notwithstanding, few AdaSL signers still presented lexical tokens that were borrowed from GSL. In the analysis, borrowed lexical items are indicated as such.

Lexical studies in many spoken languages have used the Swadesh word list (Swadesh, 1955) that has about 100 words or above. The Swadesh word list has words from the most frequent things that appear in daily life including pronouns, nouns, and body parts. However, for this current study, the Swadesh list was not considered as an option because of the following reasons; (1) earlier researchers of sign languages saw it as inadequate for sign language research (Woll, 1984); (2) many of the lexical items in the Swadesh list referred to parts of the body which is indexical in most sign languages (Aldersson & McEntee-Atalianis, 2008); (3) for the current study, 80% of the AdaSL signers could neither read nor write therefore, a wordlist was not a good choice for elicitation; (4) other researchers have used pictures for lexical elicitation and it worked for lexical data elicitation (Padden, et al., 2013; 2015; Hou, 2018; Hwang, et al., 2017).

As already established, sign languages are highly iconic as compared to spoken languages (Taub, 2001; Perniss, et al., 2010) and iconicity in sign language is afforded by the visual-spatial modality and the availability of iconic devices and strategies (Occhino, 2016; Padden, et al., 2013; Hou, 2018; Mandel, 1977). Although iconicity may be considered a design feature of language (Perniss, et al., 2010), it is highly embedded in language specifics, i.e., there is no universal sign language because of iconicity. Lexical iconicity is dependent on the iconic devices and the construal of form that is profiled by signers. That is, in different sign languages a specific *form* of the *image* is chosen and represented with different iconic strategies. Furthermore, depending on the semantic category of items, signers may use different types of iconic profiling. An example is the different ways to represent *tree* in different sign language as shown in chapter 2 §2.2.2. The hand(s), the major articulator(s) in sign languages, produce different iconic strategies based on how signers' profile the hands. For instance, the hand can represent an object by using the finger(s), the arm or any portion of the hand (*entity depiction*); the hand can hold or grasp the entity (*handling*); the hand can show the dimension, the perimeters, and the hand can act as a drawing tool that traces the object (*virtual depiction*). The diverse iconic devices and strategies signers employ to represent lexical items demonstrate the different ways in which the structure of the referent may be preserved in the structure of the linguistic form.

Different sign languages prefer diverse selection of specific handshapes with movement, location, and orientation for iconic representation. For example, according to Nyst (2007a; 2016a), AdaSL prefers body-based depiction of size, using a finger, the hand, or the arm to represent an entity. Nyst (ibid) found language-specific patterning for iconic size depiction in AdaSL. On the other hand, many European sign languages represent size by depicting distance in space (e.g., distance between two fingers or between the two hands). Although GSL is a nativized Ghanaian sign language, its' history can be traced from ASL as a result of Dr. Foster's sign language education in Ghana. This presents an interesting cross-language discussion of one indigenous African sign language (AdaSL) and another "foreign-based"[49] African sign language (GSL).

[49] The term foreign-based is used here with caution. I believe that GSL has been influenced greatly by ASL but do not accept that GSL is a dialect of ASL (as stipulated by other researchers). GSL and ASL are mutually intelligible in some respects but both languages are unique in their own ways. The influence of ASL in the structure and grammar of many African sign languages can be attributed to the missionary work of Dr. Andrew Foster but many of these sign languages have advanced beyond the level to be referred to as dialects of ASL. Dialects are associated with particular ethnic groups and these African communities are not related to America.

5.1. Strategies for iconic mapping

Research on lexical comparisons of sign languages have taken into account iconicity (Su & Tai , 2009; Ebling, et al., 2015) and iconic devices that are employed by various sign languages (Kimmelman, et al., 2018; Padden, et al., 2013; Hou, 2018). Individual sign languages make use of diverse iconic devices and strategies. For example, Nyst's taxonomy of iconic devices in AdaSL looked specifically at size and shape depictions involving shape for shape depictions (e.g., WOMAN in AdaSL where the HS refers to the shape of the breast) and distance for size depiction (BIG in AdaSL where the distance between the hands refers to the size of the object). Padden and her colleagues (2015; 2013) found that signers of ASL, ABSL[50], NZSL and ISL prefer *handling* and *instrument* strategies in naming Handheld tools. From Nyst (2016a) and Padden et al. (2015; 2013), we can identify that the differences between lexical items inter- or intra sign languages can be discussed by looking at the iconic strategies applied in relation to size and shape specifications or the different semantic categories of the lexical items. This chapter focuses on the latter.

In chapter 2, §2.4 different types of iconic mapping based on Mandel's taxonomy of iconic devices (Mandel, 1977), Taub's iconic devices (Taub, 2001), Padden et al., (2013; 2015), Hwang et al., (2017) and Nyst (2016a; 2016b) were identified. For the current dissertation, other strategies relevant for the data were added (to the strategies taken from previous research) and used in the analysis of the lexical signs. The discussions in this chapter are based on semantic categories identified in the set of 50 Household tools and objects used for the data elicitation. The paragraphs below explain the strategies that are used in this dissertation and Table 5.1 gives examples from the data.

Handling (Padden, et al., 2013; 2015)- In this strategy, the hand(s) represent human hands holding or grasping an object. The hand holding or grasping the object can also perform canonical actions related to the object. In this dissertation, there is an extended meaning of this strategy to include all actions of the hand(s) and fingers where the hand or fingers wiggle, move, or perform other actions that are not necessarily holding or grasping (and are not showing features of the object) but are related to the understanding of the object by showing an interaction with the object. An example is the fingers moving in a manner of typing.

Instrument (Padden, et al., 2013; 2015)- In this strategy, the hand(s) depict features of the object and perform canonical actions related to the object. The Handshape (HS) has

[50] Al-Sayyid Bedouin Sign Language (ABSL), New Zealand Sign Language (NZSL), Israeli Sign Language (ISL)

some or all the features of the depicted object. For example, in Table 5.1, TOOTHBRUSH- HS shows the part of the toothbrush that goes into the mouth but not the part that is held. On the other hand, MOBILE PHONE in the same table seems to show the complete Y-shaped telephone. In the *instrument* strategy, the hand is the object, but the signer is the agent using the object. The *instrument* strategy involves movement of the HS that depict the object in use as exemplified by TOOTHBRUSH in Table 1.

Entity depiction[51]- This strategy collapses three strategies that will be discussed in this chapter: ***entity, entity at body location*** and ***measure stick***. The *entity* strategy is referred as the *object* strategy by other researchers (Padden, et al., 2013; Kimmelman, et al., 2018; Hou, 2018). In this strategy, the hand only shows features of an object and does not perform any action. *Entity at body location* (*entity at loc*.) strategy has an entity handshape that shows the feature(s) of the object being represented and is located at a meaningful place on signer's body. The hand at the location represents an object at a meaningful location. *Measure stick* (Nyst, 2007a; 2016) strategy has an entity handshape and the size of the object is shown by delimiting the relevant part of the finger, hand, or arm. When the *measure stick* strategy is represented with two-handed signs; one hand is the entity, and the other is the measuring tape that shows the height or size of the depicted entity in relation to the handshape.

Measuring (Mandel, 1977; Ebling, et al., 2015)- Hand(s) indicate size or the height of entity. The relative size or height is shown by stretching the arms wide or by indicating the relevant height by raising the palm relative to the body.

Virtual depiction (Mandel, 1977)- This refers to two strategies used in this chapter: ***tracing 2D*** and ***tracing 3D***. The *tracing 2D* strategy uses the hand(s) as a drawing tool and the movement creates a virtual shape of the length and width in space or on body. It is referred to as *sketching* in other literature (Mandel, 1977; Ebling, et al., 2015). In the *tracing 3D* strategy, the hands and movement represent the shape of an entity by tracing the outline or surface of the entity leaving a virtual shape that indicates length, width, and height of object. This results in 3D shapes (Ebling, et al., 2015; Padden, et al., 2013; Kimmelman, et al., 2018).

Indexing- Signer's hand points (or holds on) to part of the signer's body or clothing that is related to the object. Wilcox refers to indexing that refers to part of the body as *self-*

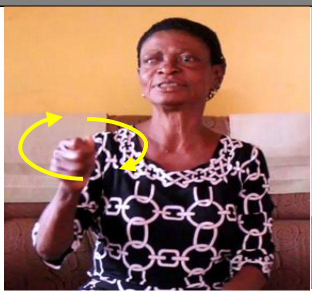
[51] The difference between *entity depiction* and *instrument* is that while *entity depiction* is static, *instrument* shows the hands in active use. More broadly, the *instrument* strategy can be categorised as *entity depiction* because the hand depicts features of the object. However, in this chapter, *entity depiction* and *instrument* are considered separately.

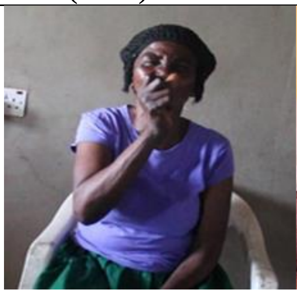
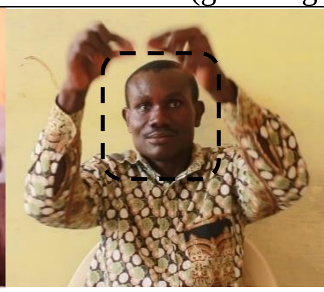
symbolisation (Wilcox, 2004) and Padden et al. (2013) refers to holding or touching items on the body as the *touching* strategy.

Body- Parts of the body perform canonical actions. The *body* strategy is distinct from the *handling*, *instrument*, and *entity depiction* because this strategy does not include signs that involve manipulation of the hands as either holding, grasping, wiggling etc. The body strategy includes shrugging (the shoulders), kicking, reclining, moving the body up and down (to depict sitting or standing) among others.

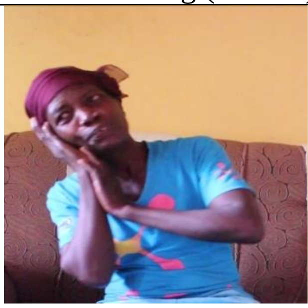
Presentable Action- This refers to embodied conceptual gestures in a source culture that are used to code experiences (both abstract and tangible) or to name items that are related to the experiences generated by an object. For example, the gesture of smelling roses- FLOWER; the gesture of putting the head down on a pillow- SLEEP.

Table 5.1 Iconic strategies with examples

Iconicity Type	Examples
Handling	 KEY (AdaSL)  LONG BROOM (AdaSL)  COMB (GSL)
Instrument	 TOOTHBRUSH (AdaSL)  MOBILE PHONE (GSL)  SYRINGE (GSL)
Entity	 MIRROR (GSL)  TREE (AdaSL)  MIRROR (AdaSL)

Entity at body location	 HAT (GSL)	 SPECTACLES (GSL)	 SPECTACLES (AdaSL)
Measure Stick	 SMALL PEPPER	 BOTTLE	 CUP (AdaSL)[52]
Measuring	 DRESS (GSL-length)	 STANDING FAN(gest-length)	 TREE (GSL-size)
Tracing 2D	 TELEVISION (AdaSL)	 COMPUTER (GSL)	 TABLE (AdaSL)
Tracing 3D	 PLATE (GSL)	 BALL (AdaSL)	 BOTTLE (GSL)

[52] In the measure stick strategy for BOTTLE and CUP, the hand raised is actually the entity handshape and the other hand marks out the length of the entity with the measure stick.

Body	 CHAIR (AdaSL)	 BALL (AdaSL)	 SOFA (GSL-recline)
Indexing	 SHOE-touching (AdaSL)	 DRESS-holding (GSL)	 DRESS-holding (gest)
Presentable Action	 BED- to sleep (AdaSL)	 FLOWER- to smell (GSL)	 FRIDGE-feel cold (GSL)

5.2 Coding and data analysis

All the responses from the signers were coded in ELAN version 5.4, 2018 (Wittenburg, et al., 2006) as discussed in chapter 4. The coding was done according to the iconic strategies discussed in §5.1 above. Responses were additionally coded for the following: sign parts (number of tokens used to name the sign); sign type (based on the classes of manual signs developed by Battison, 1978 c.f. Johnson & Schembri (2007). Other manual classes were developed to specifically meet the needs of this data (see Class D & E in Table 5.2). Relevant to the coding was Handshapes (dominant and non-dominant); Movement (path and internal); Location; figure-ground (forms produced with both dominant and non-dominant hands, see manual sign Class B type 5 & 6); iconic strategy (for both hands); initialisation; motivated location; mouth action, and repetition. §5.2 present the coding and analysis of all the five semantic categories (§5.2.1-5) and §5.2.6 presents an analysis of the signs coded as *not clear* and *non-iconic* across all the semantic categories.

Table 5.2 List of Manual signs

Class A (one-handed) (Johnston & Schembri, 2007)	Type 1-Signs that are produced in the signing space, and do not have contact with body		Type 2- Signs that have contact with the body	
Class B (two-handed) (Johnston & Schembri, 2007)	Type 3- Signs that have same the HS and are produced in the signing space, and do not have contact with body	Type 4- Signs that same HS and have contact with the body	Type 5- signs that have the same HS on both hands, but one hand acts on the other	Type 6- signs that have different HS and one hand acts on the other
Class C (combination of A & B) (Johnston & Schembri, 2007)				
Class D (no hand involved)	Signs that uses other parts of signer's body as active articulators		e.g. FOOTBALL (leg) in AdaSL	
Class E (hand + other)	Signs that use the hand and other parts of the body as active articulators		e.g. SHOE (hand and leg) in AdaSL	

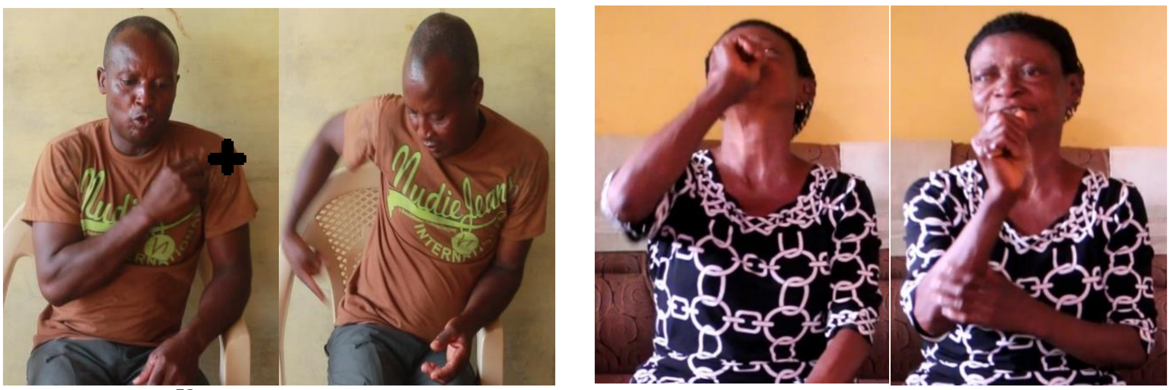
One of the goals of the coding was to investigate patterned iconicity, in order to identify those patterns used by signers in the different semantic categories, i.e. the recurrent use of an iconic strategy across concepts in a semantic category (Padden, et al., 2013; Padden, et al., 2015; Brentari, et al., 2015; Kimmelman, et al., 2018). The 50 Household tools and objects were further grouped according to semantic categories (see Table 5.3). Data from signers from each sign language were coded individually to identify variants of the same strategy and for further analysis on profiling the handshapes (discussed in chapter 8). Important to note is that comparing lexical iconicity in GSL and AdaSL, the individual data from signers were compiled and the average means found for the specific strategies used across sign language group (or gesture group) was calculated. In other words, irrespective of the different number of responses, the data from both sign language totalled 100%.

Table 5.3 Semantic categories for the Household tools and objects

Semantic Category	Number of items	Number of Responses	
		GSL	AdaSL
Handheld tools	22	281	275
Clothing & Accessories	11	201	132
Furniture & Household items	9	148	149
Appliances	6	89	92
Nature	2	25	34
Total	50	741	682

5.2.1 Iconic Patterns for Handheld tools in GSL and AdaSL

The coded Handheld tools are *bottle, broom, bucket, comb, cup, fork, hammer, iron, key, knife, lipstick, long broom, mobile phone, paintbrush, pen, saw, scissors, spoon, toothbrush, sewing needle, syringe* and *umbrella*. The 22 Handheld tools resulted in signs with single tokens and signs with multiple tokens. Some of the multiple tokens were two-part signs while others were responses which presented variants of the same sign. For example, SYRINGE was signed by 5 GSL signers as two-parts (compound) sign consisting of the lexical sign HOSPITAL (H-HS makes a cross at the shoulder of non-dominant hand) and SYRINGE (G-HS touches the shoulder of the non-dominant hand or touches the rump). BOTTLE was signed by 6 AdaSL signers as a two-part sign consisting of DRINK (hand holds imaginary bottle and mouth) and BOTTLE (the fist and hand). Items that elicited multiple responses were coded based on each response. For example, BOTTLE (Figure 5.1) elicited *handling* and *entity* strategies.



not clear[53] *instrument* *handling* *entity*

[53] The cross on the shoulder is depictive of the symbol ✚ used to represent hospital on a map. It was coded as *not clear* because although it has form-meaning resemblance mapping, it could not be added to any of the categories discussed in §5.1.

SYRINGE (GSL) BOTTLE (AdaSL)

Figure 5.1 Two-part signs in Handheld tools in GSL and AdaSL

After coding the data with ELAN version 5.4, 2018 (Wittenburg, et al., 2006), the main iconic strategies that emerged were the *handling* and *instrument* strategies for naming Handheld tools in both GSL and AdaSL. Signers of GSL (see Figure 5.2) prefer *instrument* and *handling* strategies as compared to other strategies discussed above. Other strategies were rarely used by GSL signers. There was a higher preference for *instrument* strategy (47%, N=130) as compared to *handling* strategy (28%, N=79). *Tracing 3D* was the next most frequently used strategy by GSL signers (7%, N=21). However, 9% (N=26) of the GSL strategies used to depict Handheld tools and objects were coded as *non-iconic* (e.g., variants of SAW, GLASS for BOTTLE). These non-iconic signs did not exhibit a form-meaning resemblance relationship.

AdaSL signers (Figure 5.2), just like their urban counterparts, demonstrated a preference for *instrument* and *handling* strategies for naming Handheld tools and objects. However, *instrument* was the most preferred strategy among the two iconic strategies and had a mean of 63% (N=173). *Handling* strategy was the next most used iconic strategy that was used 25% (N=69) of the time to name the Handheld tools in AdaSL. The *entity* strategy was only used by 5% (GSL, N=14; AdaSL, N=11) of signers of both sign languages to name Handheld tools. The other iconic strategies elicited few responses in naming Handheld tools in GSL and AdaSL.

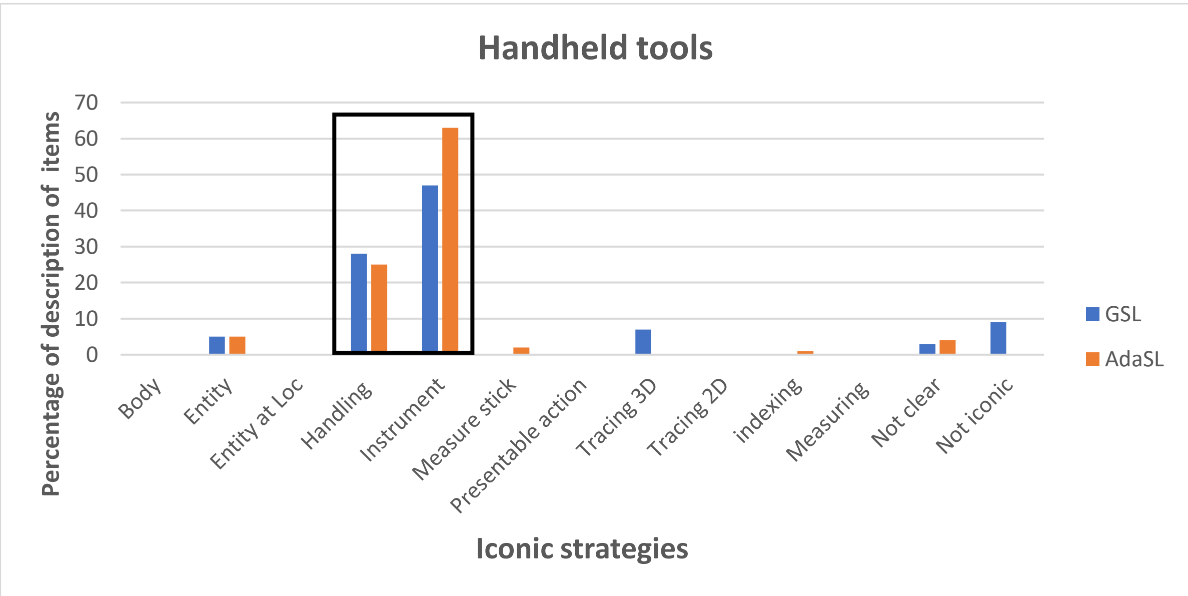


Figure 5.2 Mean percent of responses; Iconic strategies for Handheld tools by GSL and AdaSL signers

From Figure 5.2, we identify preferential patterns demonstrated by signers of GSL and AdaSL. Overall, *instrument* strategy was preferred by both sign languages to name Handheld tools, but AdaSL signers showed a greater preference (63%, N=173) than GSL signers (47%, N=130). On the other hand, the *handling* strategy was similarly used by both sign languages (GSL-28% (N=79); AdaSL-25% (N=69)) indicating a similar preference. *Entity* strategy was used at the same level (5% each, i.e., (GSL, N=14; AdaSL, N=11)) and *tracing 3D* was only used by GSL signers. Other iconic strategies elicited either few or null responses in both sign languages, and GSL had signs without resemblance mappings in this category (9%, N=26). This implies that all the strategies used by AdaSL signers had some sort of form-meaning resemblance mappings.

Considering the individual lexical items, there were items that elicited more *instrument* forms in both sign languages. That is, signers used the *instrument* strategy to name those items as compared to other strategies.[54] For example, broom (100% GSL, 100% AdaSL), comb (80% GSL, 100% AdaSL), fork (100% GSL, 100% AdaSL), mobile phone (100% GSL, 100% AdaSL), paintbrush (100% GSL, 100% AdaSL), saw (90% GSL, 100% AdaSL), scissors (100% GSL, 100% AdaSL), spoon (100% GSL, 100% AdaSL), syringe (100% GSL, 100% AdaSL) and toothbrush (80% GSL, 100% AdaSL). Furthermore, there were other tools that elicited more *instrument* forms in one sign language as compared to the other. In other words, those tools were preferentially *instrument* in one sign language and in the other sign language different strategies were preferred. Examples include the following: knife (10% GSL, 100% AdaSL), pen (70% GSL, 0 AdaSL), sewing needle (10% GSL, 70% AdaSL), lipstick (40% GSL, 90% AdaSL).

There were some items that elicited more *handling* forms in both sign languages. These include the following: bucket (100 GSL, 90% AdaSL), hammer (80% GSL, 100% AdaSL), iron (90% GSL, 80% AdaSL), key (80% GSL, 100% AdaSL), long broom (70% GSL, 60% AdaSL) and umbrella (70% GSL, 70% AdaSL). Other tools elicited more *handling* forms in one sign language as compared to the other; these are lipstick (80% GSL, 20% AdaSL), pen (10% GSL, 100% AdaSL), and sewing needle (90% GSL, 20% AdaSL).

Few items had high responses for using other iconic strategies in one or both sign languages and these include bottle (*tracing 3D*-100% GSL); bottle (*entity*, 70% AdaSL),

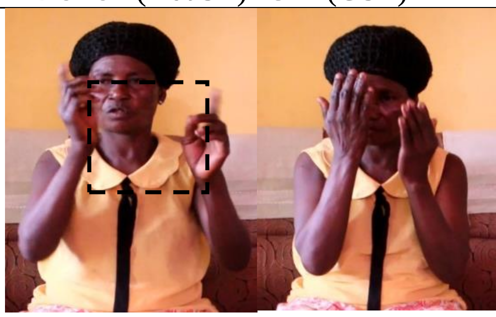
[54] Percentages in this paragraph refer to the number of signers who used a particular strategy. 100% means all 10 signers, 90% refers to 9 signers, 10% refers to 1 signer and 0 means no signer used that strategy.

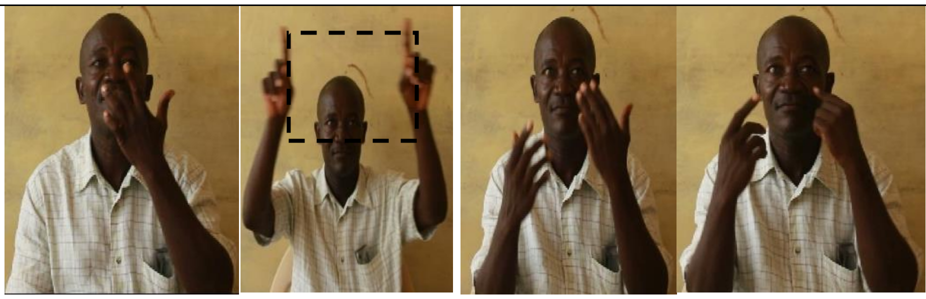
umbrella (*entity* 50% GSL, 40% AdaSL) and cup (*tracing 3D*-90% GSL; *instrument*-80% AdaSL).

5.2.2. Iconic Patterns for Clothing & Accessories in GSL and AdaSL

The items coded as Clothing & Accessories are *backpack, cap, dress, handbag, hat, high-heeled shoe, mirror, spectacles, shoe, trouser,* and *suitcase.* Items that elicited more individual tokens (single signs) in both sign languages included *cap, hat, and spectacles.* AdaSL signers had only one and two-part signs with 90 of the 132 responses as single signs and 21 as two-part signs. On the other hand, GSL signers were more descriptive in their responses with only 43 out of the 201 tokens as single signs, 39 two-part signs. The rest presented different variants of the same sign and others gave description of the object. For example, in Table 5.4 the GSL signer in row 3 presents descriptive signs for SUITCASE (TRAVEL^BAG ^PULL) and the signer in row 4 presents different sign variants for MIRROR (2 variants- GLASS^OUTLINE and MIRROR^SEE).

Table 5.4 Examples of Clothing & Accessories according to sign types

Sign types	Examples
One-part sign	   BACKPACK(AdaSL) HIGH-HEELED SHOE (AdaSL) CAP (GSL)
Two-part sign	  MIRROR (GSL) GLASS^MIRROR; MIRROR (AdaSL) OUTLINE^MIRROR

Descriptive sign	 SUITCASE (GSL) TRAVEL^BG^ PULL
Different variants	 MIRROR (GSL) GLASS^OUTLINE MIRROR^SEE

Signers of both GSL and AdaSL demonstrated a preference for the *handling* strategy for naming Clothing & Accessories (Figure 5.3). 23% (N=44) of GSL responses used *handling* strategy, 9% (N=16) of the responses were in *entity* strategy and 6% (N=11) in *tracing 3D* strategy. The rest of the strategies elicited fewer responses. However, 45% (N=91) of GSL tokens had no iconic relationship between the sign and the referent and as such were coded as *non-iconic*. These were mostly lexicalised fingerspelling and initialised signs.

AdaSL signers demonstrated a greater preference for *handling* strategy (Figure 5.3) in naming Clothing & Accessories as compared to GSL signers. 44% (57) of AdaSL responses used *handling* strategy, 12% (N=16) of the responses used *entity at body location* (a subtype of *entity depiction*) strategy, 10% (N=13) in *entity strategy*, 8% (N=10) *tracing 2D*, 6% (N=8) *instrument* and 5% (N=7) *tracing 3D*. Other strategies elicited few to null responses by AdaSL signers.

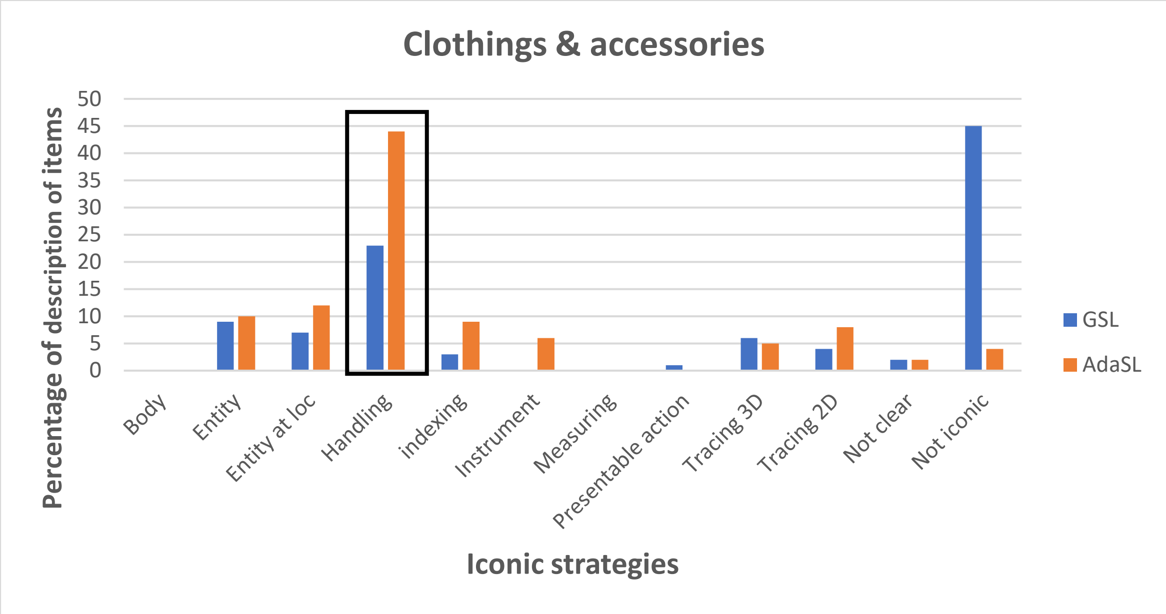


Figure 5.3 Mean percent of responses; Iconic strategies for Clothing & Accessories

Focusing on the individual items in this category, specific items elicited more *handling* strategy in both sign languages. In other words, such items were represented by how they are handled on the body (mainly) or outside the body for objects such as BAG and SUITCASE. Examples of specific items that elicited *handling* strategy in both sign languages are backpack (80% GSL, 100% AdaSL), cap (100% GSL, 100% AdaSL), handbag (80% GSL, 100% AdaSL), suitcase (100% GSL, 100% AdaSL), and trouser (60% GSL, 100% AdaSL). Both GSL and AdaSL signers showed a preference for *entity at body location* strategy for naming spectacles (80% GSL, 100% AdaSL), *entity* strategy for mirror (70% GSL, 100% AdaSL) and *tracing 2D* for dress (70% GSL, 90% AdaSL). Other items elicited different responses from GSL and AdaSL and these include high-heeled shoe (90% GSL-*entity*; 70% AdaSL-*instrument*), hat (GSL 30% *entity at loc*., 10% *handling*, 60% *tracing* 3D; AdaSL 50% *entity at loc*., 50% *tracing* 3D).

5.2.3 Iconic Patterns for Furniture & Household items in GSL and AdaSL

The items coded as Furniture & Household items are *bed, sofa, chair, table, mat, plate, bowl, book*, and *ball*. Ball was added to this category because it qualifies more as a Household toy/item than any other semantic category discussed in this chapter. This semantic category presented diverse items in terms of sizes. Whereas the Furniture consisted of bigger items, the other Household items were items that could be held by hands. Both sign languages used descriptive signs for this semantic category and items had single and multiple responses

(There was a response consisting of four parts and another response consisting of five parts given by a GSL signer). Ball, book, and chair elicited mostly single responses from both GSL and AdaSL. Inter-language variation in the selection of handshapes existed in this category. For example, table elicited a variety of HS (see Figure 5.4 row 1 and 2) in GSL and AdaSL (G-HS, L-HS, B-HS) that produced similar iconic strategies (e.g., row 1 *tracing* 2D & 3D-*virtual depiction*; row 2, *entity depiction*)

Signers used similar strategies for some of the individual items coded in this semantic category (see Figure 5.4). For instance, TABLE elicited *tracing 2D*, *tracing 3D* and *entity* strategies in both sign languages; BED elicited mostly *presentable action* and *tracing 3D*; PLATE elicited mostly *tracing 3D* and, BOOK elicited *instrument* strategy in both sign languages.

Furniture

TABLE-AdaSL TABLE -GSL TABLE-AdaSL TABLE- GSL

tracing 2D *tracing 3D*

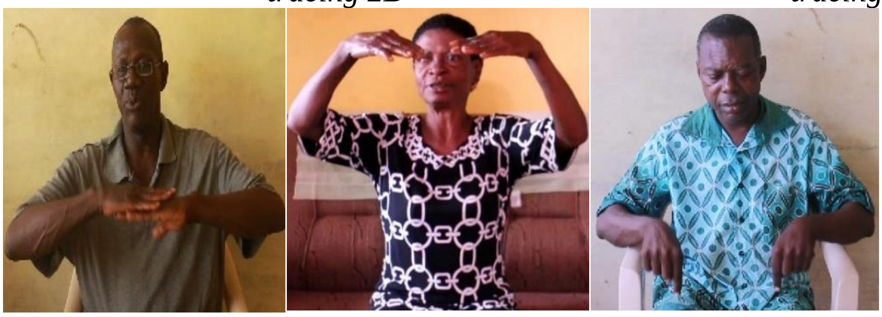


TABLE-GSL TABLE- AdaSL TABLE (legs)-GSL

entity

BED- AdaSL BED- GSL

presentable ac. tracing 3D presentable ac. not clear tracing 3D presentable ac.

Household items

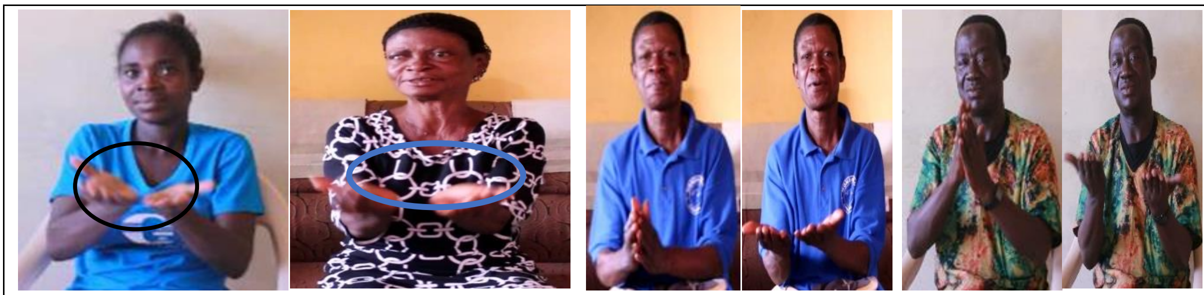


PLATE- GSL PLATE- AdaSL BOOK- AdaSL BOOK-GSL

tracing 3D *instrument*[55]

Figure 5.4 Examples of Furniture and Household items

In this semantic category, signers of GSL and AdaSL demonstrated a higher preference for *tracing 3D* for naming items (see Figure 5.5). GSL signers had 34% (N=50) of their responses using the *tracing 3D* strategy, 10% (N=17) *presentable action* and 10% (N=14) *entity* strategy. *Handling* (N=8) and *measuring* (N=7) strategies had 5% each and other strategies elicited less than 5% (or null) responses.

AdaSL signers had 32% (N=48) of their responses in the *tracing 3D* strategy, 20% (N=29) responses in the *body* strategy, 18% (N=27) *presentable action*, 10% (N=15) *handling* and 7% (N=11) *instrument*. Other strategies elicited fewer responses in AdaSL. As explained in §5.1 above, *body* strategy involves body parts of signers performing canonical actions which are not *handling*. Thus, it includes shrugging the shoulders, moving a leg, reclining, moving body up and down among others. Some of the items in this category are objects that demand body actions and movement when they are used (e.g., *bed*-lying down, *chair*/*sofa*-sitting/reclining, *football*-kicking etc.). *Body* strategy was highly used by AdaSL signers (20%, N=29) as compared to GSL signers (1%, N=1). In other words, AdaSL signers named the entities that use the *body* strategy based on how signers manipulate their bodies in using such entities.

[55] BOOK is taken as an instrument not an entity because the sign depicts features of the object and performs canonical actions related to the object (opening and closing). On the other hand, entity depicts features of the object, but it is static.

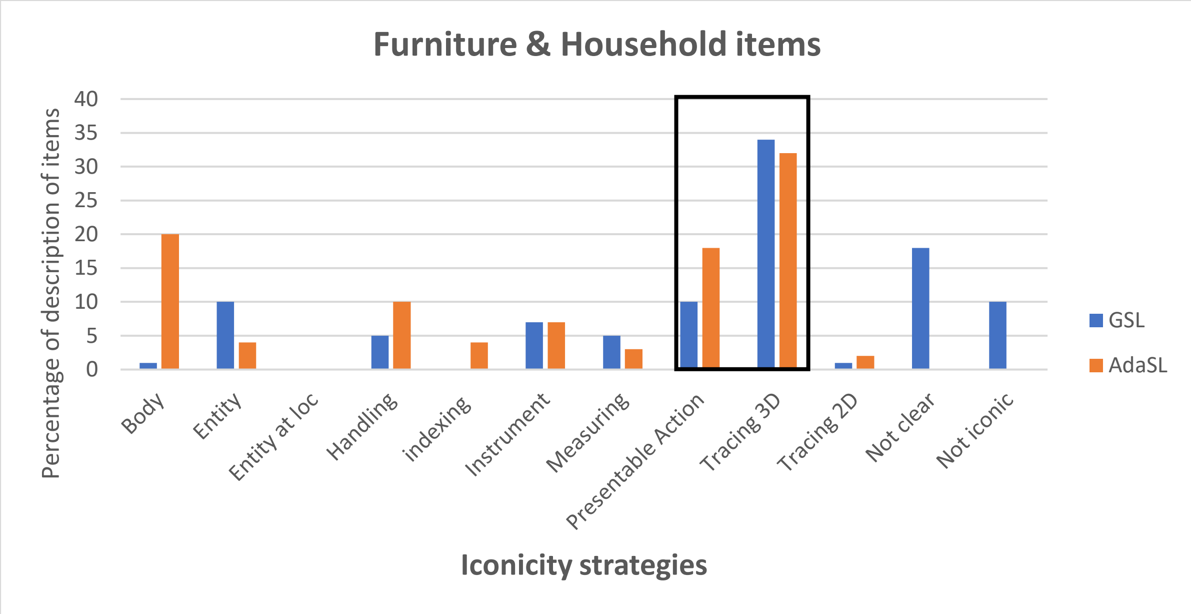


Figure 5.5 Mean percent of responses: Furniture & Household items

Another strategy that elicited more responses (other than *tracing 3D*) in this category is *presentable action* which refers to embodied conceptual gestures used in the surrounding communities to code experiences. In both sign languages (10% GSL (N=14); 18% AdaSL (N=27)), items that elicited these embodied conceptual gestures included *bed*, *mat*, and *sofa*. The notions of *sleep* and *soft* were represented with gestures that are used by both hearing and non-hearing members of the communities.[56] These gestures have embodied meanings of sleep (putting head on pillow) and soft (pressing something in the hands) and have become accepted forms for gesturing in the spoken languages used within the communities of research (as seen in the gestures of non-signers).

The *handling* strategy which elicited 5% and 10% responses from GSL (N=8) and AdaSL (N=15) respectively was used as one part of two-part signs for naming *mat* (hand rolling mat-GSL), *bowl*, *plate* (hand holds food-GSL & AdaSL) and *table* (hand holds food-AdaSL). In other words, the *handling* strategy used by both GSL and AdaSL signers did not give entity-based information of the items but extra information concerning the usage of the items. The GSL sign CHAIR was coded as *not clear* as it had perceived iconicity but could not be classified according to the iconic strategies listed §5.1 (§5.6 gives details and examples). Further, 10% (N=15) of GSL responses did not have resemblance-based mapping and were

[56] Although GSL and AdaSL are two different sign languages, most often the presentable action strategies are represented with the same handshape, location, and movement in both sign languages. However, these embodied gestures are not universal gestures.

coded as *non-iconic*. These were lexicalised fingerspelling (#BED, #MAT)[57], initialised signs and signs without form-meaning mappings.

Comparing both sign languages, we identified cross-linguistic similarities in this semantic category as both preferred specific strategies for certain items. *Body, handling, indexing* and *presentable action* strategies were predominantly used by AdaSL signers as compared to GSL signers (Figure 5.5). All the other strategies were used to a fair amount to almost the same degree. Items that elicited responses for *tracing 3D* are bed (70% GSL, 50% AdaSL), bowl (100% GSL, 90% AdaSL), mat (100% GSL, 100% AdaSL), plate (100% GSL, 90% AdaSL), and table (80% GSL, 70% AdaSL). Bed was predominantly represented with *presentable action* in both sign languages (90% GSL, 100% AdaSL) and book elicited 100% responses from both sign languages as *instrument*. *Entity*, *measuring* and *tracing 2D* had minimal responses from both sign languages and there was no response for *entity at a body* location in both sign languages.

5.2.4 Iconic Patterns for Appliances in GSL and AdaSL

The items coded as Appliances are *ceiling fan, computer, fridge, sewing machine, standing fan and television*. The items that elicited single tokens in both sign languages include *ceiling fan, sewing machine, standing fan* and *television*. Figure 5.6 shows examples of the items in this category and the number of tokens they elicited across both sign languages.

Appliances	Examples
Fridge	 Fetch out + DRINK (*handling*)-AdaSL  COLD (*pre. action*) + outline (*tracing 3D*)-GSL
Computer	  

57 Fingerspelling is introduced by the hash key, e.g. #BED

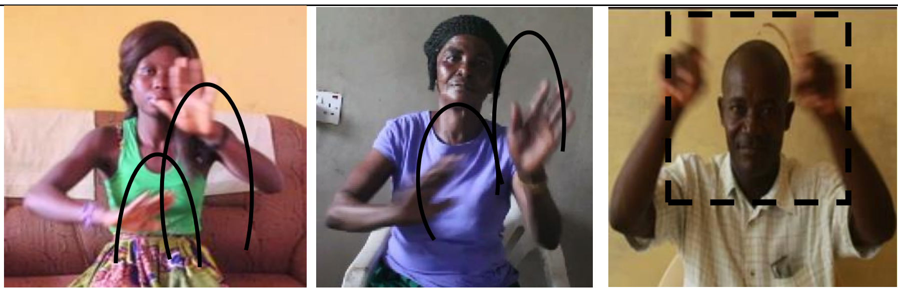
	Mouse (*instrument*) typing (*handling*) LAPTOP (*instrument*) - GSL  TELEVISION (*tracing 3D*) + typing (*handling*)-AdaSL mouse (*handling*)- GSL
Ceiling fan & standing fan	 GSL  AdaSL *instrument*
Sewing machine	 *handling*- AdaSL *handling*- GSL
Television	 *tracing 3D*- AdaSL *tracing 2D*- GSL

Figure 5.6 Examples of Appliances from GSL and AdaSL

Signers' predominant preference for *instrument* and *handling* strategies was once again demonstrated in this category (Figure 5.7). GSL signers demonstrated a higher preference for the *instrument* strategy and 44% (N=38) of their responses used *instrument* strategy. For the other strategies, *handling* had 15% (N=13), *presentable action* 12% (N=10), *tracing 3D* 10% (N=10) and *tracing 2D* 5% (N=4). *Body*, *entity*, *entity at loc*. and *measure* strategies got null responses from GSL signers. 13% (N=12) of the responses from GSL did not have resemblance mapping and were classified as *non-iconic*. The responses without form-meaning resemblance mapping were mostly lexicalised fingerspelling (#TV, see Table 5.5).

AdaSL signers on the other hand had 35% (N=33) *instrument*, 29% (N=26) *handling*, 16% (N=15) *tracing* 3D, 9% (N=8) *presentable action*, 5% (N=4) *tracing 2D*. The other iconic strategies (*body*, *entity*, *entity at loc*., *indexing*, *measure*) had few to null responses from AdaSL signers. As with most of the semantic categories above, AdaSL signers had none of their responses coded as *non-iconic*. In other words, there was perceived iconicity in all the forms produced by AdaSL signers to name Appliances.

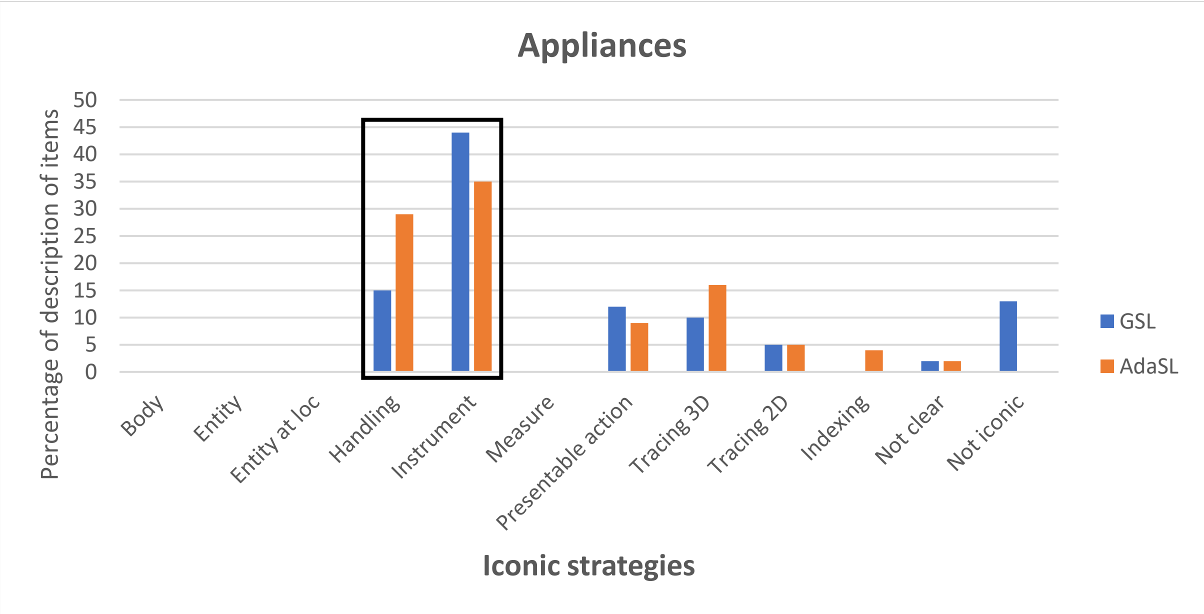


Figure 5.7 Mean percent of responses: Appliances

From the graph in Figure 5.7, we identify that in the category of Appliances, GSL and AdaSL used *instrument* and *handling* strategies but with different proportions. For example, the preference for *instrument* strategy (44%, N=38) for GSL signers was obviously higher than the preference for *handling* strategy (15%, N=13). On the other hand, AdaSL does not show a clear-cut preference for either *instrument* strategy (35%, N=33) or *handling* strategy

(29%, N=26). Furthermore, both sign languages barely used other strategies except *presentable action* and *tracing* (2D &3D). *Presentable action* was almost used in the same degree by both sign languages because of the item *fridge* which was depicted mostly with the gesture COLD.[58] In this strategy, signers "use a picture of one object to denote something else that is associated with the object" (Mandel, 1977), that is, *cold* for *fridge*. A few AdaSL signers gave other descriptions like WATER/DRINK as one of their responses to *fridge*. In this category, both signers presented myriad of responses for *computer*. Nine of the GSL signers had responses represented by *computer mouse moving on a mouse pad* and there were few other responses of typing or outlining the shape of computer. One GSL signer had three different signs for computer and each of these responses (variants) was represented by iconic strategies that profile or denote an aspect of the broad meaning, usage of computer or a variant of computer (see GSL COMPUTER e.g., in Figure 5.6). Seven of the AdaSL signers represented computer with *typing* and few others had responses like TELEVISION, MOBILE PHONE, and the computer mouse.

Most of the six items in this semantic category elicited specific iconic strategies from both sign languages. Responses from individual signers reflected the preference for certain iconic strategies to name specific items. For example, ceiling fan and standing fan elicited 100% responses in *instrument* strategy in both GSL and AdaSL, sewing machine elicited 100% responses in *handling* strategy in both GSL and AdaSL, and fridge elicited 100% and 70% responses in *presentable action* strategy from GSL and AdaSL signers, respectively. Computer elicited different iconic strategies in both languages; 90% *instrument* (with focus on the mouse) in GSL, but 70% *handling* (typing) in AdaSL. Finally, television elicited *tracing 3D* (80%) and *tracing 2D* (30%) responses from of AdaSL signers. On the other hand, only 20% of the responses for television in GSL[59] were iconic (*tracing 2D*) while all the ten signers gave responses that were considered *non-iconic*.[60]

5.2.5 Iconic Patterns for Nature in GSL and AdaSL

Only two items were coded for Nature semantic category and these are *flower* and *tree*. The limited number of objects in this semantic category activated several responses from the signers. All ten AdaSL signers responded and had signs for this category and nine of the GSL

[58] The sign COLD for FRIDGE can equally be referred as a metonymic relationship because *cold* is closely associated to *fridge*.
[59] These 20% responses were from signers that depicted TELEVISION as a 2-part sign [#TV ^ outline shape].
[60] As a reminder, the percentages here refer to the number of signers who use the strategy. 100% refers to all 10 signers and 10% refers to 1 signer.

signers responded to this category (one GSL signer skipped these two signs by oversight). The nine GSL signers had 25 responses and the ten AdaSL signers had 34 responses. Both *flower* and *tree* were represented with both single and multiple responses in both sign languages. GSL signers had 44% (N=11) of their responses as single tokens and 56% (N=14) as two-part signs. AdaSL signer had 23% (N=8) as single tokens, 59% (N=20) as two-part signs and 18% (N=6) given as three responses.

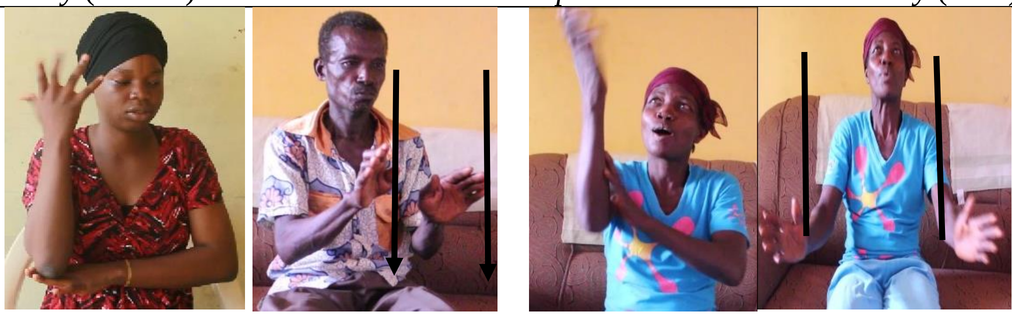
Nature	Examples
Flower	 *entity* (AdaSL) *presentable action* *entity* (GSL)
Tree	 *entity* (GSL) *tracing 3D* (AdaSL) *entity* *tracing 3D* (AdaSL)

Figure 5.8 Examples of Nature from GSL and AdaSL

Signers demonstrated a greater preference for *entity* strategy in this semantic category (see figure 5.9). GSL signers had 52% (N=13) *entity*, 38% (N=9) *presentable action*, 7% (N=2) *tracing 3D* and 3% (N=1) *measuring*. All the other strategies elicited null responses among GSL signers and none of the GSL responses were coded as *not clear* or *non-iconic*.

AdaSL signers had a mean percentage of 77% (N=26) for the *entity* strategy. Other strategies were represented as follows: *tracing 3D* 17% (N=6) and *presentable action* 3% (N=1). There were null responses for the other iconic strategies and AdaSL had 3% (N=1) of the response coded as *not clear*. Although *entity* strategy was the preferred strategy, AdaSL signer demonstrated a higher preference as compared to GSL signers. On the other hand, GSL signers showed a higher preference for the *presentable action* (GSL, 38% (N=9)) strategy which was barely used by AdaSL signers (AdaSL, 3% (N=1)). Again, both sign languages used *tracing 3D* minimally but a clear preference for *tracing 3D* was shown by

AdaSL (17%, N=6) as compared to GSL (7%, N=2). In GSL, *entity strategy* is used to name Nature objects like *sun*, *rain*, *moon*, *leaf*, *forest* etc. (McGuire & Deutsch, 2015).

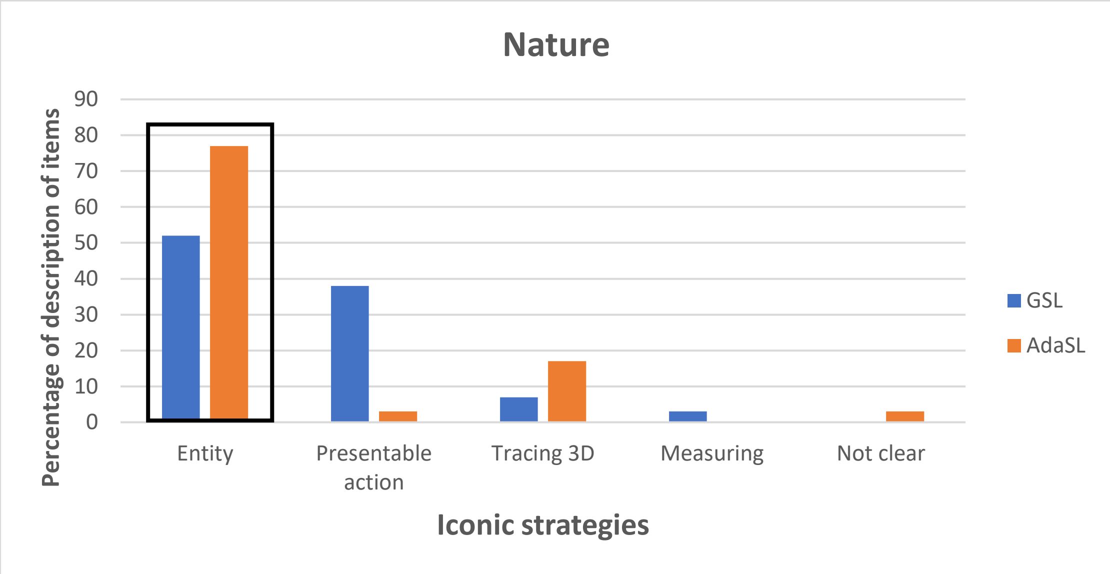


Figure 5.9 Mean percent of responses: Nature

Figure 5.10 GSL examples of Nature items that use entity strategy

5.2.6 Comparing not clear and non-iconic across all semantic categories

Not all responses could be classified according to the strategies mentioned in §5.1. Few of the signs were also classified as *not clear*. These signs on the surface were perceived as having some form of iconic mapping. However, the mapping between the form of the sign and the referent was not clearly identifiable as one of the listed strategies in §5.1.[61] For example, initialised signs with meaningful locations and (or) meaningful movement but not specific

[61] *Not clear* signs have perceived iconicity. New categories may be identified in future research that could accommodate the strategies used in these signs.

iconic strategies were coded as *not clear*. Examples of signs coded as *not clear* are variants of KEY, PANT (for trouser) exemplified in Table 5.5.

Furthermore, few of the lexical signs did not have form-meaning resemblance relationship. These signs were classified as *non-iconic* and they included signs without resemblance mapping relationship. Signs produced with lexicalised fingerspelling were coded as *non-iconic*. These include variants of #BED for BED, #BG for BAG, #SAW for SAW, #TV for TELEVISION etc. The examples in Table 5.5 were taken from GSL signers.

Table 5.5 Not clear and non-iconic signs

Not Clear		Non-iconic	
 KEY with K HS	In this sign, the movement is meaningful, but the handshape is initialised from KEY.	 TELEVISION (GSL)	TV for TELEVISION
 TROUSER[62] with P HS	PANTS (borrowed from ASL). The location (above the thigh) is meaningful, but the handshape is initialised from PANT.	 SHOE (GSL)	

From the results presented in §5.2.1-5, we have identified that GSL signers gave more responses that were coded as *not clear*. Again, signers of both sign languages gave few responses with perceived iconicity, but they could not be classified according to the iconic strategies listed in §5.1. This subsection presents the occurrence of *not clear* and *non-iconic* signs across semantic categories with the goal of highlighting the categories that elicited most of these responses and to compare between GSL and AdaSL. The summary of the *not clear*

[62] This variant of PANT is generally not acceptable in many ASL signing communities.

and *non-iconic* forms across sign languages and semantic categories are presented in Figures 5.11 and 5.13.

From Figure 5.11, we identify that GSL exhibited a majority of *not clear* responses within the semantic category of Furniture & Household items specifically for *chair* and *sofa* (17% (N=25 out of 148)). However, AdaSL did not record any response coded as *not clear* in this category. The sign CHAIR in GSL (Figure 5.12) which was given as response for both *chair* and *sofa* had a seemingly form-meaning resemblance mapping showed in the two handshapes (C & H). However, the H-HS tapping on the lower part of the C-HS made it difficult to identify which strategy was in use. For example, one can argue that the C-HS is the *entity* (chair) and the H-HS refers to the legs of the person the person on the chair (obviously *entity* strategy). In most of the categories, the *not clear* responses from AdaSL were signs borrowed from GSL except for the signs in the category of Nature. The responses from AdaSL coded as *not clear* had perceived iconicity but could not be classified with any of the strategies listed in §5.1. The distribution of the *not clear* proportions found in GSL and AdaSL are: Handheld tool (GSL 3%, N=7; AdaSL 4%, N=11), Clothing & Accessories (GSL 2%, N=4; AdaSL 2%, N= 3); Furniture & Household items (GSL 17%, N=25; AdaSL 0%), Appliances (GSL 2%, N= 2; AdaSL 2%, N=2) and Nature (GSL 0%; AdaSL 3%, N=1).

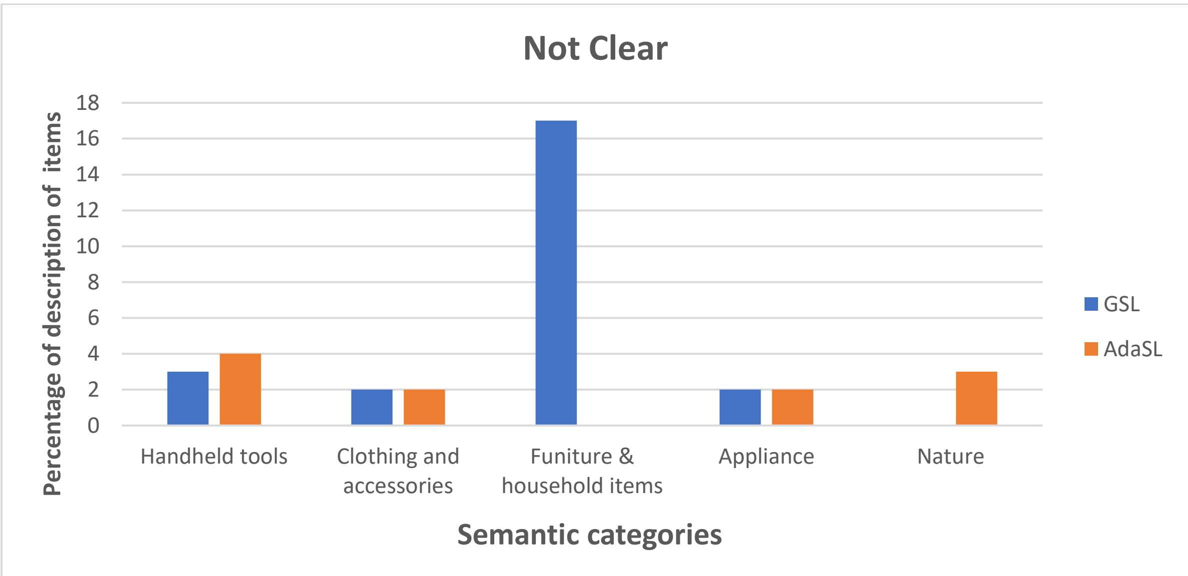


Figure 5.11 Percentage of categories classified as not clear in GSL and AdaSL

Figure 5.12 CHAIR in GSL

Furthermore, GSL recorded more responses that were coded as *non-iconic* with the highest found in the semantic category of Clothing & Accessories (Figure. 5.13). AdaSL had *non-iconic* responses from the Clothing & Accessories category because of the GSL sign SHOE (Figure 5.14) which was borrowed by six AdaSL signers as part of their responses for *shoe*. Comparing GSL and AdaSL, we identify that the presence of fingerspelling and finger alphabet HS in GSL increased the chances of using lexicalised fingerspelling for naming some of the items in the various semantic categories. For example, #BG for BAG in Figure 5.14 was part of the responses for *backpack*, *handbag*, and *suitcase*. Again, items such as *mirror*, *spectacles*, and *bottle* elicited responses with the sign GLASS (Figure 5.14) among GSL signers and GLASS was coded as *non-iconic*. The distribution of the *not-iconic* proportions found in GSL and AdaSL are: Handheld tool (GSL 9%, N=26; AdaSL 0%), Clothing & Accessories (GSL 45%, N=91; AdaSL 4%, N= 6); Furniture & Household items (GSL 10%, N=15; AdaSL 0%), Appliances (GSL 13%, N= 12 ; AdaSL 0%) and Nature (GSL 0%; AdaSL 0%).

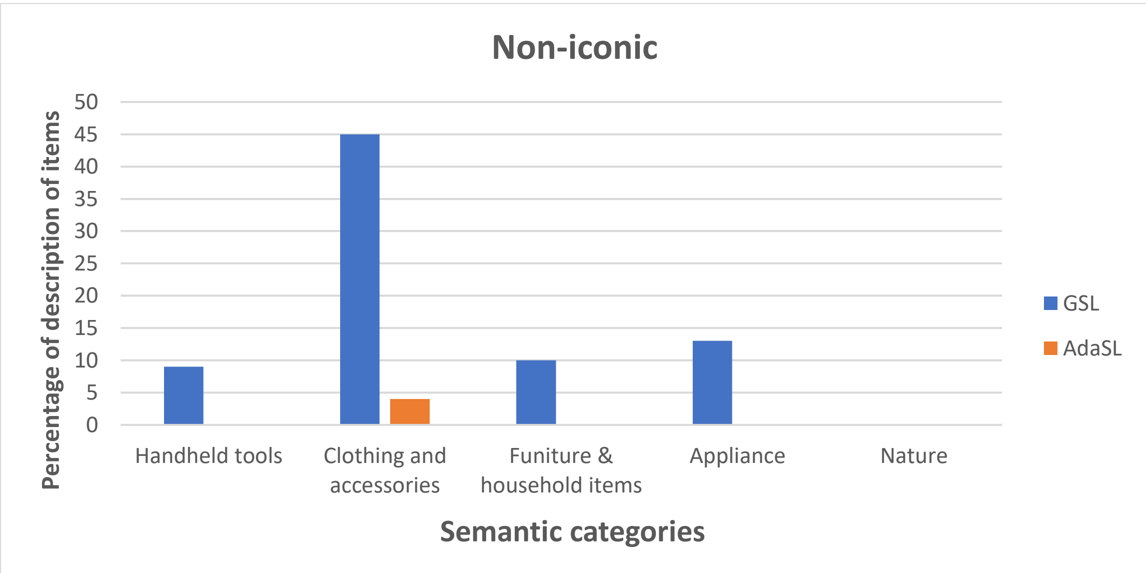


Figure 5.13 Percentage of categories classified as non-iconic in GSL and AdaSL

SHOE GLASS BAG[63]

Figure 5.14 Examples of non-iconic forms in GSL

5.3 Figure-Ground Relationships across semantic categories

Earlier research on lexical iconicity did not consider the non-dominant hand (Padden, et al., 2013; 2015; Kimmelman, et al., 2018; Hwang, et al., 2017; Hou, 2018), i.e. the patterns of iconicity for ground elements (the non-dominant hand) across the semantic categories that were investigated. However, in this section, figure-ground relationships considered the iconic strategies for both the dominant and the non-dominant hands. Figure-ground relationships were considered important to the discussion in this dissertation because the two hands used different iconic strategies and it was relevant to identify which strategies are used on each hand. As noted by Lepic et al. (2016) two hands can be recruited to iconically encode various relationship types in lexical signs within and across languages. However, also identified in the coding and analysis of the data was the fact that not all semantic categories produced enough forms with figure-ground relationships. §5.3.1 discusses in detail the figure-ground relations in the category of Handheld tools since it generated the most figure-ground responses; §5.3.2 discusses the use of figure-ground relations in Clothing & Accessories focusing on signers' use of the body as the ground object in what is termed as *motivated location*; and §5.3.3 considers the other semantic categories.

5.3.1 Figure-ground in Handheld tools

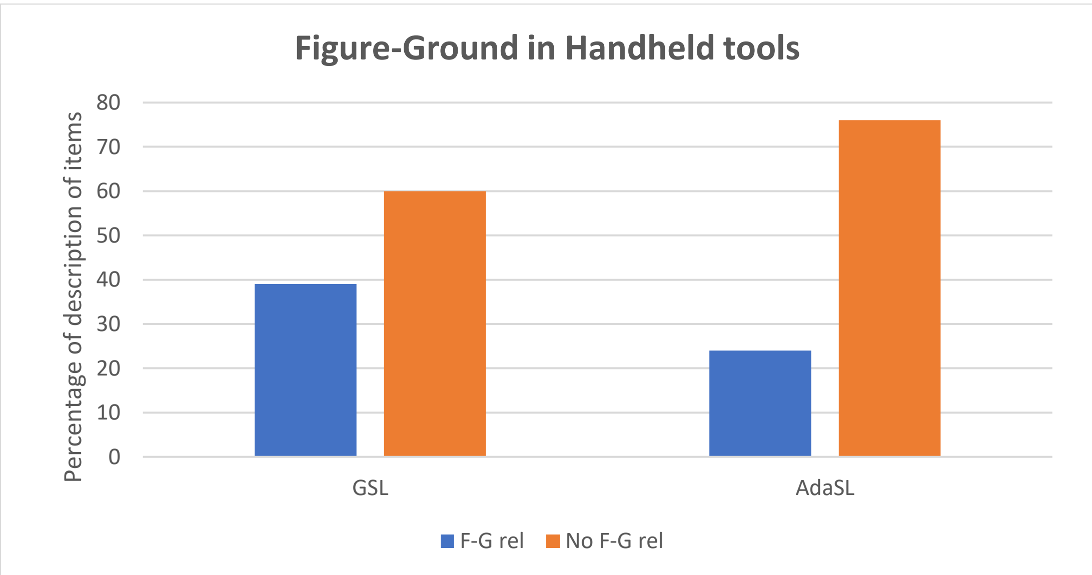
Handheld tools were coded for figure-ground relationships considering the dominant and non-dominant hands that contributed different meanings to the sign (see Figure 5.15). GSL

[63] Although 3 recent dictionaries of GSL; McGuire & Deutsch (2015), Leiden GSL app (2020) and the Ayele foundation GSL dictionary (n.d) depict BAG or HANDBAG and BACKPACK with the handling strategy only, five out of the ten GSL signers depicted BAG or HANDBAG with lexicalised fingerspelling in addition to the handling strategy; and two out of the ten GSL signers depicted BACKPACK with lexicalised fingerspelling in addition to handling strategy. Four other GSL signers used lexicalised fingerspelling and handling strategy for SUITCASE [#BG ^ handling].

and AdaSL signers depicted figure-ground relationships in some of their responses[64] and the handshapes, movement, location, and orientation of the dominant and non-dominant hands were coded separately for the iconic strategies that were simultaneously used.

Examples from GSL	*Examples from AdaSL*
 FORK KEY	 KNIFE HAMMER
1. FORK - Dominant hand is figure (FORK-instrument) and non-dominant is plate/ food (ground-entity) 2. KEY - Dominant hand is figure (KEY-handling) and non-dominant hand is the ground (door/something to be opened-entity)	1. KNIFE- Dominant hand is figure (KNIFE-instrument) and non-dominant hand is object being acted upon (ground-entity) 2. HAMMER- Dominant hand is figure (HAMMER-handling) and non-dominant hand is ground (object to be hammered-entity)

Figure 5.15. Figure-Ground relationship



[64] In figure-ground relationships, both hands have different iconic strategies. Chapter 8 will give a cognitive linguistics analysis of figure-ground relationship.

Figure 5.16 Mean percent of responses: Figure-Ground relationship

From the graph in Figure 5.16, it is clear that GSL signers showed a greater preference (39%, N=109) for figure-ground for Handheld tools as compared to AdaSL (24%, N=65). In other words, there were more Handheld tools represented with figure-ground relationships in GSL than in AdaSL. It was necessary to identify the iconic strategies used for the ground object. Already established for the dominant hands are the preference for *instrument* and *handling* (see Figure 5.2). The preferred iconic strategy for the non-dominant hand is *entity strategy*, as occurred in 37% (N=105) of responses from GSL signers and 21% (N=57) of responses from AdaSL signers[65] (Figure 5.17). The *ground* usually shows the object that is acted on by the figure and therefore, *entity* strategy is preferred. *Handling* was elicited in a few responses as well; 3% (N=8) for AdaSL and about 1% (N= 4) for GSL.

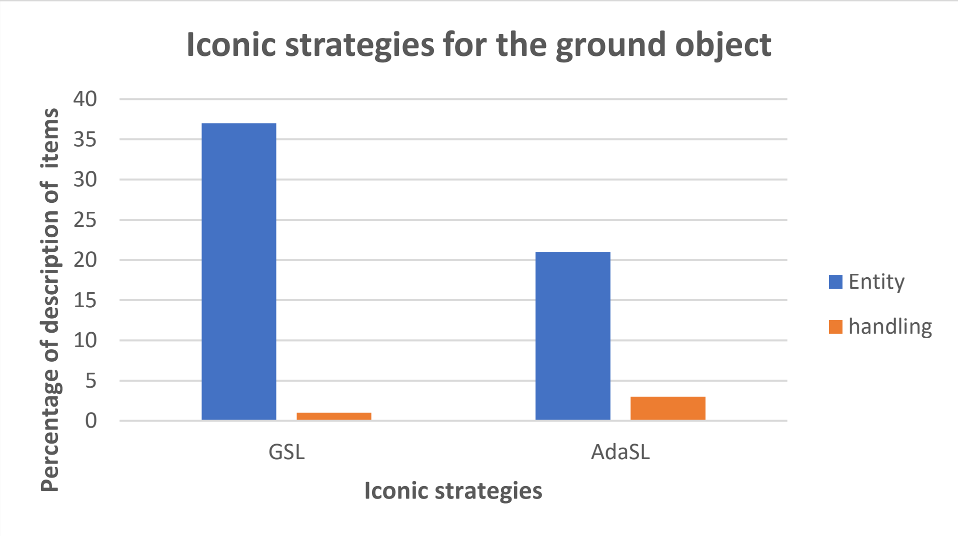


Figure 5.17 Iconic strategies for ground: Handheld tools

5.3.2 Figure-ground in Clothing & Accessories

Unlike Handheld tools that elicited more responses for figure-ground, there were few occurrences of figure-ground relationship within the category of Clothing & Accessories. Thus, in this semantic category, there were hardly two handshapes performing two different functions, or one hand acting upon the other in both sign languages. However, there was simultaneous movement of the two hands performing the same action as compared to two hands performing different actions. Items like *dress, backpack, hat, high-heeled shoe, shoe, spectacles* and *trousers* were mostly produced with both hands (same handshape body-

[65] This is calculated from the percentages of the iconic strategies based on the non-dominant hand responses in Figure-ground relationships.

anchored or non-body anchored) in GSL and AdaSL. Important to this category is the fact that the signer's body acted as the *ground object* (comparable to the non-dominant hand that is the ground object in Handheld tools) and as such most of the movement of the hands was located on different parts of the body where the object is found. The body as the ground object in this category resulted in signs that had *motivated* locations. The motivation to situate the sign on the signer's body is because the body acted as the ground object being acted on. In other words, there was one-to-one mapping of the location of the sign and the semantics of the object. Both sign languages used motivated locations but because of the presence of *non-iconic* structures in GSL, motivated locations were recorded more for AdaSL signers.

Furthermore, this semantic category had objects that are either worn on the body (*cap, dress, hat, high-heeled shoe, trousers, shoe, spectacles*), carried on the body (*backpack*), held with the hands and involved with the body (*mirror, suitcase, handbag*), as exemplified in Figure 5.18. These meaningful locations contributed to the iconicity revealed in the signs and were referred to as *motivated locations* because the locations of the signs were motivated by form-meaning resemblance mapping between the object and the linguistic forms.

Clothing & Accessories	Examples from GSL and AdaSL
Worn on the body	 TROUSER (AdaSL-thigh)  SHOE (AdaSL-leg)  SPECTACLES (GSL-eye)  DRESS (GSL-body)  HAT (GSL-head)  CAP (AdaSL-head)

Carried on the body	  BACKPACK (shoulder & body) HANDBAG (shoulder & body)- AdaSL
Held with the hands and involved with the body	   MIRROR (AdaSL) SUITCASE (AdaSL) HANDBAG (GSL)

Figure 5.18 Motivated locations for clothing and accessories

Signers of both sign languages gave responses with motivated locations where the body is the ground object. Again, AdaSL signers had more responses located on the body than GSL signers. AdaSL had 72% (N=99) and GSL signers had 55% (N=109) of the responses for Clothing & Accessories located at a meaningful location on the body. The higher proportion of motivated locations in AdaSL is caused by the absence of lexicalised fingerspelling and initialised signs that are found in GSL. GSL signers had 45% (N=91) of the mean responses to the semantic category coded as *non-iconic* and most of these signs without form-meaning resemblance mappings were lexicalised fingerspelling and initialised signs that did not meet any of the criteria for the iconic strategies used for coding. For this category, only one object elicited arbitrary forms in AdaSL and that is *shoe* which was borrowed from GSL. Most AdaSL signers used the GSL sign SHOE in addition to the AdaSL sign for shoe which represented with motivated locations (foot/leg).

5.3.3 Figure-ground in other categories

Furniture & Household items, Appliances and Nature elicited few instances of figure-ground relationships. For example, Furniture & Household items were mainly depicted with *tracing* strategies (2D/2D), which falls under the broad category of *virtual depiction* and involves the articulators leaving an imaginary trace of the shape of the object. In the category of Appliances, GSL variants of COMPUTER and SEWING MACHINE encoded figure-ground relationships (see Figure 5.6). Figure-ground in Nature was represented in the GSL sign TREE (see Figure 5.8).

5.4 Consistency and Full agreement across semantic categories

The responses from signers were further analysed for consistency and full agreement (Padden, et al., 2013). Consistent use of strategy is defined as more than 70 percent of signers (>70%) use the same strategy (Padden, et al., 2013). Full agreement is defined as 100% of signers use the same strategy in each group. It was important to investigate signers' consistency and full agreement of iconic strategies to further understand the specific patterns of iconicity across signers in each language. Consistency and full agreement within groups considered the iconic strategies and not just the formational parameters (see Figure 5.24). For example, there were few signs used within groups that used the same iconic strategies but had different profiling of the handshapes. The graphs in Figure 5.19-23 present consistencies and full agreement across the different semantic categories.

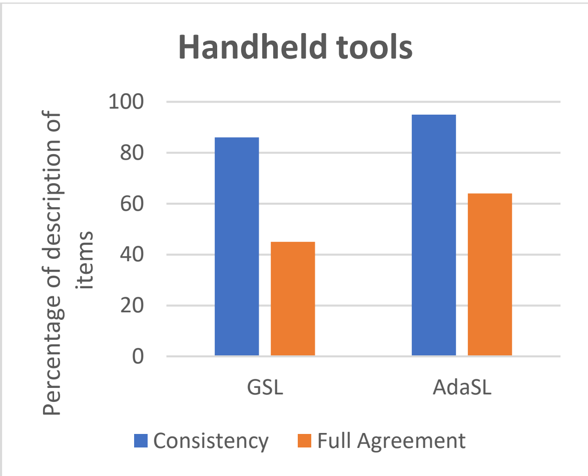


Figure 5.19 Handheld tools

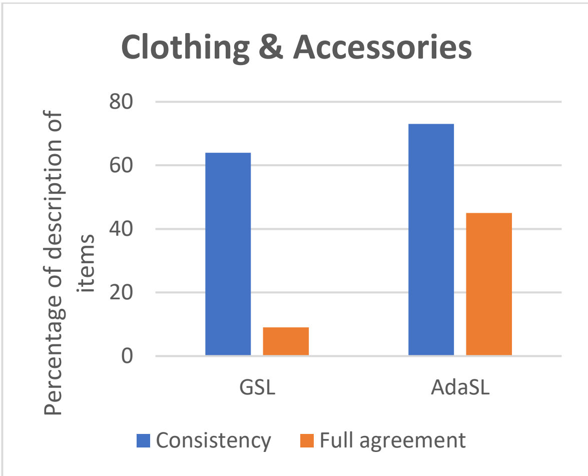


Figure 5.20 Clothing & Accessories

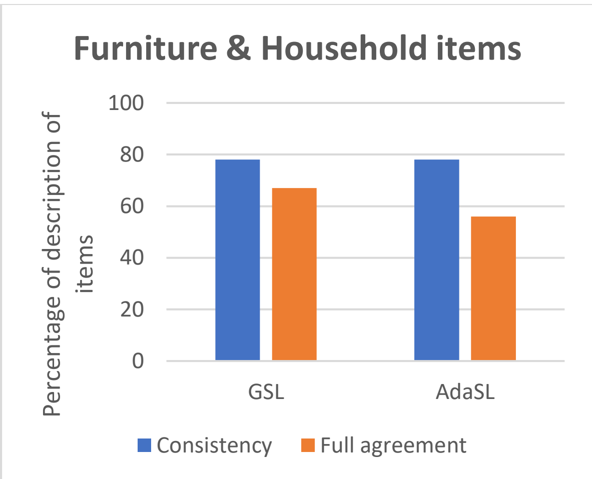


Figure 5.21 Furniture & Household items

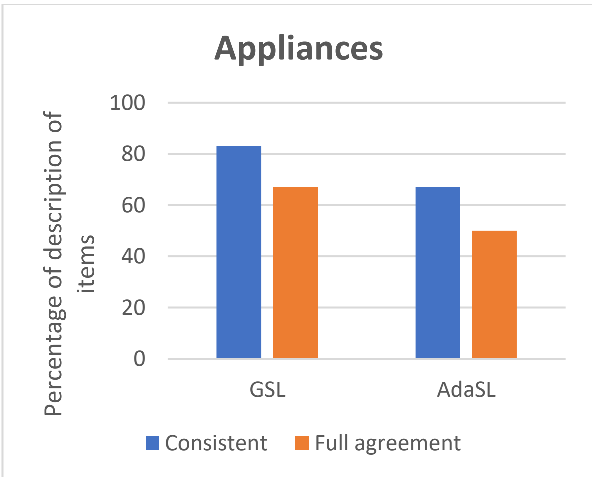


Figure 5.22 Appliances

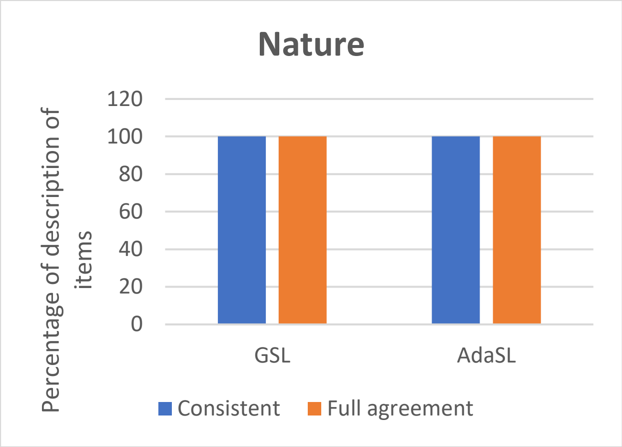


Figure 5.23 Nature

For the category of Handheld tools (N=22), AdaSL signers had a higher consistency (AdaSL 95%, N=21; GSL 86%, N=19) and full agreement (AdaSL 64%, N= 14; GSL 45%, N=10).[66] In other words, agreement in use of the same strategy for individual items was higher in AdaSL than in GSL. As indicated earlier, few signs used within groups had the same iconic strategies but different profiling of the handshapes for Handheld tools. For example, the iconic strategy used by all the 10 signers of GSL for MOBILE PHONE as exemplified in Figure 5.24 is *instrument* strategy, but different handshapes were produced for the same iconic strategy. In other words, the sign (the representation of the object) is not the same, but the strategies are the same. (The Y-HS and G-HS represent different types of phones and this will be discussed in detail in chapter 8).

Consistent use of strategy and full agreement for Clothing & Accessories (N=11) resulted in the following: AdaSL signers had 73% (N=8) consistency and GSL signers had 64% (N=7) consistency; AdaSL signers had 55% (N=6) full agreement and GSL signers had 9% (N=1) full agreement. There were more inconsistencies in GSL strategies (see Figure 5.25) as compared to AdaSL and only *suitcase* had full agreement (*handling*) in GSL. On the other hand, AdaSL signers demonstrated more consistency and full agreement of strategies. GSL signers consistently used forms that were considered not to be iconic. For *handbag*, *high-heeled shoe,* and *shoe*, all ten signers gave responses that were classified as *non-iconic*. These were either fingerspelling, or forms without resemblance mapping relationship.

[66]An analysis of 20 Handheld tools for consistency and agreement appears in a separate paper (Edward, 2020).

*Figure 5.24 GSL Full Agreement (*MOBILE PHONE*- instrument)*

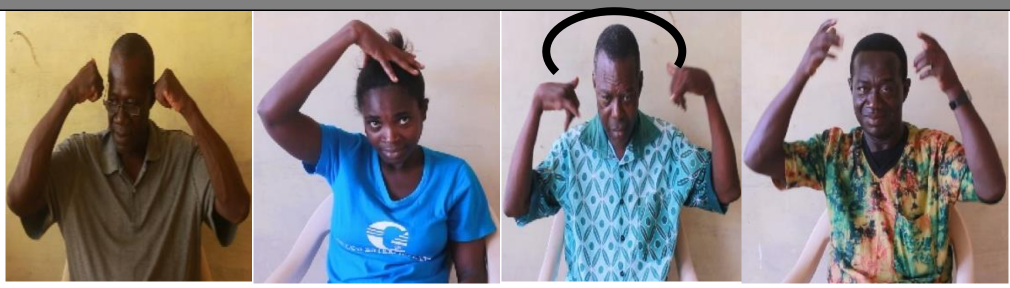
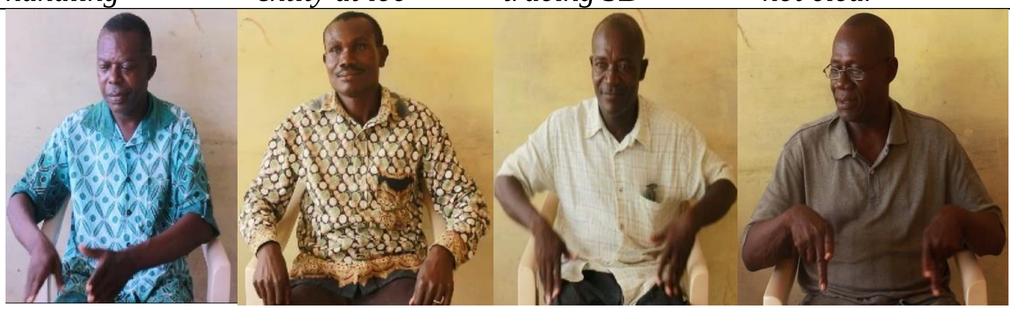
Item	GSL's different strategies
Hat	 *handling* *entity at loc* *tracing 3D* *not clear*
Trouser	 *tracing 3D* *indexing* *handling* *not clear*

Figure 5.25 Different strategies for same items in GSL

The semantic category of Furniture & Household items (N=9) was similar for GSL and AdaSL in terms of consistency (Figure 5.21). GSL and AdaSL signers had same percentages for consistency of strategies used (78%, N=7). However, GSL signers had a full agreement of 67% (N=6) and AdaSL signers had 56% (N=5).

GSL signers had 83% (N=5) consistency and 67% (N=4) full agreement in the semantic category of Appliances (N=6). On the other hand, AdaSL signers had 67% (N=4) consistency and 50% (N=3) full agreement with the semantic category of Appliances. This was the only category for which GSL clearly showed more consistency and full agreement than AdaSL.

Lastly, both sign languages had 100 percent consistency and full agreement for the choice of strategies for the category of Nature (N=2). For example, all the signers of GSL had 100% (N=2) response for *presentable action* (flower) and 100% (N=2) response for *entity* (tree) and AdaSL signers had 100% (N=2) response for *entity* (flower and tree). Other iconic strategies were minimally used since some of the responses were given in two-parts (and some other variants by AdaSL signers). Although the items in this category are few, we can see the preference for *entity* as dominating in both sign languages. The entity handshape seems to be the preferred handshape for naming objects in the Nature category for GSL signers.

In summary, consistency and full agreement across the semantic categories demonstrate that AdaSL as a village sign language with a long history shows higher agreement in the use of strategy compared to the younger GSL, which is relatively new sign language (that emerged in 1957). However, AdaSL demonstrated lower consistency and full agreement for items within the category of Appliances showing the possible novelty of these signs in the AdaSL lexicon.

5.5 Comparing signs to gesture

The coded data from signers were compared to gestures produced by hearing non-signers. 20 gesturers representing rural (N=10) and urban (N=10) communities gestured the 50 Household tools and objects. Findings are discussed with respect to patterns of iconicity across semantic categories and similarities and differences between sign and gesture taking motivation from previous literature (Padden, et al., 2013; Padden, et al., 2015). For this section, the coding category *entity depiction* combines *entity*, *entity at body location* and *measure stick*[67] and the category *virtual depiction* combines *tracing* 2D and 3D. The graphs in Figures 5.26, 5.28, 5.30, 5.32, 5.34 compare signers' and gesturers' representation of the items across semantic categories focusing on the strategies that were mostly used by signers and gesturers. Figures 5.27, 5.29, 5.31, 5.33, 5.35 present examples from sign and gesture.

Table 5.6 Semantic categories for the Household tools and objects: signers & gesturers

Semantic Category	Number of items	Number of Responses			
		GSL	AdaSL	Rural	Urban
Handheld tools	22	281	275	278	320

[67] Measure stick was only recorded in AdaSL for the category of Handheld tools.

Clothing & Accessories	11	201	132	171	191
Furniture & Household items	9	148	149	155	175
Appliances	6	89	92	97	137
Nature	2	25	34	35	39
Total	50	741	682	736	862

5.5.1 Handheld tools: Sign and Gesture

Gesturers from urban and rural locations also made predominant use of *handling* and *instrument* strategies for the category of Handheld tools as found in Padden, et al. (2013). Although most of the responses from the gesturers in the semantic category of tools used *handling* strategy as in previous research (Brentari, et al., 2015; Ortega & Özyürek, 2016; Padden, et al., 2013), gesturers from Adamorobe (rural) showed much more similar preference for *handling* and *instrument* strategies in contrast to the urban gesturers (who showed a clear preference for *handling*) and more similar to what was demonstrated by the AdaSL signers (see Figure 5.26). The preference for the rural gesturers is in contrast to other research on silent gesturers who showed a clear preference for *handling* (Brentari, et al., 2015; Padden, et al., 2013). 53% (N=168) of the average responses of the urban gesturers used *handling* strategy and 51% (N=138) of the average responses from rural gesturers were in the *handling* strategy. However, rural gesturers used *instrument* strategy to a higher degree (39%, N=110) as compared with urban gesturers (29%, N=89). For instance, nine out of the ten rural gesturers responded with an *instrument* strategy for *knife*, but six out of the ten urban signers responded with an *instrument* strategy. All rural gesturers responded with *instrument* strategy for *broom* whereas only three urban gesturers responded with *instrument* strategy.

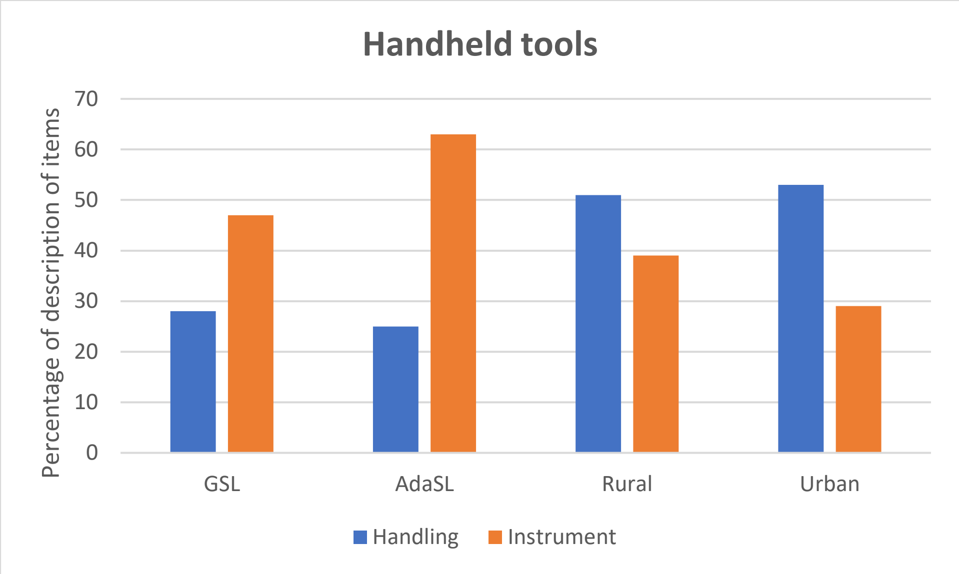


Figure 5.26 Comparing signers and gesturers; Handheld tools

Previous research by Padden, et al. (2013) showed a clear preference for a *handling* strategy by the American and Bedouin gesturers for Handheld tools. Contrasting the American, Bedouin gesturers (Padden, et al., 2013) and urban gesturers (for this dissertation) with the rural gesturers from Adamorobe, we identify that there is a remarkable difference in the preference for *handling* and *instrument* strategies. That is, Adamorobe gesturers show an increased preference for *instrument* as compared to the other gesturers. This striking preference among the rural gesturers of Adamorobe is attributed to the contact with AdaSL signers. On the other hand, Bedouin gesturers showed a striking preference for *handling* although, the Bedouin signers demonstrated a preference for *instrument* strategy for Handheld tools. Thus, the preference for instrument strategy by the rural gesturers is unique to Adamorobe gesturers.

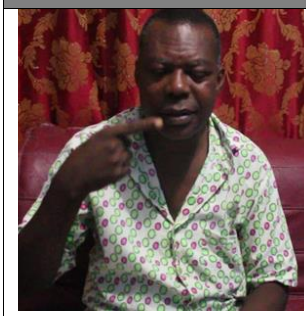
GSL	AdaSL	Rural gesturers	Urban gesturers
 TOOTHBRUSH	 SCISSORS	 SAW	 MOBILE PHONE

Figure 5.27 Instrument (row 1) and handling (row 2) strategies for Handheld tools

5.5.2 Clothing & Accessories: Sign and Gesture

Gesturers exhibited a systematic preference for *handling* strategy for the iconic representation of Clothing & Accessories, demonstrating how the object is held. Signers' and gesturers' preference for *handling* strategy seems to emerge from a shared motivation; that is, both groups show how the object is handled, used, or manipulated on the body (see Figure 5.29). GSL signers (23%, N= 44) and urban gesturers (38%, N=70) showed lesser preference for *handling* as compared to AdaSL signers (44%, (N=57)) and rural gesturers from Adamorobe (48%, N=76). *Entity depiction* was the next most frequently used strategy by both signers and gesturers; GSL (16%, N=31), AdaSL (22%, N=29), rural gesturers (9%, N=19) and urban gesturers (12%, N=22). Overall, GSL signers did not show a clear preference for *handling* and *entity depiction* compared to AdaSL signers and the gesture groups who show a clear preference for *handling* strategy. This category also shows a similarity between AdaSL signers and the rural gesturers considering their preferences for *handling* strategy.

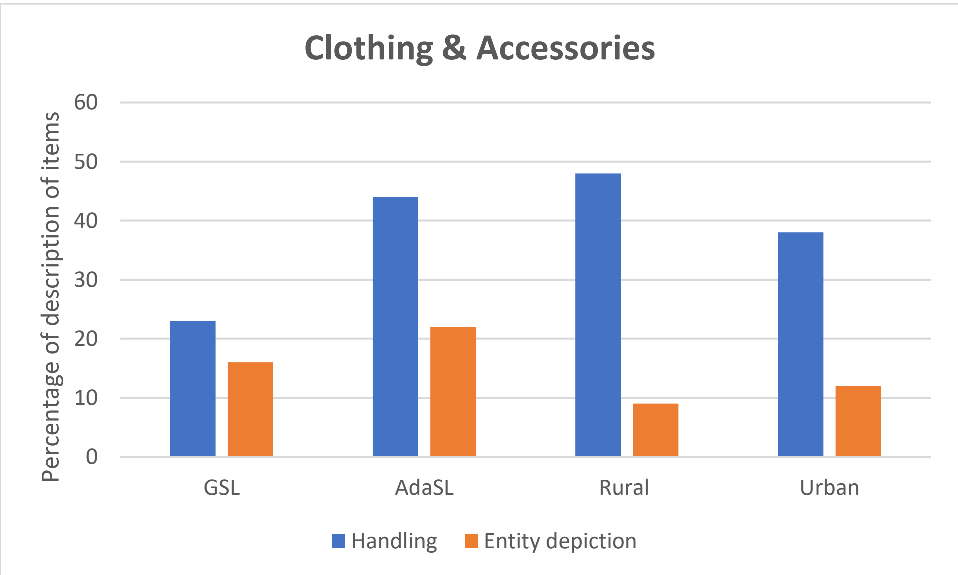


Figure 5.28 Comparing signers and gesturers; Clothing & Accessories[68]

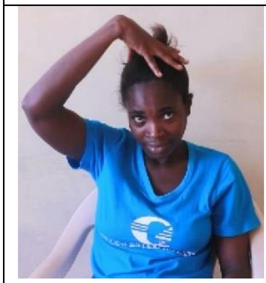
GSL	AdaSL	Rural gesturers	Urban gesturers
 HAT	 BACKPACK	 TROUSER	 SUITCASE
 HAT	 HAT	 HAT	 HAT

Figure 5.29 Handling (row 1) and entity depiction (row 2) strategies for Clothing & Accessories

5.5.3 Furniture & Household items: Sign and Gesture

Virtual depiction of items was preferred by gesturers to name Furniture & Household items. Thus, both signers and gesturers predominantly used *tracing* strategies to depict features of the object. Numerically, both signers and gesturers showed a greater preference for *virtual depiction* (Figure 5.30); GSL (35%, N= 52), AdaSL (34%, N=50), rural gesturers (34%, N=52) and urban gesturers (38%, N=67). Items such as *plate* and *bowl* were mainly represented with *tracing* strategies across sign and gesture groups. Furthermore, the *body* strategy was used extensively by AdaSL signers and the gesturers; AdaSL (20%, N= 29), rural gesturers (17%, N=26), urban gesturers (20%, N=35).

68 Remember that entity depiction combines entity, entity at body location and measure stick. Virtual depiction combines tracing 2D and tracing 3D

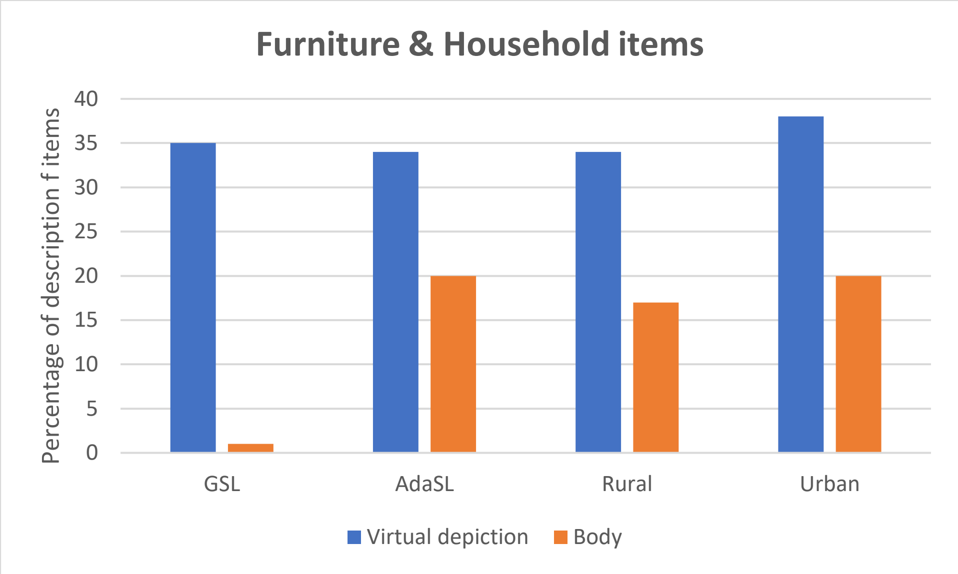


Figure 5.30 Comparing signers and gesturers; Furniture & Household items

The interesting finding from this category is that both sign and gesture groups show a clear preference for *virtual depiction*. On the use of *body* strategy, AdaSL signers and the gesture groups use a fair amount in contrast to GSL signers who barely used the *body* strategy. For example, both AdaSL signers and the gesturers depicted *chair* and *sofa* mainly with the body reclining to a sitting position. On the other hand, both *chair* and *sofa* were depicted with forms regarded as *not clear* by the GSL signers.

GSL	AdaSL	Rural gesturers	Urban gesturers
 TABLE	 PLATE	 BED	 SOFA
 SOFA (recline)	 CHAIR (arm & body moves up & down)	 CHAIR (body move up & down)	 SOFA (recline)

Figure 5.31 Virtual depiction (row 1) and body (row 2) strategies for Furniture & Household items

5.5.4 Appliances: Sign and Gesture

Gesturers demonstrated a preference for *handling*, *instrument*, and *virtual depiction* strategies for the category of Appliances. However, comparing signs to gestures, we identified that signers demonstrated a greater preference for *instrument* (GSL 44%, N=38; AdaSL 35%, N=33) as compared to gesturers (rural 25%, N=23; urban 21%, N=28). AdaSL signers and the gesturers (rural/urban) demonstrated a similar preference for *handling* strategy (AdaSL 29%, N=26; rural 33%, N=31; urban 24%, N=34) as compared to GSL (15%, N=13). From the graph (Figure 5.32), we see that GSL shows a clear preference for *instrument* strategy, AdaSL shows a balanced preference for *instrument* and *handling*, and the gesture groups show a preference for *handling, instrument*, and *virtual depiction*.

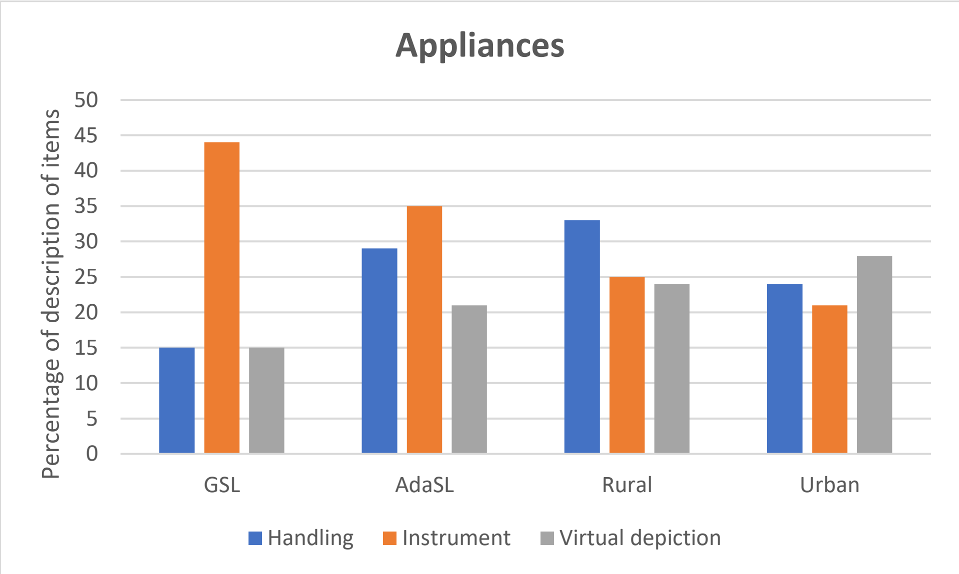


Figure 5.32 Comparing signers and gesturers; Appliances

One interesting finding is the preference for *virtual depiction* by the gesturers which is comparable to what AdaSL signers used: AdaSL (21%, N=19), rural gesturers (24%, N=21), urban gesturers (28%, N=40). In other words, in this category, the gesture groups and AdaSL signers used *virtual depiction* to a comparable degree (see examples on row 3 of Figure 5.33). For example, Appliances such as *television*, *fridge* and *computer* were represented with more *virtual depictions* by the gesture groups and the AdaSL signers.

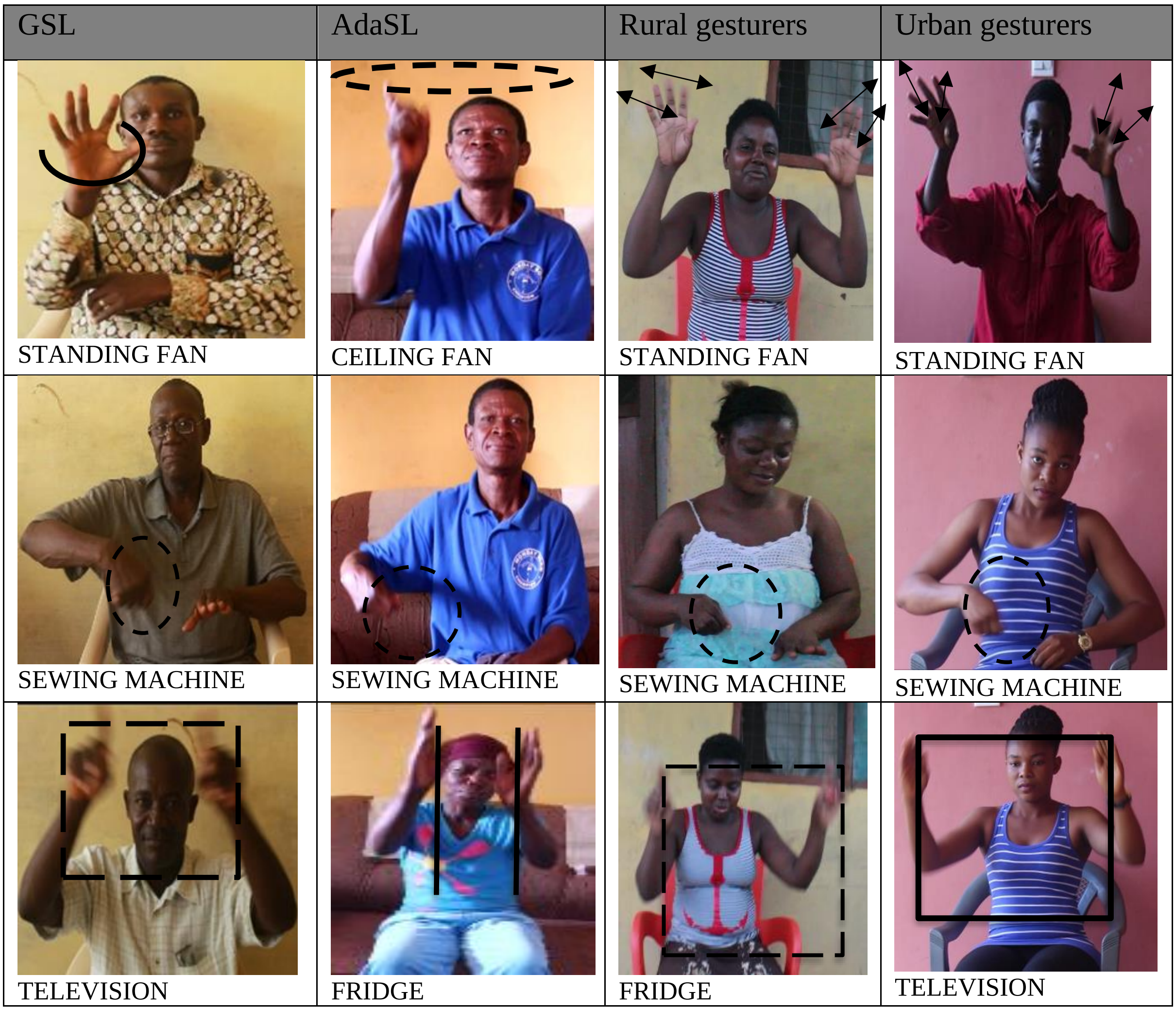


Figure. 5.33 Instrument (row 1), handling (row 2) and virtual depiction (row 3) strategies for Appliances

5.5.5 Nature: Sign and Gesture

In the semantic category of Nature, both signers and gesturers demonstrated a preference for *entity depiction*. Signers however demonstrated a greater preference for this strategy (GSL 52%, N=13; AdaSL-77%, N=26) as compared to the gesturers (rural 46%, N=13; urban 34%, N=13). *Virtual depiction* was used by both signers and gesturers but to a greater degree by the gesturers (rural 40%, N=13; urban 56%, N=20) as compared to the signers (GSL7%, N=2; AdaSL 17%, N=6). On the other hand, GSL signers used *presentable action* as compared to AdaSL signers and the gesturers (GSL 38%, N=9; AdaSL 3%, N=1; rural 1%, N=1; urban 3%, N=1). For example, GSL signers depicted *flower* with the gesture of smelling a flower as compared to the *virtual* and *entity depictions* mainly used by AdaSL signers and the gesturers. This gesture is used in surrounding communities and understood as referring to smelling a flower.[69]

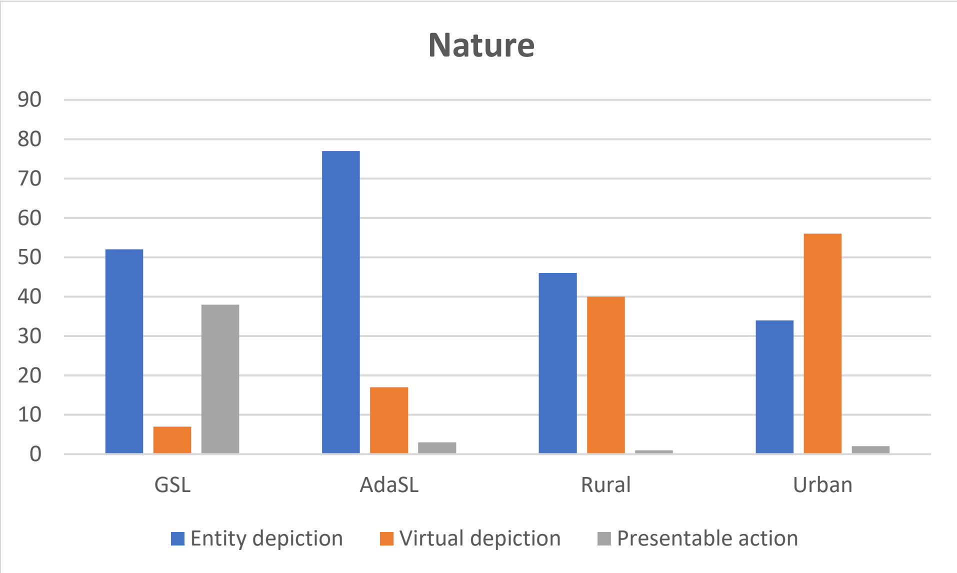


Figure 5.34 Comparing signers and gesturers; Nature

GSL	AdaSL	Rural gesturers	Urban gesturers
 FLOWER	 FLOWER	 TREE	 TREE
 FLOWER	 TREE	 TREE	 TREE

[69] Surprisingly, the gesture groups (and AdaSL) hardly used presentable action to represent items in the nature category. This was quite unexpected considering the gestural substrate of signs used across Africa.

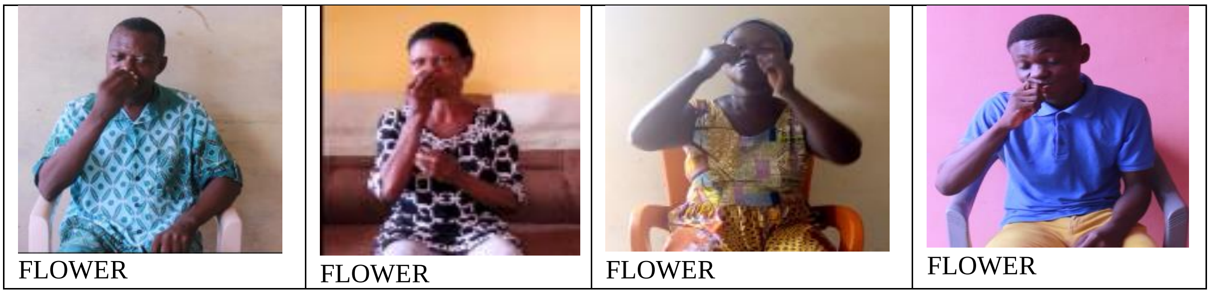


Figure 5.35 Entity depiction (row 1), virtual depiction (row 2) and presentable action (row 3) strategies for Nature

5.6 Summary & Discussion

This chapter analysed and discussed lexical iconicity in GSL and AdaSL, focusing mainly on iconic strategies used by signers, consistency in the use of strategies and full agreement. Other information given includes figure-ground relationships in some of the strategies. GSL and AdaSL demonstrate both similarities and differences in their preferences for specific strategies for each semantic category. For example, for Handheld tools which was the category with the most items, both sign languages demonstrated a preference for *instrument* followed by *handling* strategies. However, AdaSL signers showed a greater preference for *instrument* in Handheld tools than GSL signers. On the other hand, for the category of Appliances, although *instrument* was the most preferred among signers of both sign languages, GSL signers demonstrated a higher use of *instrument* than AdaSL.

Again, comparing consistency and full agreement across the semantic categories, AdaSL as a village sign language with a long history showed a higher consistency and agreement in the use of strategies compared to younger GSL (except for Appliances). The signs for the category of Appliances are relatively new to AdaSL, which is a rural sign language used for intra-community communication. In other words, the selection of the items within the category of Appliances introduced inconsistencies in the naming patterns as signers showed different strategies for items such as *television*, *computer*, and *fridge*. Considering the ages of AdaSL (ca. 18th century) and GSL (ca. 20th century) and their exposure to technology (rural sign language/language of Deaf education), it is expected that modern items will be much more known to GSL signers than to AdaSL signers. Furthermore, considering AdaSL and GSL signers' consistency and full agreement of use of iconic strategies, the results from the data seem to imply that the more concentrated the users of a language are (in a small community like Adamorobe), the more likely for signers to have more consistency and full agreement in their use of iconic strategies as compared to users in large urban centres.

Data from signers compared with gestures by non-signers showed similarities and differences in the visual-spatial domain. For instance, in Handheld tools, gesturers showed a preference for *handling* and *instrument* strategies. However, as seen, the rural gesturers did not show a clear preference for *handling* in contrast to the urban gesturers and other gesturers (Bedouin and American) discussed in previous literature (Padden, et al., 2013). Another example is Furniture & Household items, for which both gesture and sign groups showed a systematic preference for *virtual depiction* (*tracing* strategies).

5.6.1 Summary

Across all semantic categories, the most used iconic strategy by GSL signers (see Figure 5.36) is the *instrument* strategy (the predominant strategy for Handheld tools and Appliances); *entity depiction* (*entity*, *entity at loc*. & *measure stick*) was the next most frequently used strategy (predominant strategy for Nature); *virtual depiction* (*tracing* 2D/3D) was the third most frequently used strategy by GSL signers (predominant for Furniture & Household items). *Virtual depiction* is the only strategy used to depict items across all the 5 semantic categories in GSL. *Indexing* strategy was used by GSL signers to depict only Clothing & Accessories, and *body* strategy for the category of Furniture & Household items.

On the other hand, AdaSL signers did not show a clear preference for the use of a specific iconic strategy (see Figure 5.37). *Instrument*, *handling*, and *entity depiction* were used to the same degree across the different semantic categories. AdaSL signers predominantly used *instrument* strategy for Handheld tools; *handling* strategy for Clothing & Accessories; *entity depiction* for Nature, *virtual depiction* for Furniture & Household items. *Virtual depiction* was the only strategy used by AdaSL signers to depict items in all the 5 categories. *Indexing* strategy was mainly used for the category of Clothing & Accessories and minimally for other categories (except Nature). AdaSL signers used *body* strategy only for the category of Furniture & Household items.

Overall, GSL and AdaSL signers showed similarities and differences in their preferences for iconic strategies used for the different semantic categories. In both sign languages, *instrument* and *handling* were preferred for Handheld tools and *entity depiction* for Nature. All the other categories showed a varying degree of preference for different iconic strategies.

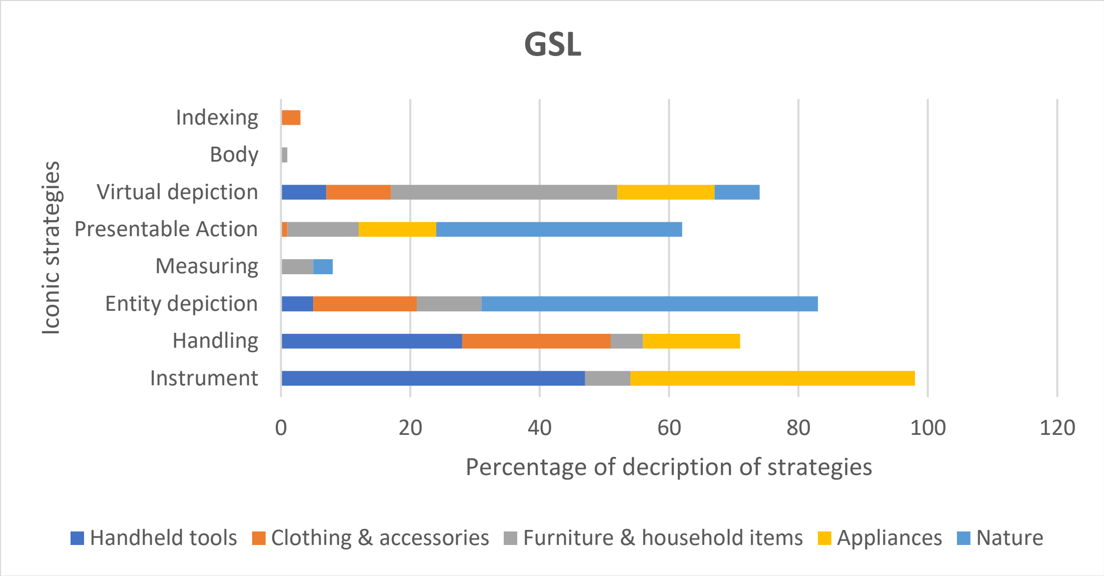


Figure 5.36 Summary of Iconic strategies for the semantic categories by GSL signers

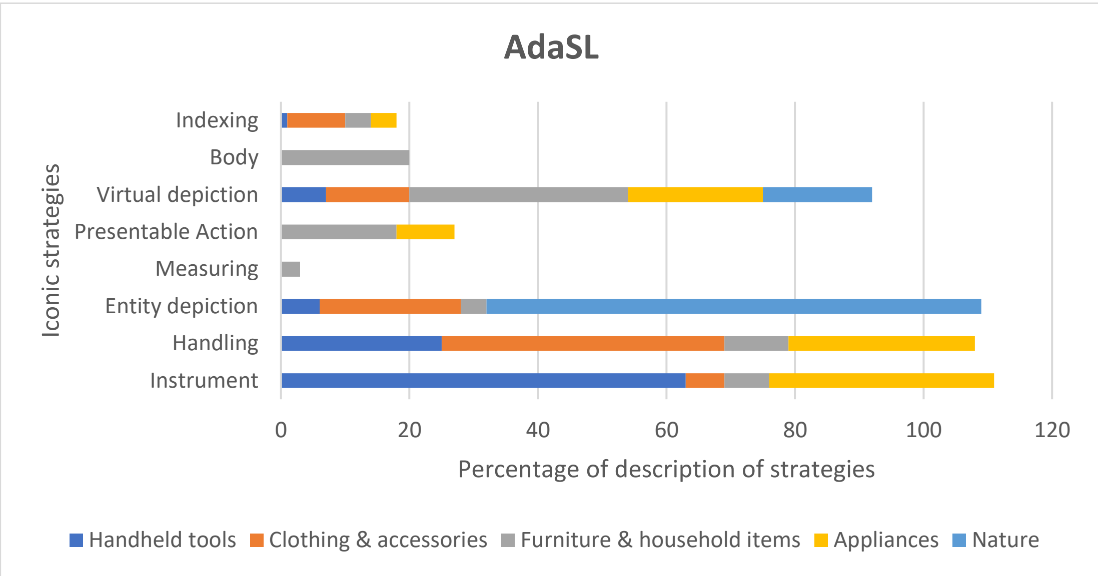


Figure 5.37 Summary of Iconic strategies for the semantic categories by AdaSL signers

Conversely, gesturers used more *handling* and *virtual depiction* strategies (rural-> more handling; urban-> more virtual depiction) overall than other strategies (Figures 5.38-39). *Virtual depiction*, *entity depiction* and *indexing* strategies were used across all semantic domains by both gesture groups. Besides the category of Clothing & Accessories, gesturers mainly used *indexing* strategy to point (or hold on) to the part of signer's body that is related to the object by extension. For example, touching the eyes (*television*, *mirror*, *computer* etc.) to indicate that the eyes are involved in the usage of the item. *Instrument* strategy was used more by the rural gesturers as compared to the urban gesturers and *entity depiction* was used to a similar degree by gesturers. The comparison with sign and gesture groups shows the preferred iconic strategies for established languages (sign languages) and for ad-hoc gestures used by speakers of surrounding communities.

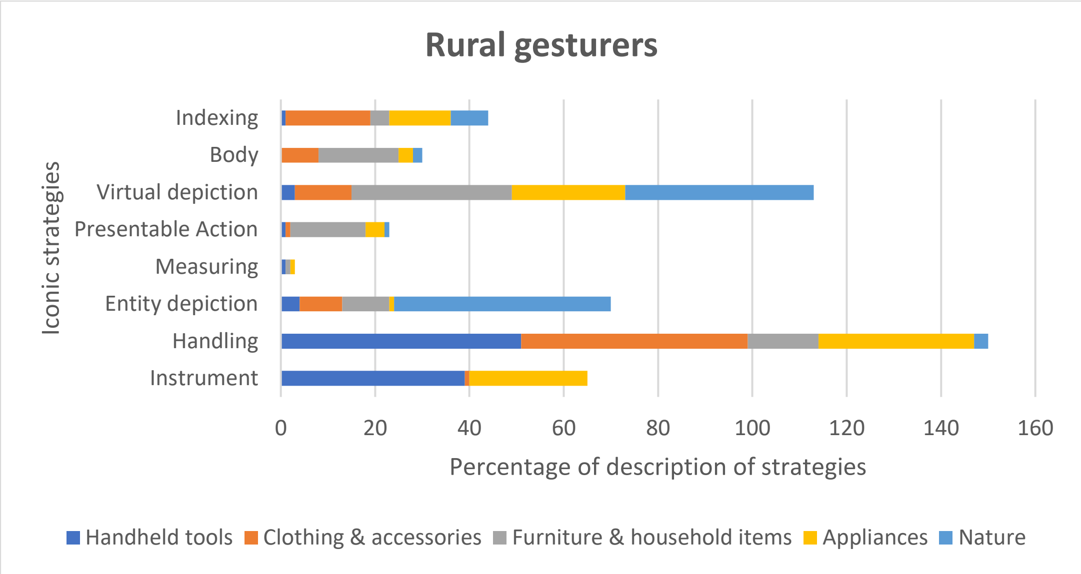


Figure. 5.38 Summary of Iconic strategies for the semantic categories by the rural gesturers

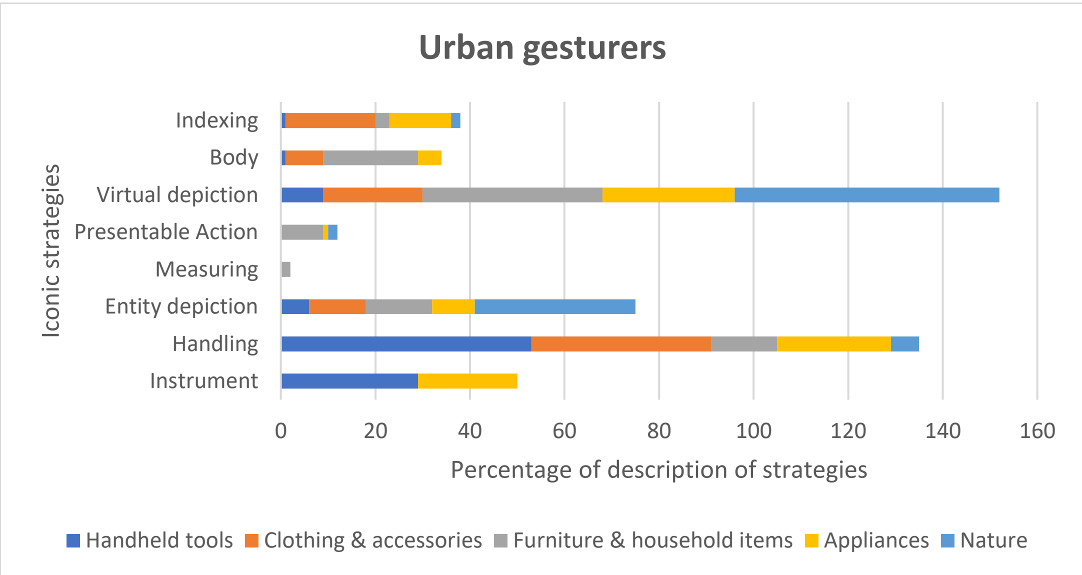


Figure 5.39 Summary of Iconic strategies for the semantic categories by the rural gesturers

5.6.2 Discussion

Comparing the results from GSL and AdaSL with earlier research works, we identify several similarities across signers' choices of iconic strategies. Iconic patterns for different semantic categories in GSL and AdaSL have demonstrated a systematic preference for different iconic strategies for different semantic categories. GSL and AdaSL signers demonstrated a preference for *instrument* (predominantly) and *handling* strategies for naming Handheld tools; *handling* strategy for Clothing & Accessories; *virtual depiction* (*tracing* 2D/3D) for Furniture & Household items; *instrument* (predominantly) and *handling* strategies for Appliances; and *entity depiction* predominantly for Nature. Although these results predict a general pattern of iconicity for the sign languages, it also gives a hint about language emergence and development. For instance, it seems the preference for *instrument* forms in Handheld tools emerge quickly in a new sign language as in ABSL (Padden, et al., 2013). As seen in this chapter, GSL which is a relatively new sign language that emerged in the 1950s (but with ASL roots) shows a high preference for *instrument* strategy for both Handheld tools and Appliances. Comparing the GSL signers to ASL signers in Padden et al. (2013; 2015), both show a preference for *instrument* strategy for naming Handheld tools.

Handheld tools

Previous research (Padden, et al., 2013; 2015; Kimmelman, et al., 2018; Hou, 2018) showed a preference for *handling* and *instrument* strategies for naming Handheld tools. GSL and AdaSL, just like ASL and ABSL (Padden, et al., 2013; 2015) prefer *handling* and *instrument* strategies for naming Handheld tools. Although numerical comparison of the means shows that AdaSL has higher preference for *instrument* strategy (63%, N=173) than GSL (47%, N=130), GSL and AdaSL are perceived as *similar* in their preference for *instrument* and *handling* strategies for naming Handheld tools. However, the strategy used most often by both GSL and AdaSL is *instrument* which corresponds to ASL and ABSL signers in Padden et al.'s (2013) research. Handling strategy was the next preferred strategy by ASL and ABSL which is similar to GSL and AdaSL. The preference for *instrument* strategy is not generic to all sign languages as research has identified that different sign languages exhibit differential patterns of iconicity within a category (Kimmelman, et al., 2018; Padden, et al., 2013; 2015). New Zealand Sign Language (NZSL) (Padden, et al., 2013), German Sign Language (DGS) and British Sign Language (BSL) (Kimmelman, et al., 2018) prefer more *handling* strategy for naming Handheld tools as compared to *instrument*. Padden linked the preference for use of *handling* strategy to be associated with use of mouthing as way of marking nouns in NZSL (Padden, et al., 2013).

Considering the semantic category of Tools, several studies have demonstrated the preference for *instrument* and *handling* strategies by signers. For instance, Padden, et al., (2013; 2015), Kimmelman, et al., (2018), Hwang, et al., (2017) and Hou (2018) identified the preference for *instrument* and *handling* strategies for naming Handheld tools in the sign languages they studied (urban and rural sign languages). Hwang, et al., (2017) found recurring patterns for naming Tools with manipulation (*instrument* and *handling*) in eight sign languages (ASL, Japanese SL, DGS, Israeli SL, Kenyan SL, Ha Noi SL of Vietnam, Central Taurus SL of Turkey, and ABSL of Israel). The result of Hwang, et al's study revealed a general preference for either *instrument* strategy or *handling* strategy for the semantic categories of Tools. Furthermore, other research that incorporated non-signers also identified that the semantic category of Tools mostly elicited predominantly *handling* strategy (Brentari, et al., 2015; Ortega & Özyürek, 2016; Padden, et al., 2013; Edward, 2020). Padden, et al., (2013) links the preference for *instrument* strategy to the pressure to distinguish between actions and objects. From the data gathered from GSL and AdaSL, *instrument* forms focused directly on the object and the action of the object. On the other hand, *handling* forms, focused on the actions. Languages that tend to show a predominant preference for *instrument* forms in Handheld tools (from current dissertation and previous works) include GSL, AdaSL, ASL, ABSL, Estonian SL, Brazilian SL, Russian SL, Latvian SL, Lithuanian and Polish SL. Contrastively, DGS, NZSL, BSL, French SL, Greek SL, Spanish SL and Turkish SL are predominantly *handling* for Handheld tools.

The data from GSL and AdaSL compared with other sign languages present further evidence for a preference for *instrument* and *handling* forms for naming Handheld tools in sign languages. The predominance of one over the other seems to be language specific as seen from the examples shown in this dissertation and from the other research works quoted above. In other words, some sign languages use more *instrument* forms than *handling* (e.g., GSL, AdaSL, ASL, ABSL) and others prefer more *handling* forms than *instrument* (e.g., BSL, DGS, NZSL) but, in general, both *handling* and *instrument* are preferred for naming Handheld tools. Padden et al. (2013) is of the view that the preference for *instrument* forms seems to emerge quickly in a new sign language as they identify for ABSL. Tentatively, we can link GSL's preference for *instrument* forms to the fact that these forms emerge quickly in a new sign language. Further, the historical relationship between GSL and ASL is relevant here as other research on ASL identified the preference of *instrument* forms (Padden, et al., 2013; 2015; Hwang, et al., 2017; Kimmelman, et al., 2018)

Clothing & Accessories

The visual-gestural modality of language affords great level of similarities in the choice of iconic strategies for Clothing & Accessories. There are also language specifics that create differences between sign languages. For example, in GSL the preference for lexicalised fingerspelling limits the presence of iconicity in the semantic category of Clothing & Accessories more than all the other categories that were investigated. AdaSL signers on the other hand, gave responses that had resemblance mapping between the form and the meaning. Six tokens from AdaSL signers were coded as non-iconic and these were responses from six signers who borrowed GSL sign SHOE as part of their responses for *shoe*.[70] The semantic category of Clothing & Accessories elicited myriad of responses from both GSL and AdaSL signers, but the *handling* strategy stood out as the preferred strategy for both sign languages.

Kimmelman et al. (2018, p. 4231) investigated iconic patterns for nineteen sign languages using "87 concrete concepts from seven semantic fields: transport, Nature, instruments (tools), house, clothes, food, and animals". They identified that for the semantic category of Clothes, *handling* strategy was preferred by ASL, BSL, Brazilian SL, French SL, German SL, and Italian SL over the other iconic strategies that were coded. Comparatively, in this chapter, both signers (GSL and AdaSL) and gesturers demonstrated a greater preference for the *handling* strategy for the category Clothes (and Accessories). Further, as noted already, the semantic category of Clothing & Accessories presented items that are used on the body and thus, the body act as the ground object with the signers' hand as the handling hand that places these items on the body. Therefore, the *handling* strategy is highly expected. For the current dissertation, both signers and gesturers show a preference for *handling*. However, GSL did not show a clear preference as the category also produced the most *non-iconic* forms for GSL signers.

Furniture & Household items

The major iconic strategy used by both GSL and AdaSL signers to name objects in the Furniture & Household items category is *tracing 3D* (*virtual depiction*). Other strategies used together with *tracing 3D* include *entity*, *measuring*, and *presentable action*. *Body* strategy which is mostly preferred by AdaSL signers uses parts of the body as the body performing certain actions (other than handling) like kicking, reclining and shoulder shrugging. Again, the presence of a finger alphabet (for alphabet-based) naming in GSL motivates signers' preference for lexicalised fingerspelling and initialised signs (which were either *non-iconic* or not clearly defined according to the iconic strategies).[71] The semantic category of House in

[70] Most of the signers did not acknowledge this borrowing from GSL as the sign has almost become accepted by most AdaSL signers.

[71] Some GSL signers involved in this study confirmed that the sign for *bed* is #BED which is lexicalised fingerspelling but none of the signers used #BED alone. The seven signers who used #BED used it as part of a string of signs giving other features of bed (shape/ texture/it use). However, recent dictionaries of GSL (McGuire & Deutsch (2015), Ayele Foundation's online dictionary, Leiden University's new app for GSL)

Kimmelman, et al.'s database[72] consisted mostly of furniture and other household items and is comparable to the category of Furniture & Household items discussed in this chapter. Kimmelman, et al., (2018) identified that Brazilian SL, Czech SL, Estonian SL, DGS, Icelandic SL, Latvian SL, Lithuanian SL, Romanian SL and Swedish SL prefer the tracing strategy to name items in this category. This chapter identified *tracing* strategies (2D/3D) or *virtual depiction* as the most preferred by signers and gesturers to name items in the category of Furniture & Household items. Comparing signers with gesturers, the same preference for *tracing* strategies (*virtual depiction*) was identified. From the present data and Kimmelman et al. (2018), we can propose that the semantic category of Furniture & Household items has a clear pattern for *virtual depiction* both among signers and gesturers. The preference indicates a general pattern in the visual-spatial modality to use *virtual depiction* for identifying items within this category. On the other hand, we also identify that AdaSL and the gesturers minimally used their bodies as a referent point to name items in this category.

Appliances

The Appliances semantic category contained few items, but the responses show that there is a greater preference for *instrument* strategy for naming Appliances by signers of GSL and AdaSL. *Handling* was the next strategy that had more responses in both sign languages. GSL had more consistency and full agreement in the selection of the iconic strategies for this semantic category than AdaSL. GSL being the sign language of education was more exposed to the selection of the items in this category (e.g., *computer*) as compared to AdaSL. On the other hand, some of these Appliances are new to AdaSL and the emergence of their name signs might have been a recent addition. This explains the use of different responses by AdaSL signers.

Nature

The Nature semantic category contained the least number of objects and as such inferences from the two objects for the category of Nature are made with caution. However, the preference for *entity* to name objects in this semantic category was also found in six other sign languages (Kimmelman, et al., 2018). In Kimmelman, et al.'s database the *object* (entity)

---

represented the sign BED as a *presentable action* (putting head on pillow). Here, there seems to be a gradual shift from signs produced with fingerspelling to signs with resemblance mappings in GSL. Another example of this shift is the sign FOOD which was depicted with F-HS in McGuire & Duetsch (2015) and Ayele Foundation's online GSL dictionary but with a flat O-HS in the new Leiden University's app for GSL introduced in 2020. Personal conversations with the late Francis Boison (a former president of GNAD) in 2016 revealed that FOOD with F-HS is not used in GSL anymore.

[72] https://sl-iconicity.shinyapps.io/iconicity patterns/ (Kimmelman, et al., 2018, accessed on 14/02/2019).

strategy was preferred for the semantic category of Nature by ASL, French SL, Polish SL, Romanian SL, and Turkish SL (Kimmelman, et al., 2018, accessed on 14/02/2019). In the same way, the signers who participated in this study predominantly used the *entity* strategy to name objects in the Nature category. On the other hand, gesturers did not show a clear preference for *entity* (although rural gesturers from Adamorobe used more *entity* than *virtual depiction*).

General Discussion

The preference for different iconic strategies shows different ways the body (and the relevant parts of the body) of the signer (or gesturer) are conceptualised. For instance, Meir, et al., (2013) identified three roles of the body; (1) the body represents the human body, (2) the body represents the subject argument, and (3) the body stands for 1st person. Very relevant to this chapter is the role of the signer's body (or relevant parts of the body) as a representation of the human body to depict tools and objects. For instance, the semantic categories of Handheld tools, Clothing & Accessories, Appliances, and Furniture & Household items, demonstrated several ways in which the signer's body is manipulated to depict the object. More specifically, for *handling* and *instrument* strategies, the signer is the agent. In other words, the signer performs the canonical action related to the object like sweeping (BROOM), combing (COMB), holding (BAG), typing (COMPUTER) etc. As noted by Meir, et al., the hands of the signer provide "a rich resource for iconic representations" (Meir, et al., 2013, p. 311). For example, the hands and the fingers produced several iconic strategies based on the different representations: hands-as-hands (*handling*/*indexing*), hands-as-object (*instrument*/*entity depiction*), hands-as-drawing tools (*virtual depiction*) etc. In other semantic categories (e.g., Furniture & Household items), signers used the *body* strategy; where the body represents the human body that is reclining, kicking, or shrugging the shoulder.

As mentioned in chapter 1, GSL and AdaSL are different sign languages and their preference for similar iconic strategies to name the different semantic categories presents a pattern for naming in sign languages. In other words, depending on the semantic category of items, signers use different types of iconic mappings. That is, the preference for either *instrument* or *handling* or both for Handheld tools; the preference for *handling* for Clothing & Accessories; the preference for *tracing* strategies for Furniture & Household items; the preference for *instrument* and *handling* or both for Appliances; and the preference for *entity depiction* for Nature seems to be general to most sign languages as compared with previous research. For instance, Padden, et al., (2013) found that the urban sign languages ASL and NZSL and the rural sign language ABSL preferred *instrument* and *handling* strategies for naming Tools. However, ASL and ABSL predominantly used *instrument* while NZSL predominantly used *handling*. That is, there is inter-language preference for using the hand-as-hand or the hand-as-object.

Comparing signers with gesturers, a similar pattern emerges; that is, signers and gesturers exhibited systematic preference for iconic representation of tools and objects, choosing an action-based sign depicting how the object is held or manipulated (*handling*/*body*); depicting features of the object (*instrument*/*entity depiction*/*virtual depiction*) or using conventional gestures associated with the object (*presentable action*). Gestures share iconic affordances of visual-spatial modality and exhibit use of similar strategies of iconic representation. In other words, comparing signs and gesture helps us to understand the iconic origins of sign languages and thus, is very important to understanding the iconic structure of the lexical items investigated in this chapter. Interestingly, AdaSL signers and the gesturers (urban/rural) used a similar degree of the preferred iconic strategies in the categories of Clothing & Accessories, Furniture & Household items, and Appliances, indicating that village (indigenous) sign languages and gestures do make use of the same form-meaning resemblance mappings for certain categories (reiterating the gestural substrate of sign languages). However, further research is needed to substantiate this similarity, as this could be a matter of chance considering GSL's use of *non-iconic* signs for the categories of Clothing & Accessories and Furniture & Household items. The rural gesturers from Adamorobe exhibited more similarities with AdaSL for the category of Handheld tools. That is, the gesturers preference for *instrument* strategy for Handheld tools contrasts what was found for the urban gesturers and what has been found in previous research.

Language contact between GSL and AdaSL in the past few years seems to have influenced AdaSL considering the *non-iconic* signs borrowed from GSL into AdaSL as stated in this chapter (e.g., SHOE). The effect of the language contact is asymmetrical and some signers of AdaSL are gradually shifting to GSL (Edward, 2015b; Nyst, 2007a; Kusters, 2019).[73] For example, the GSL sign SHOE, which was considered arbitrary, was used by six AdaSL signers, and the GSL sign WATER which was considered *not clear* in its iconic strategy was used by seven AdaSL signers.

[73] Originally, 11 AdaSL signers were recruited for this study but one signer was exempted for using too many GSL signs. During the coding, few borrowed signs from GSL were identified to be used by AdaSL signers (especially the adults' signers).

5.7 Conclusion

In conclusion, the patterns of lexical iconicity in GSL and AdaSL are seen in the various iconic strategies used by signers to represent the different semantic categories presented in this chapter. Signers demonstrated consistency and full agreement in different degrees for each semantic category. For instance, whereas AdaSL showed higher consistency and agreement in categories like Handheld tools, Clothing & Accessories and Furniture & Household items, and Nature, GSL signers clearly showed more consistency than AdaSL only in the semantic category of Appliances.

Finally, comparing signs with gestures, there seem to be more similarities in the iconic strategies for both sign and gesture within the different semantic domains. However, looking at the overall use of iconic strategies, there is much more similarity between GSL and AdaSL, and between the gesture groups as compared to between sign and gesture. On the other hand, there is more similarity between the gesture groups and AdaSL than between the gesture groups and GSL. The cross-language discussion of one indigenous African sign language (AdaSL) and another foreign-based African sign language (GSL) compared with gesture used by silent gesturers reveals that there are patterns of iconicity used by signers and gesturers to name items within different semantic categories. However, there are specific similarities and differences that are as result of the language use, language contact, age of language and more importantly the visual-spatial domain (visual expression of tools and objects).

The next chapter focuses on iconicity in grammatical constructions in GSL and AdaSL, specifically the expression of location, motion, and action.

PART 3(b)

ICONICITY IN GRAMMATICAL CONSTRCTIONS

Part 3(b) presents the quantitative and qualitative language data with focus on the systematic differences and similarities in grammatical constructions. The analysis in part 3(b) is based on narrative tasks that permitted signers to use spatial information. Although the research elicitation was not based on naturalistic data, story retelling afforded signers to present the information as close as they would have communicated in real life situations using character-related perspectives and strategies. The grammatical constructions investigated in part 3(b) broadly concerns the expression of location, motion, and action. The two chapters in part 3(b) investigated different aspects of iconicity expressed in grammatical constructions. Chapter 6 identified the various strategies GSL and AdaSL signers use to encode spatial information focusing on the specific devices used and the preference. Chapter 7 did a systematic investigation of the specific strategies both sign languages used to present simultaneous constructions. The observation from the analysis in both chapters shows that the expression of iconicity in grammatical constructions in GSL and AdaSL depend on specific iconic strategies and signing perspectives which are individually or simultaneously used. Although both sign languages do not show vast differences in their choice of strategies, GSL signers showed a higher preference for observer related perspectives (including entity classifiers for motion events). However, six of AdaSL signers (excluding the younger educated signers) used entity classifiers for motion events (especially motion seen from a distance) which was unexpected and in contrary to previous result. Based on part 3(b), it appears that certain factors (internal and external) motivated AdaSL signers' choice of entity classifiers for motion events.

Chapter 6

Space and iconicity in GSL and AdaSL

6.0 Introduction

Sign languages operate through the visual-gestural mode and space plays a crucial role in the grammar of sign languages. In addition to the signs that are produced on the body (body-anchored signs), there are other signs that are produced in the neutral space in front of the signer (including lexical signs and classifier predicates). Signs expressing spatial information rely on the same formational parameters of signs to represent objects or events in space using iconic devices or techniques. Spatial relationships in sign languages are very important as signers tend to conceptualise space in relation to their bodies (character) or from the viewpoint of an observer. The domain of space in language (also known as the spatial domain) is for encoding location, motion and the action of objects and events. In the spatial domain, signers use the affordances of the visual modality to represent location, motion, and action of objects/entities in motion or at stative locations. The aim of this chapter is to identify the strategies for encoding location, motion, and action in GSL and AdaSL focusing on the following questions:

1. How do GSL and AdaSL signers encode information about location, motion, and action?
2. Do both sign languages use classifier predicates?
3. What other devices are used?
4. Does the amount of use (preference for use) of different devices differ?

The chapter presents both qualitative and quantitative analysis of how GSL and AdaSL signers encode information about location, motion, and action. As indicated in chapters 1 and 2, Nyst (2007a) identified typological exceptions for AdaSL, including the absence of entity classifier for motion events and the lack of observer perspective. In this chapter, we shall consider what strategies and perspectives AdaSL uses in the absence of entity classifiers for motion event and observer perspective. The chapter is arranged as follows: §6.1 presents a brief background on locative expressions and action representation in language. §6.2 presents information on the coding and data analysis, concentrating on the relevant elements coded for this chapter. §6.3 presents information on the analysis of signers' use of perspectives; it defines and exemplifies all the perspectives identified in GSL and AdaSL. §6.4 considers how GSL and AdaSL signers encoded location scenes identified in the Pear Story and presents the perspectives and strategies used to encode location. As the static scenes in the videos were part of an unfolding event, the section presents the specific strategies signers used to project event space for static (locative) scenes found in the narrative data.[74] §6.5 presents the encoding of motion events and considers the perspectives and strategies used by GSL and AdaSL signers. §6.6 considers the perspectives and strategies for encoding action. §6.7 looks at the relationship between classifier predicates and signing perspectives. §6.8 presents a detailed discussion of the chapter and compares what is found in GSL and AdaSL with literature on other sign languages. Finally, §6.9 presents the chapter summary. It is also important to note that §6.4, §6.5, §6.6 and §6.7 presents quantitative results regarding the similarities and differences between GSL and AdaSL signers on the use of perspectives, strategies for encoding location, motion, action, and the relationship between classifier predicates and signing perspectives.

6.1 Locative expressions and action representation

Location and motion representation

Both signed and spoken languages express spatial relationships with *locative expressions*. However, there are modality differences in the representation of locative expressions in signed and spoken languages. Herskovits (1985, p. 342) defines locative expressions as "any spatial expression involving a preposition, its object, and whatever the prepositional phrase modifies (noun, clause, etc.)". Akan and several other languages use postpositions (follows the object) as compared to prepositions (precedes the object) to give locative information (see e.g. 1). In both signed and spoken languages, representation of location and motion are referred to as motion events. Talmy (1985) and Galvin & Taub (2004) define a motion event as an event where an entity moves from place to place or is located at a particular place.

Galvin & Taub (2004, p. 191) in writing about encoding motion information in ASL looked at "the relation between conceptual structures and linguistic elements". Relevant to this chapter are the "conceptual elements that a language might choose to express, the linguistic 'surface' forms that are available to express them, and the patterns of how conceptual elements are encoded by particular types of surface forms" (Galvan & Taub, 2004, p. 191). These conceptual elements (the manner, the path, figure etc.) that a sign language might choose to express, the linguistic "surface" forms may include *classifier* and *lexical* predicates, and these patterns are expressed using different *signing perspectives*. The

[74] Other researchers have used stimulus pictures to elicit information on locative expressions in sign languages (see Perniss & Özyürek, 2008; Perniss, et al., 2015),

basic conceptual elements of motion events include the figure (entity in motion or static), the ground (the landscape for the entity), the motion (movement or location), the path (where entity moves or stays). The movement of an entity in motion comes in different manners including running, sliding, bouncing etc. In a motion event, there is the figure that is moving or is at location (at a *ground*), and the *path* taken by the figure and the *manner* of motion of the figure (Talmy, 1985).

1. ɔkra no da pono no so (location)
   cat DET lie Table DET Postposition
   The cat is on the Table (Akan)
2. The cat rolled off the Table (Manner)
3. The cat moved to the left of the Table (Path)

In example 1, the postposition *so* is the locative marker in Akan indicating the location of "cat" in relation to the ground (on the Table). In the same way, *rolled off* (2) indicates the manner of the motion, whereas *moved to the left* (3) shows the path of the movement. Whereas spoken languages employ adverbs and adpositions (postposition/ preposition) to refer to places and objects, sign languages use the visual-spatial resources to visibly carry entities and movements through space. In other words, both signed and spoken languages are not limited in expressing locatives and each uses its linguistic resources to demonstrate objects in space and time. Wilcox summarised this as follows:
"While signed languages afford a unique expressive potential for iconic mapping of space and time, this potential underlies all human language ability, whether it is manifest in a spoken or a signed language" (Wilcox, 2002, p. 279).

In signed language, "[t]he spatial relationship between the signer's hands represents the spatial relationship between the referents, whereby the handshapes are iconic with certain features of the referents" (Perniss, et al., 2011, p. 1595). From the observation of their data, Galvin & Taub (2004, p. 193) noted that "when describing a motion event, the signer will use a conventional (and often iconic) configuration of articulators to represent the moving entity, and will move or position the configuration in ways that represent the actual movement or location of the entity". Sign languages tend to use iconic spatial representation[75] where real-world scenes are represented in the construals of form and/or movement using classifier predicates. Classifier predicates "exhibit a complex but systematic pattern of iconic relations

[75] There are also instances where lexical predicates (iconic and arbitrary) are used to express spatial events.

in which semantic objects (the things of cognitive grammar) are mapped onto handshapes, and process is mapped onto phonological movement" (Wilcox, 2002, p. 270). Previous studies have demonstrated that classifier predicates are used to express spatial relations iconically (Perniss, 2007a; Wilcox, 2002). Signers employ classifier predicates to give explicit spatial information; things can be carried through space and objects are manipulated to move from one location to another using classifier predicates.

The affordances of space for signers motivates the representation of the entity (in a location or moving) using iconic locative expressions. Syntactically, in the iconic representation of locative expressions, signers use locations in sign space to represent the agreement between referents and this topographic use of space has meaningful referent-location associations in sign space (Perniss, 2012). In the topographic use of space, which is strongly associated with the use of classifier predicates, space can be mapped from the perspective of an *observer* using classifier predicates to encode the two entities and the relationship between the two (which are each at a location) in an iconic representation in space based on the handshapes used and placement of the hands (Perniss, 2007a). Perniss et al.'s (2011) research on DGS and Turkish Sign Language (TİD) reveals interesting similarities and differences in the use of space in these two unrelated sign languages. The use of classifier predicates in representing spatial information was predominant in both sign languages. However, although iconicity contributes to similarities in sign languages, there is the possibility that different iconic forms will be preferred in different sign languages. For example, while DGS and TİD prefer entity classifiers to encode referent location (Perniss, et al., 2015), among AdaSL signers, entity classifiers are not used to encode referent location (Nyst, 2007a).

In Perniss (2007a), DGS signers demonstrated the preference for use of entity classifiers in static and motion tasks. For instance, signers used the *upright entity classifier* to represent man, tree etc. and the *2-legged entity classifier to* represent man. Spatial relationships are encoded with entity classifiers depicting sizes and shapes of entities located in the sign space. In the example in Figure 6.1, the signer's hands (specifically the formational parameters, i.e., HS, Orn., Loc., Mov.) represent the depicted still image *man is facing the tree*. The upright entity classifier (tree) and the 2-legged entity classifier (man) profiles the still image *man standing in front of the tree*.

RH: CL_E (man): loc.$_R$,orn.$_L$
LH: CL_E (tree): loc.$_L$

Figure 6.1 Example of entity classifier for static scene depiction in DGS. Figure reprinted by permission of the author (Perniss, 2007a, p. 4)

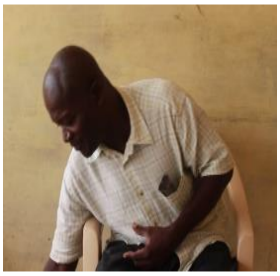
Action Representation

In many but not all events, there is an initiator or an individual that carries out something known as *Agent*. The "agen**t** is an individual who wilfully initiates and carries out an action, typically a physical action affecting other entities" and becomes the "energy source and the initial participant in an action chain" (Langacker, 2008, p. 356). In narrative tasks, signers represent *action* using varied strategies. For example, when the signer profiles a real-world person performing an event, the agentive role is assigned to the signer. In other words, when signers retell an event with a conceptualization of the body to represent the people or the animate referents performing the event in real life, the strategy used is constructed action (CA). CA is a representational device in sign languages where signers use one or more bodily articulators including head, face, arms and torso to depict the actions, utterances or feelings of another referent (Cormier, et al., 2015). CA can be used alone in character perspective or co-occur with other strategies deriving a blend of perspectives. CA is also known as role shift or enactment and the signer uses "his or her body (the head, face, arms, and torso) to represent the thoughts, feelings, or actions of a referent using the surrounding space on a real-world scale" (Cormier, et al., 2013, p. 370). Expressing events on the real-world scale uses real and surrogate spaces[76] (Liddell, 1995).

In Figure 6.2, both the GSL and AdaSL signers use CA to depict the action of the man picking the pear from the ground. In expressing action, signers typically use classifier and lexical predicates, and the event is mostly depicted with signer's viewpoint as a character performing the action (Perniss, 2007a). When lexical predicates are used, the verbs are used in their plain state or modified for manner and intensity. In depicting action, signers tend to use handling classifiers as compared to entity classifiers because action usually shows manipulation or an activity-based event. That is, in an action event, it is least expected that

[76] Defined in chapter 2, § 2.5.

signers will use entity classifiers because the action is usually encoded with the signer as a character. However, the action of *person on bicycle hitting a stone* for example, can be expressed using the one-legged entity classifier (which represent the person on the bicycle), but other features such as the hands and the face of the person hitting the stone are not represented or are expressed on the face of the signer (deriving both character and observer perspectives).



GSL

AdaSL

Video scene

Figure 6.2 CA for action event in GSL and AdaSL. (The video scene is represented first and examples from GSL and AdaSL are provided)

6.2 Coding and data analysis

Chapter 4 presents the detailed methodological issues concerning the relevant methods used for data collection and annotation of the Pear Story. In this section, we shall concentrate on the relevant elements coded for this chapter.

6.2.1 Summary of data

In total, 120 video vignettes of the Pear Story were coded for GSL and AdaSL signers. Each signer retold the story before the researcher and other signers. Signers narrated the event to other signers who were present. The 6 divisions of the Pear Story comprised of videos with multiple motion scenes, action events and static scenes with different levels of complexity (see §4.4.2).

Table 6.1 Total number of predicates from GSL and AdaSL[77]

Pear 1-6	**GSL (N=10)**	**AdaSL (N=10)**
All sign tokens	2177	1888
All events (Location, Motion, Action)	1185	1204
Location	30	47
Motion	401	455

[77] The total number include all the signs recorded from the signers. Every meaningful token was counted and categorised based on the information represented (Location, Motion and Action).

Action	760	735

6.2.2 Data coding

Narratives were coded in ELAN (Wittenburg, et al., 2006) for strategies of referent representation, including classifier and lexical predicates and for the use of space and the body to encode location, motion and action information, including event space representation from a character (the signer's body is within the event space) or observer (body external to the event space) perspectives, the use of simultaneous perspectives (discussed in detail in chapter 7) and the use of constructed action (see Figure 6.3 for the coding in ELAN). Below are the relevant elements coded for this chapter:

Predicate type:

Signs were identified as constructed action, lexical predicates (directional verb/directionals, locomotion verbs, spatial verbs, plain verbs), classifier predicate (entity, handling, and limb), size and shape specifiers (SASS), indexing (pointing signs).

(1) Constructed action (CA): signers use one or more bodily articulators including head, face, arms, torso to depict the actions, utterance, or feelings of another referent.

(2) Classifier predicates: complex predicates that involve handshapes and movement morphemes combined in certain ways to show or express information about the size and shape, handling, location, and movements and is classified into handling, entity, and limb classifiers.

(3) Size and shape specifiers (SASS): are iconic for sketching the size and shape of the referent noun in 2D and 3D shapes.

(4) Directional verbs: refers to lexical verbs that indicate agreement by establishing meaningful locations in sign space

(5) Directionals: refers to verbs with inherent expression of directional motion. Directionals was borrowed from Nyst (2007a) who uses the term to refer to group of signs with very general semantics of expressions of directional motion.

(5) Spatial verbs: lexical verbs that are modified to indicate locations in space.

(6) Locomotion verbs: lexical verbs that show the movement from place to place.

(7) Indexing: pointing to the left or right, up, and down etc. to indicate locations of entities in space.

Scene type:

Scenes were identified as static or dynamic. Static scenes considered scenes that presented information on location and dynamic scenes were classified as motion (movement) or action scenes.

Event components:

The sign encodes certain components or aspects of the event. Event components considered the conceptual elements presented by the sign. For instance, entity (figure), path, manner, ground, entity-path, entity-path-manner, entity-ground.

Perspectives:

This considered the viewpoint of signers: character, observer, narrator, character-observer, character-narrator, and observer-narrator as explained in Table 6.2 and exemplified in Figure 6.4.

(1) Character: signer as an actor involved in an action which allows transfer of person.

(2) Observer: signer retells event as seen using the space in front of the body and the event is "projected onto the area of sign space in front of the body" (Perniss, 2007a, p. 9).

(3) Narrator: signer retells actions using lexical signs that show location, motion, and action (iconic or abstract lexical signs)

(4) Character-observer: signer as the character because the animate referent is mapped onto signer's body, and at the same time, signer as an observer because entities are projected in reduced space in observer perspective.

(5) Character-narrator: signer as the character because animate referent is mapped onto signer's body, and at the same time signer uses (iconic or arbitrary) lexical signs.

(6) Observer-narrator: signer retells event with *entity classifiers* using a reduced-size representation, and at the same time signer uses (iconic or arbitrary) lexical signs.

Spatial modification:

This considered the different ways signers moved the articulators to depict the different movements in the Pear Story (e.g. from left to right etc.). The spatial modification determined how signers represented spatial representation using the sign space. The depiction of the spatial relationships relied on the different types of perspectives used by signers. For example, in character perspective, signers moved their bodies to indicate spatial modification. In observer perspective, spatial modification involves the movement of the entity classifier handshapes located in the reduced-sized space.

Simultaneity:

This considered the simultaneous use of the two hands as autonomous entities (e.g. using handling and entity classifiers simultaneously), or the simultaneous use of the hand(s) and other part of signer's body (e.g. using the hands and the body at the same time). The simultaneous constructions (SC) depicted one event with aspects of the same event represented simultaneously or depicted two different events simultaneously (Chapter 7 focuses on SC).

Iconic strategies:

This considered the individual iconic strategies represented in the expression of location, motion, and action. The same iconic strategies identified in §5.1 (chapter 5) were applied here.

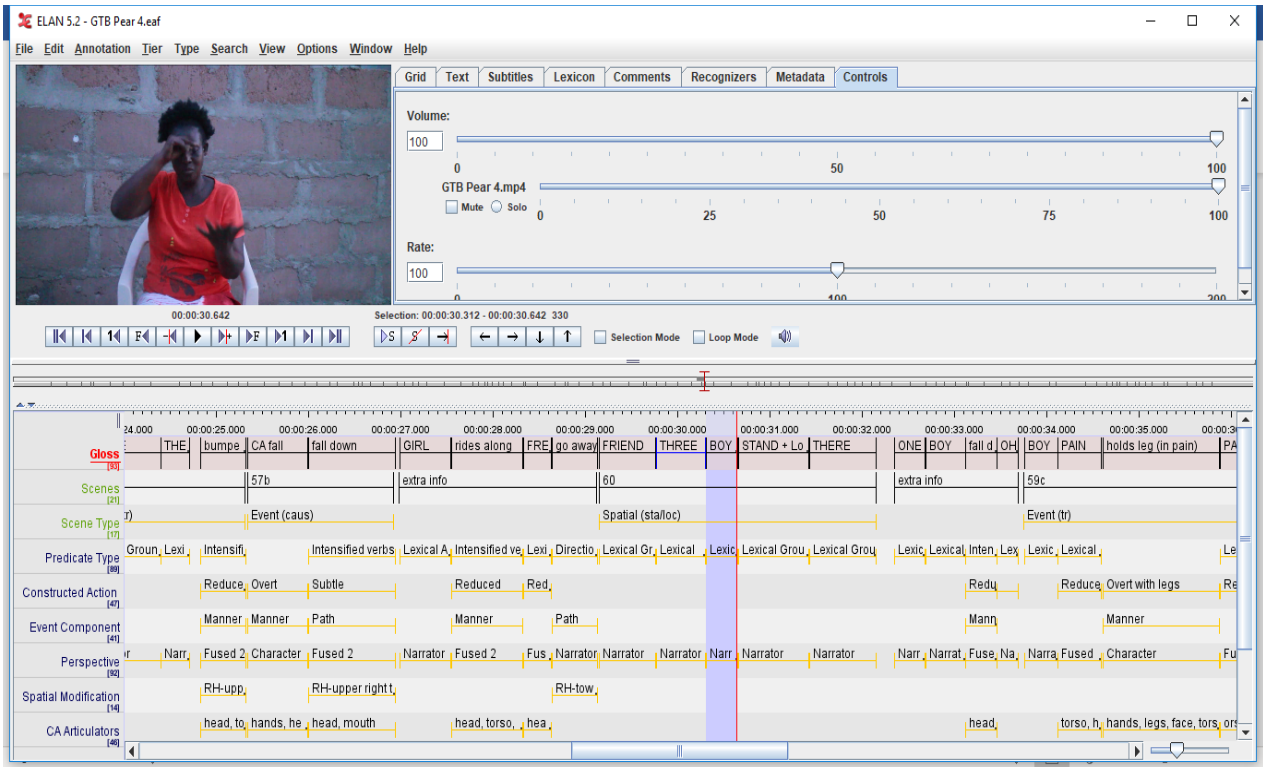
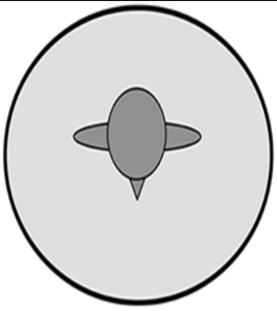
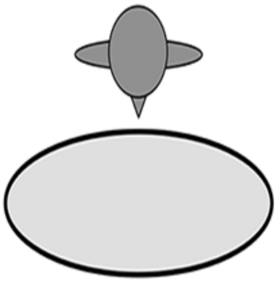
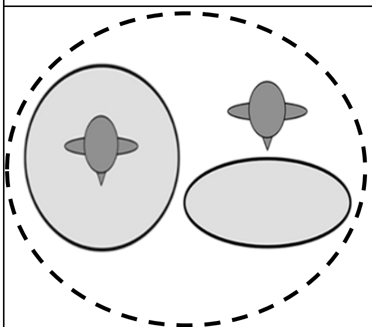


Figure 6.3 Analysis in ELAN[78]

[78] See appendix 6 for the coding scheme used in ELAN.

Perspective(s)	Definitions	Spatial projection
Character	Use constructed action (CA) with many articulators. It has no element of narration. Signer is fully in character.	Event-internal viewpoint with signer involved and life-sized representation (real and surrogate space). Spatial relationships are expressed with signer as character in life-sized transfer of event.
Observer	Use the space in front of the signer's body to project the event. Signer is out of character.	Event-external viewpoint and the reduced-sized representation (token space). Spatial relationships are expressed with entity/limb classifiers and projected in the sign space in front of the body from observer's viewpoint. Direction of movement is on the lateral axis.
Narrator	Use of lexical signs with no elements of CA. Signer is out of character	Spatial relationships are expressed with directional verbs, directionals, plain and modified verbs.
Character-Observer (Fused 1)	Use of CA with simultaneous use of entity classifiers. Signer uses character/observer at the same time.	Event internal/external viewpoints. Spatial projections are manifested in both life-sized and reduced-sized representations.
Character-Narrator (Fused 2)	Use of CA with simultaneous narration (lexical items).	Simultaneous use of event-internal viewpoint (handling classifiers, SASS, CA) and narrative elements such as spatial verbs, directional verbs, directionals for spatial projection.
Observer-Narrator (Fused 3)	Use the space in front of the signer's body to project the event with simultaneous use of lexical signs with no elements of CA. Signer is out of character	Event-external viewpoint and the reduced-sized representation. Simultaneous use of entity classifiers and lexical items for spatial projection.

Table 6.2 Spatial projection in different perspectives

	Examples from GSL and AdaSL	
 Character	 Holds bicycle towards right CL_H (bicycle)	 Holds bicycle towards left CL_H (bicycle)
 Observer	 Boy and girl ride towards each other CL_E (boy and girl)	
 Narrator	 GO AWAY Directional	 GO Directional
 Character-Observer (Fused 1)	 man drags animal along CL_E (man RH) + CL_H (drag)	 boy holds bicycle and moves CL_L (limping leg)[79] + CL_H (bicycle)

[79] The direction of movement is on the lateral axis is indicative of the observer perspective

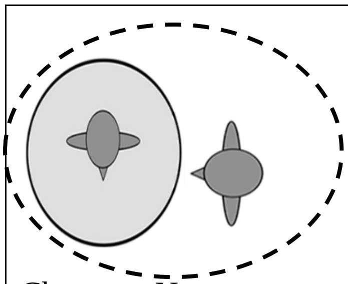
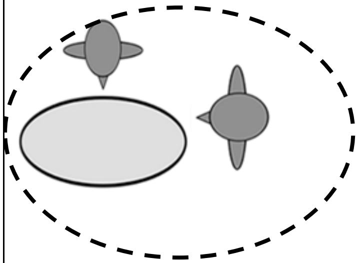
 Character-Narrator (Fused 2)	  boy/girl move towards — man look at moving boys Signer (char) + SEE (RH/LH) — Signer (char) + GO (RH) Spatial verb — Directional
 Observer-Narrator (Fused 3)	 Man looks at three boys CL_E (three boys RH) + SEE (LH)

Figure 6.4 Signing Perspectives in GSL (1st) and AdaSL (2nd)

In Figure 6.4 (row 1) the two signers in character perspective are agents performing the action of holding the handlebars of a bicycle. In other words, the signers retell the story as though they are holding the bicycle depicting this event on a real-world scale. In character perspective, signers construe the world from their viewpoint as actors in the signed event representing the action comparable to what is in the real world through *embodiment* (i.e. representation on the body) based on experiential knowledge of the world through interactions with surroundings and physical processes (Langacker, 2008). This depiction allows the transfer of person and the transfer of event.

On the other hand, the signers in observer perspective disconnect themselves from the action and use entity classifiers to represent the human agents. The event is depicted in signer's external viewpoint with reduced-sized spatial representation. For example, the upright entity classifier in Figure 6.4 (row 2) gives an iconic depiction of the construal of form (boy and girl). In other words, movement of the boy and girl towards each other is represented in the reduced-sized signing space as movement of the entity handshapes from left and right planes of the signing space. In observer perspective, the space in front of the signer taken as the *field* and the upright entity classifiers depict the figures in motion (boy and girl on bicycles) and the path of the figures (riding from the opposite direction of the field).

In the same Figure. 6.4 (row 3), we identify signers use narrative techniques that situate the signer outside the sign event. The lexical verbs (GO AWAY and GO) express the motion of person without involving the signer as either character or observer. These lexical verbs however are directional in nature and express directional motion. Signers move their hands towards the left or right indicating the path of the motion.

The simultaneous use of different perspectives are exemplified in rows 4-6 of Figure 6.4 and explained in rows 4-6 of Table 6.2. Figure 6.4 does not give an example of observer-narrator perspective in AdaSL because none was found in the data.

Row 4 of Figure 6.4 exemplify a simultaneous use of character-observer perspectives. Signers use handling classifiers to depict the handling of goat (GSL) and the handlebars of the bicycle (AdaSL). These had transfer of persons and signers depicted these events with an internal viewpoint. On the other hand, the right hands of both signers expressed the figure (man/boy) and path of motion (moving away) with a reduced-size spatial representation. Specifically, the entity and limb classifiers expressed movement on the lateral axis.

On row 5 of Figure 6.4, signers use character-narrator perspectives to depict the events. In both examples, we identify signers shifting their bodies and locating their eye gazes at a particular direction as characters in the sign event. At the same time, lexical signs (SEE and GO) are signed to express aspects of the events.

Row 6 of Figure 6.4 shows the simultaneous use of observer-narrator perspectives. First, signer use the plural entity classifier (3 boys) in a reduced-sized spatial projection to depict the figures (three boys) and their path of motion (moving in front of a man). On the other hand, the lexical sign SEE is projected on the left hand (in narrator perspective) to signify another event. The event *man looks at three boys* is simultaneous represented by two types of referents: the man (depicted with lexical sign SEE) and the three boys (depicted with the plural entity classifier).

6.3 Encoding Location in GSL and AdaSL

The focus of this section is to present signers' descriptions of location in static scenes. The difference between motion events and static scenes (location) is that motion events have dynamic motion while static scenes have 'restful' pictures (or scenes) that usually precede the dynamic scenes. The focus of this section is to identify how signers expressed location (static scenes) identified in the narrative. Furthermore, this section shall identify the preference for classifier and lexical predicates and consider the perspectives signers use to express location.

The similarities and differences between GSL and AdaSL signers to express location will be quantified with graphs.

In static scenes locative descriptions are used to place entities in location. Research on locative expression in sign languages discussed in the literature are mostly for Western sign languages (Perniss, 2007a; Perniss & Özyürek, 2008; de Vos, 2012; Perniss, et al., 2015). Based on the earlier research on sign languages, there are some observations made on locative constructions in sign languages. These observations stem from single descriptions of scenes, not within narratives as represented in this dissertation. These conventions gathered from previous research works on mostly Western sign languages are listed below (Perniss, 2007a, p. 78) and exemplified in Figure 6.5.

a. referents are identified by a full Noun Phrase (NP) before information about them is predicated
b. classifier predicates are used to encode spatial information about the introduced referents
c. the ground object is encoded before the figure object
d. the spatial relationship between the two referents is depicted in sign space by means of a simultaneous classifier construction
e. the spatial scene is depicted from the signer's viewpoint as the viewer of the scene (*in observer perspective*)

RH MAN BROWN SASS(HAT) CL$_{E(man): locR.ornL}$
LH TREE CL$_E$(tree):locL…hold……………………………………………………………….

Figure 6.5 Static scene depiction in DGS using all 5 conventions. Still 1 and 3 identify the referents TREE and MAN. Still 2 and 3 use classifier predicates to encode spatial information about the referents. Still 2 encodes the ground object TREE before the figure. Simultaneous classifier predicates are used to depict the relationship between the two referents in still 6 and the scene is depicted in signer's viewpoint as an observer. Figure reprinted by permission of the author (Perniss, 2007a, p. 78)

These properties according to Perniss (2007a, p. 78) are very "typical of Western sign languages" for basic locative constructions. As noted in chapter 1, both GSL and AdaSL are African sign languages but GSL is related to ASL which is a Western sign language. Therefore, the conventions might favour GSL as compared to AdaSL. Crucially, most research on static scene depiction use static images; that is signers are shown static images for retelling. On the other hand, this research used video retelling and the story did not have static scenes but rather restful scenes which did not have motion and action involved. Based on the fact that the static scenes in the videos were part of an event that was unfolding, the properties listed above for locative constructions in sign languages are likely to be influenced by the discourse strategies used by signers to express location (as these strategies were originally formulated for single locative expressions). To add to the above, signers of DGS (a Western sign language) were found to use more static scene descriptions that supported one or two of the conventions as compared to all five conventions (Perniss, 2007c). In other words, signers presented locative expressions with conventions a and b, a and c, a and d etc. as compared to locative expressions with conventions a, b, c, d, and e (together). This further suggests that there might be language specific differences in the presentation of static scenes in sign languages. The next subsections will consider the perspectives used to express location, the strategies to express location and the "patterns" for the expression of location in GSL and AdaSL.

6.3.1 Perspectives for encoding Location

In encoding location, GSL and AdaSL signers used character-narrator perspectives greatest (see Figure 6.6). 79% of descriptions (N=36) used character-narrator perspectives in AdaSL whereas GSL signers had 64% (N=19). Furthermore, narrator perspective only was used by both sign languages with AdaSL having a total of 11% (N=6) and GSL a total of 4% (N=3). GSL signers also minimally used character, observer, narrator perspectives in depicting static scenes. The higher proportions of character-narrator and narrator perspectives used by GSL and AdaSL seem to predict the preference for narration as a strategy for encoding location (see Figure 6.9 for e.g., of narration). 13% (N=4) of descriptions used character perspective in GSL (but none in AdaSL) and 8% (N=4) of descriptions used observer perspective in GSL (AdaSL signers did not use any observer perspective).

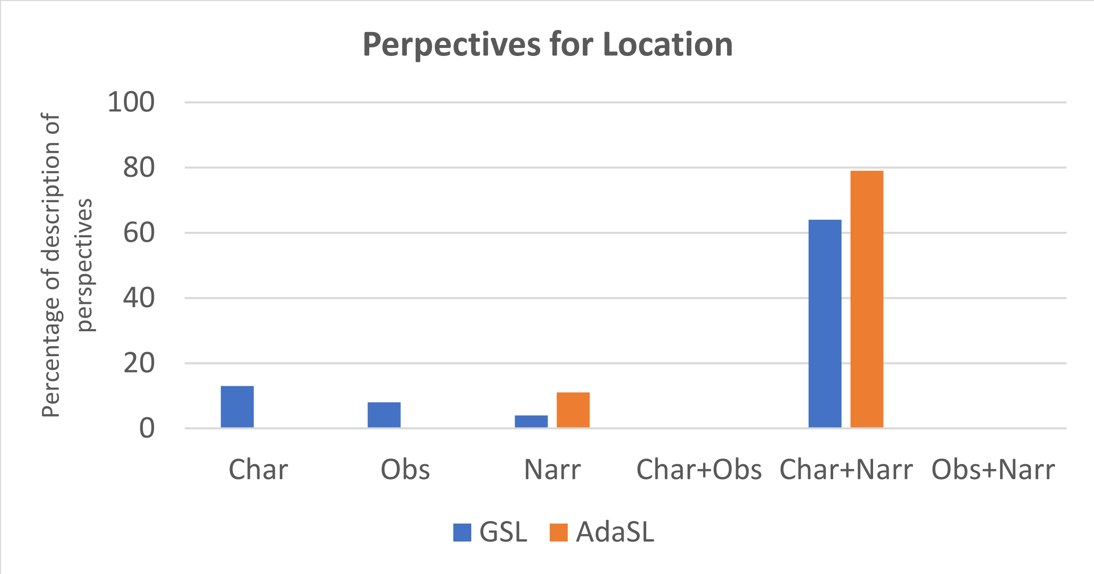


Figure 6.6 Perspectives for location

6.3.2 Strategies for encoding location

Figure 6.7 gives the proportion of all the strategies signers used to encode location. The dominant strategy for encoding location was the use of size and shape specifiers (SASS) (see Figure 6.11). SASSes depicted the iconic size and shape of the referent nouns in 3D shapes and were mostly used by both GSL and AdaSL signers to depict location by placing 3D shapes of entities around the signer. The location of the SASS corresponds to the location of the real-world object around the figure in the Pear Story (GSL e.g., in Figure 6.11) or correspond to the location of the baskets in signers' viewpoints as characters in the event. More specifically, SASSes were used to show the location of baskets as shown in the stimulus videos. AdaSL signers used SASS up to a total of 35% (N=21) as compared to 25% (N=8) used by GSL signers. Lexical predicates were the next most used strategy and AdaSL had a total of 32% (N=16) lexical predicates and GSL had a total of 20% (N=8). These lexical items were located in space to show the location of people or items (Figure 6.9). For example, in Figure 6.9, the GSL signer signs STAND with three different locations on the palm to indicate that there were three boys standing under the tree. Indexing (or pointing to locations) were used by signers to depict location information with GSL exhibiting 22% (N=5) and AdaSL 21% (N=9) use of indexing.

SASS, lexical predicates, and indexing (points) were all expressed in character-narrator viewpoint. For example, the lexical sign BASKET is expressed as SASS in AdaSL, but signers located these in their viewpoints as characters using character-narrator perspectives (see Figure 6.11). On the other hand, the using SASS to depict *basket* is an iconic representation in GSL for the arbitrary sign BASKET and these were expressed in character perspective. Indexing or pointing were mostly expressed with character or character-narrator perspectives because the points located in space expressed spatial projections which used signer's body as point of reference. For example, in Figure 6.10, the index referred to locations above signer's head (fruit located above signer- GSL) or by signer's sides (bicycle is by signer's right and basket of fruit is located down-AdaSL). In my data, SASS and indexing aligned with character perspective and lexical predicates aligned with narrator perspective. The simultaneous use of these resulted in character-narrator perspective.

Directional verbs were rarely used and only one GSL signer did so, making it less than one percent of the strategies used. As stated earlier, the static scenes were part of an unfolding story, and in describing the locative scene in (5), one GSL signer used the lexical verb BRING as part of the narrative technique used (4). The GSL signer described the scene using the man on the tree as the focal point and explaining the location from the man's viewpoint

4. FATHER **BRING BRING** BASKET SASS (setdown) LADDER LADDER SASS (setdown) LADDER CL_{H} (holds ladder)
5. *Scene of sloping hill with tree in foreground, ladder leaning against tree (on right side of tree) and basket on ground to right of tree. Ladder is between basket and tree. Man is standing at top of ladder in tree (this is hard to see). Other trees in background.*

Further, only in the GSL data were handling classifiers used to depict location. Most of the GSL signers explained the scene in (5) to include:

6. LADDER CL_{H} (holds ladder)

Entity classifiers expressing location were only used by GSL signers (10%, N=5) and entity depiction (see Figure 6.13) was used by one AdaSL signer (1%, N=1). Entity classifiers were used by GSL signers in observer perspective and the entity depiction used by the one AdaSL signer was depicted in character perspective. Entity classifiers are expressed in reduced-sized spatial projection and entity depictions are expressed in real-size spatial projection.

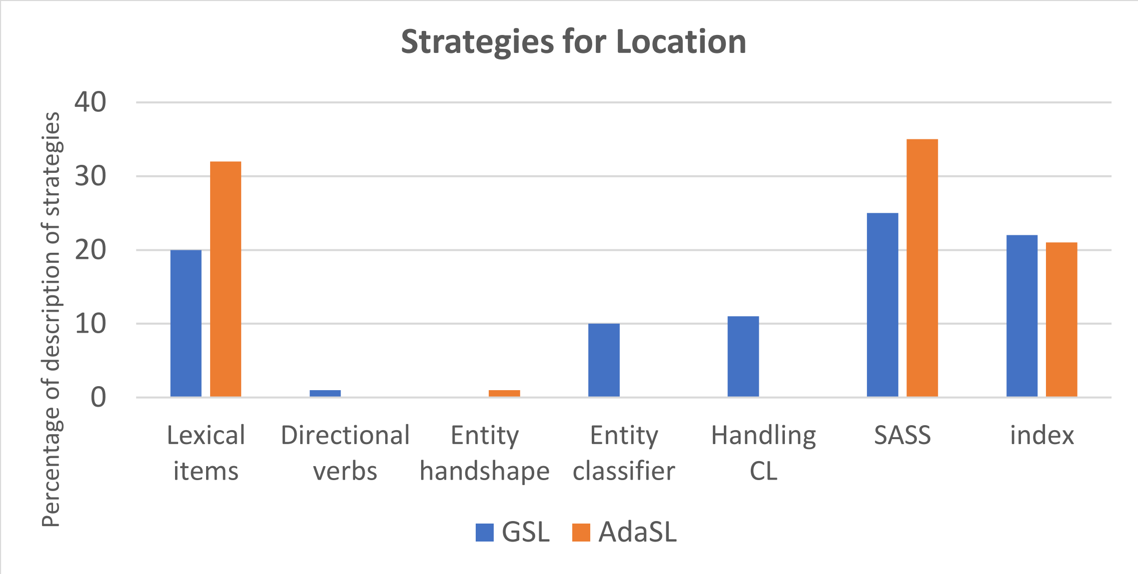


Figure 6.7 Strategies for encoding location

6.3.3 The projection of event space in GSL and AdaSL static scenes

This subsection considers the expression of static scenes in GSL and AdaSL. Whereas §6.3.2 considers the strategies for encoding location, this subsection considers the particular "patterns" of the signers since the static scenes in the Pear Story are different from individual static images as explained above. These patterns are based on the data analysed for GSL and AdaSL and corresponds to the conventions discussed in §6.3 for Western sign languages (Perniss, 2007a). The patterns consider the ways in which GSL and AdaSL signers presented location scenes from the Pear Story. From the analysis of the Pear Story, 23 static scenes were identified in the video.[80] Table 6.1 shows the total number of predicates coded for location in each sign language. Given that the elicitation material was embedded in a narrative, the conventions listed in §6.3 are not likely to appear in exactly the same way in GSL and AdaSL locative scenes.

Based on the data from GSL and AdaSL, the following patterns were identified. These were the patterns in the video descriptions found in the data for GSL and AdaSL signers. These might vary in static scene experiments done with static or still images. The patterns were found to occur alone or co-occur with other patterns in both sign languages.

1. referents are named or identified with noun phrases before other information is given
2. placement of lexical signs in spatial locations[81]

[80] See appendix

[81] This was expressed in both narrator perspective (see GSL e.g. in Figure 6.9) and character-narrator (see AdaSL e.g. in Figure 6.9)

3. referents are placed in space by indexing
4. signer as a figure describing the scene in character (or character-narrator) perspective[82]
5. use of entity classifiers to encode spatial information about referent in observer perspective (specific to GSL)

Pattern 1

Pattern 1 is also stated in Perniss (2007a, p. 78) as "referents are identified by a full NP before information about them is predicated" and is general to spoken and sign language (Perniss, 2007a). For instance, this is reflected in Akan as we saw in example (1) in §6.0. where the NP "ɔkra no" is indicated before the location is stated. Pattern 1 was not highly expected because the locative scenes were in narratives and not single descriptions.

1. ɔkra no da pono no so
   cat DET lie Table DET Postposition
   The cat is on the Table (Akan)

Signers of both GSL and AdaSL used pattern 1 to describe static scenes as depicted in Figure 6.8. The lexical signs PEOPLE/BOY are identified before further information given about them.

GSL

RH: PEOPLE BOY CL_E (boy) $loc._L$ CL_E(boy) $loc._C$
LH: PEOPLE

AdaSL

RH: BOY …………….AROUND………….

[82] Describing the scene in character-narrator perspective is based on the type of sign used.

LH : ……………AROUND[83] ………….

Figure 6.8 Referents identified with noun phrases before other information is given

Pattern 2

The second pattern is the placement of lexical signs in spatial location and this was found in both GSL and AdaSL as exemplified in Figure 6.9. In using this strategy, signers described the static scene using lexical signs but locations in space are factored in the signing through slight spatial modification or adjustment of the phonological parameters of the sign.

For example, in Figure 6.9 the GSL signer placed the lexical sign STAND in three locations on the palm indicating the spatial arrangement of the 3 boys. The localization of STAND in the GSL example is expressed in narrator perspective because the signer disassociate herself from the action. The sign STAND in GSL gives an iconic depiction of figure and ground relationship. In still 3 of the GSL example below, the signer signs the ground element of STAND as she signs the lexical sign BOY. This is an indication of the conceptualization of the non-dominant hand as the ground and the dominant hand as the entity and therefore placing them in 3 different locations on the palm. The AdaSL signer on the other hand used a wider spread for the sign AROUND to show the locations of the 3 boys in space. The sign also indicates the proximity of the 3 boys in relation to the boy on the ground.

GSL

RH:	FRIEND	THREE	BOY	STAND$_{fig.}$ loc.$_1$	STAND$_{fig}$ loc.$_2$	STAND$_{fig}$ loc$_3$	THERE
LH:	FRIEND		STAND$_{gr.}$	STAND$_{gr.}$	STAND$_{gr.}$	STAND$_{gr.}$	

AdaSL

[83] This lexical sign is used to spatially locate the three boys (referents) in a specific location

RH: BOY ……….AROUND (spread hands)………
LH: ………AROUND (spread hands)………

Figure 6.9 Narration to encode or describe static scenes and placing lexical signs in location

Pattern 3

The third pattern identified is that referents are placed in space by indexing. This strategy uses *pointing* to show the static locations of the entities in space after or before the lexical identification of the referent. This was used by both GSL and AdaSL signers.

GSL

RH: index loc.$_{up}$ MANGO
LH: index loc.$_{up}$

basket of fruits on bicycle

AdaSL

RH:	BICYCLE	index loc.$_{R}$	ORANGE	index loc.$_{down}$	ORANGE	SASS (full basket)
LH:	BICYCLE					SASS (full basket)

Figure 6.10. Referents are identified and placed in space by indexing

Pattern 4

The fourth pattern states that static scenes are depicted from signer's internal viewpoint as exemplified in Figure 6.11 below. This strategy used character or character-narrator perspectives with SASS and the entities are located with respect to the signer as character's body. This strategy was mostly used by AdaSL signers. In this strategy, signers located the entities using the space in front or around them. The alignment of the entities uses character viewpoint as spatial depiction in life-sized representation. SASSes are mainly used in this life-sized representation.

GSL

RH: FRUIT SASS(basket) SASS loc.$_{R}$ BICYCLE SASS(basket) SASS loc.$_{R}$ STOP
LH: SASS(basket) SASS loc.$_{R}$ BICYCLE SASS(basket) SASS loc.$_{R}$ STOP

AdaSL

RH: BASKET loc.$_{C}$ BASKET loc.$_{L}$
LH: BASKET loc.$_{C}$ BASKET loc.$_{L}$

AdaSL

RH: ORANGE PEAR BASKET loc.$_{R}$ BASKET loc.$_{C}$
LH: PEAR BASKET loc.$_{R}$ BASKET loc.$_{C}$

AdaSL

RH: ORANGE BIG BASKET loc.$_{L}$ SASS (basket) BASKET loc.$_{R}$ FULL
LH: ORANGE BIG BASKET loc.$_{L}$ SASS (basket) BASKET loc.$_{R}$ FULL

Figure 6.11 Depiction from character and character-narrator perspectives with SASS

Pattern 5

The fifth pattern states that entity classifier predicates are used to encode referent location in static scenes.[84] This aligns with convention 2 of what has been found in Western sign

[84] No SASSes in reduced-sized were identified for either GSL or AdaSL. Pattern 5 uses the observer perspective as all the examples found in the data used entity classifiers in prototypical alignment.

languages; “classifier predicates are used to encode spatial information about the introduced referents” (Perniss, 2007a, p. 78). This is specific to GSL as no record was found in the data for AdaSL signers. The use of entity classifiers for static scene depictions were preceded by lexical signs/SASS and this conforms to conventions 1, 2 and 5 of what has been found in other Western sign languages (Perniss, 2007a). The difference between patterns 4 and 5 is that the former has life-sized scale, and the latter has reduced-sized scale.

GSL

RH: PEOPLE BOY CL$_E$(boy loc.$_L$) CL$_E$(boy loc.$_C$)
LH:

GSL

RH: basket (SASS) CL$_E$ (basket) CL$_E$ (basket) CL$_E$ (basket)
LH: basket (SASS) CL$_E$ (ground) CL$_E$ (ground) CL$_E$ (ground)

Figure 6.12 Entity classifier predicates for static scene depiction

6.3.4 Summary of location depictions

Location (static scenes) depictions from the data conformed to at least one of the patterns that have been discussed. In both GSL and AdaSL, there was not a single static scene depiction that used all the 5 patterns. Whereas all the conventions listed in Perniss (2007a) can occur in a single description, the 5 patterns identified in this dissertation cannot appear in a single description because some of the patterns make reference to the same thing (e.g., patterns 2 & 3). Most importantly, the DGS example in Figure 6.5 is expressed in just one perspective (observer). However, the patterns identified in the data used different perspectives. Few signers localized the locative scenes with 2 patterns. Overall, GSL and AdaSL signers demonstrated more similarities than differences in the use of these patterns stated above. Individual variations were identified, and some signers used 3 of these patterns in a single static scene depiction as exemplified by the AdaSL signer in Figure 6.13. In this example, the constituent order is presented in pattern 1, the localization strategy in pattern 3 and the perspective in pattern 4.

AdaSL

RH:	ORANGE	index loc$_{low\ left}$	FULL(GSL)	FULL	CL$_E$ (orange)	FULL
LH:			FULL(GSL)	FULL		FULL
Pers:		……..…………………… character-narrator…………………………..				

Pattern. 1 referent named before other information is given
Pattern. 3 referents are placed in space by indexing
Pattern. 4 describing the scene in character (or character-narrator) perspective

Figure 6.13 Describing static scenes with 3 patterns

Patterns 1 and 2 were mostly used by both sign languages to depict static scenes (1. referents are named or identified with noun phrases before other information is given and 2. placing lexical signs in spatial locations). In pattern 1, the constituents are named and pattern 2 places the lexical signs in space. Pattern 3 was used by GSL and AdaSL signers almost to the same degree. Pattern 4 was fairly used by both sign languages and pattern 5 was only used by GSL signers (see Figure 6.14).

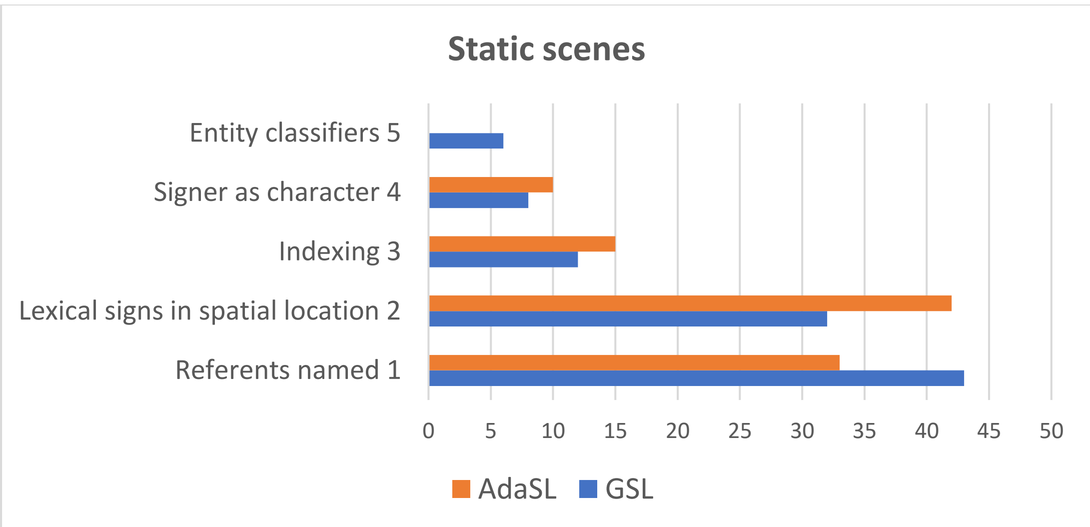


Figure 6.14 Proportion of patterns used for location

6.4 Encoding Motion

This section's focus is to present signers' description of motion events. Motion events have dynamic motion and there is movement from location 1 to location 2. The encoding of motion events in a signed language mainly relies on the signing perspectives and the devices (classifier and lexical predicates) that are used (just as for location encoding). Motion and location encoding in sign languages rely extensively on the topographic use of space. Perniss (2007a, p. 22) defines the topographic use of space as "the meaningful (i.e., iconic) use of locations in sign space to represent referent locations, for example, with the use of classifier predicates". Typical to the expression of motion in many sign languages is the use of entity classifiers in observer perspective. Other strategies identified in the literature include directional verbs, directionals and spatial verbs (Talmy, 1985; Perniss, 2007a; Nyst, 2007a). The section seeks to identify how motion was expressed by signers of GSL and AdaSL (perspectives and strategies) and presents quantitative analyses of the similarities and differences in graphs.

6.4.1 Perspectives for encoding motion

Signers of GSL and AdaSL predominantly used character-narrator perspective to encode motion (Figure. 6.15). GSL signers represented a total 49% (N=200) and AdaSL signers a total of 46% (N=196) of the motion events in character-narrator perspective. Narrator perspective had a total of 33% (N=146) use by AdaSL signers and 12% (N=50) by GSL signers. Character perspective for expressing motion events had a total 17% (N=66) from AdaSL signers and 15% (N=61) from GSL signers. On the other hand, observer perspective was mainly used by GSL signers who had a total of 18% (N=65) as compared to the 3% (N=14) use by AdaSL signers. AdaSL signers used entity classifiers in observer perspective for depicting motion of referents, especially for motion seen from a distance (specifically, riding bicycle across field). Character-observer was used in 6% (N=22) of descriptions by GSL signers and in less than one percent (N=1) by AdaSL signers. Observer-narrator was barely used by GSL (less than 1%, N=3) and not used at all by AdaSL signers for motion events. Figure 6.16 gives examples from the data showing each perspective type.

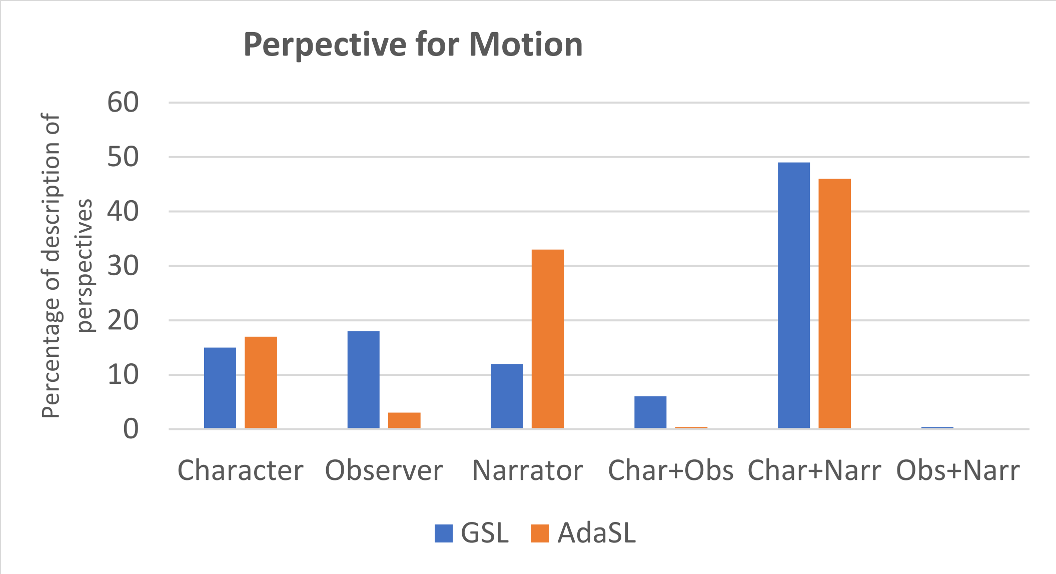


Figure 6.15 Proportion of perspectives used for motion events

1. *Character perspective*

 GSL  AdaSL

RH:	CL_H (hold bicycle)	CL_H (hold bicycle)
LH:	CL_H (hold bicycle)	CL_H (hold bicycle)

2. *Observer perspective*


GSL


AdaSL

RH: CL$_{E}$ (boy); mov. $_{\text{forward}}$
LH: CL$_{E}$ (girl); mov. $_{\text{backward}}$

CL$_{E}$ (boy); mov. $_{\text{right to left}}$
CL$_{E}$ (girl); mov. $_{\text{left to right}}$

3. Narrator


GSL

RH: GO AWAY (directional) loc.$_{1}$ to loc.$_{2}$
LH:


AdaSL

RH: GO (directional) loc.$_{L}$ towards loc.$_{C}$
LH:

4. Character-observer perspective


GSL

RH: CL$_{E}$ (man)
LH:
Body: moves back (man-character)

AdaSL[85]

RH: CL_L (limping leg)
LH: CL_H (holds bicycle- character)

GSL

RH: CL_E (3 boys) + signer (man) watch
LH:
Signer: looks intently (man-character)

5. *Character-narrator perspective*

GSL

RH: WATCH (spatial verb)
LH: WATCH (spatial verb)
Signer: looks intently (could be either boy or girl)

AdaSL

RH: GO (directional)
LH:
Signer: looks intently (man)

[85] This example combines both motion (movement) and manner (signer turns his leg). The direction of movement of the limb classifier is on the lateral axis which is indicative of observer perspective.

6. Observer-narrator perspective

GSL

RH: CL_{E} (girl)[86]
LH: SEE

Figure 6.16 Perspectives for motion events in GSL and AdaSL

There was no difference in the preference for character and character-narrator perspectives for motion event by GSL and AdaSL signers, i.e., both sign languages preferred these perspectives to a similar degree. Contrastively, observer related perspectives were used mostly by GSL signers as compared to AdaSL signers and this was expected. As noted earlier in this chapter, there has been no research on observer perspectives in GSL prior to this dissertation but GSL's relationship with ASL led to the assumption that observer perspective will be used in GSL. In observer perspective, as seen in example 2 of Figure 6.16, the signer projects the event on the space in front of the body and signer is external to the event which is represented in a reduced size. Typical of observer perspective is the use of entity classifiers which represent the event from the signer's external viewpoint. Critical to note is that AdaSL signers mostly used observer perspective to depict motion of referents seen from a distance (e.g., riding bicycle across field). Although the signers depicted these events as observers (*boy and girl ride towards each other*), the depiction seems less of a reduced-sized event space representation as the depiction profiled the entities construed from a distance. Previous research on AdaSL found the absence of observer perspective (Nyst, 2004; 2007a) and, it was not expected that AdaSL signers will use observer perspective for motion events. Therefore, one critical finding in this dissertation is AdaSL signers encoding motion information from an observer perspective in AdaSL (see Figure 6.16, *boy and girl ride towards each other*), similar to what is found in GSL.

Signers use narrator perspective using lexical signs to depict motion events with no elements of CA. Therefore, the signer is out of character and not an observer. Lexical items

[86] This example uses a blend of observer, narrator and character perspectives. The signer uses CA when he turns his head with the movement of the entity CL and the lexical item SEE/WATCH. In this scene, the boy turns to look (still 2) at the girl on the bicycle (still 1) who passed by while the boy kept riding and moving along on his own bicycle.

with inherent directional motion were indicative of the use of narrator perspective. These lexical signs depicted movement from $loc._1$ to $loc._2$.[87] AdaSL signers demonstrated a predominant use of the narrator perspective by using 33% (N=146) of lexical items that were directional in nature. On the other hand, 12% (N=50) of GSL signers motion events were depicted with narrator perspective. That is, AdaSL signers demonstrated a greater preference for narrator perspective and a greater preference for directionals and directional verbs (supporting Nyst, 2007a on the use of directionals for motion event in AdaSL).

In character-observer perspective, the signer's body is projected into the blend and this produces "a visible blended element" (Dudis, 2004, p. 223) with both real, surrogate and token spaces. This can be explained in terms of blended spaces and body partitioning. The use of blended space to depict multiple events (Dudis, 2004) has been attested in many sign languages.[88] The importance of partitionable zones in sign language is listed by Dudis (2004) to include partitioning the signer's body to identify the invisible actor, produce different choices of perspectives, making visible blends that contains a visible actor, partitioning the hand as entity etc.

In other words, signers depicted such events with the simultaneous use of observer perspective which situated a reduced-size representation using entity classifiers and the signer acted as a character (using life-sized scales) in the same event. GSL signers used the blend of character-observer in 6% (N=22) of their description of motion events. On the other hand, AdaSL signers rarely used this perspective and only 0.1% (N=1) of their total motion events were in character-observer perspective. One out of the ten AdaSL signers used character-observer perspective and this attests to the unpopularity of this perspective in AdaSL. The depiction of character-observer perspective in AdaSL relied on handling and limb classifiers with the limb classifier expressed on the lateral axis which is indicative of the observer perspective (e.g., 4 of Figure 6.16).

Character-narrator perspective also makes use of blended space where signers use character and narrator perspectives simultaneously. Character-narrator perspective in GSL and AdaSL involves a human actor and a lexical item that is modified to express spatial events. The human actor does one or more of the following simultaneously with the lexical sign; moves the torso, facial change to depict character, movement in other parts of the body to signal movement from $loc._1$ to $loc._2$. The lexical item produced simultaneously with the

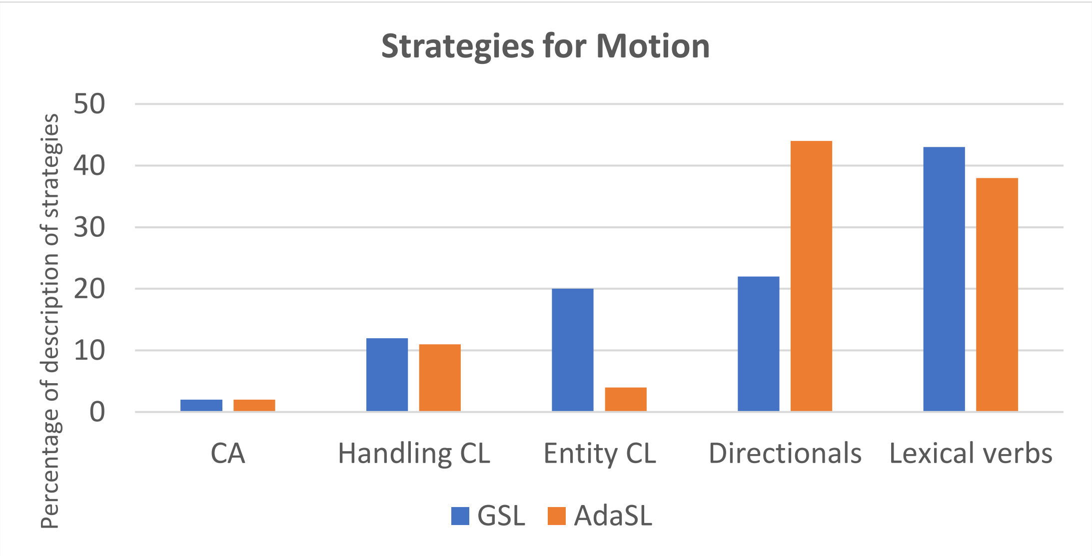
[87] These lexical signs have starting and ending locations but not projected from character or observer perspectives.
[88] Chapter 7 will focus on the iconic strategies used in blended spaces.

human action is modified in movement, location, or intensity. This was the most used strategy by GSL and AdaSL signers (GSL 49%, N-200; AdaSL 46%, N=196). All the 10 signers from each language group used character-narrator perspective to depict motion event to a similar and substantial degree.

The use of observer-narrator perspective for motion events was not popular in either sign languages. Only 2 signers of GSL used this perspective to express motion events and AdaSL signers did not use this at all.

6.4.2 Strategies for encoding motion events

This section presents the strategies used by signers to depict motion events in the video retelling tasks. Directionals/directional verbs in the broad category of lexical predicates are represented separately here given that their use has been described previously in AdaSL (see Nyst, 2007a). Results from the analysis shows that lexical predicates (referring to plain verbs, locomotion verbs and spatial verbs) were the most used for encoding motion (GSL 43%, N=185; AdaSL 38%, N=169). However, directional verbs/directionals were the highest used strategy by AdaSL signers. A total of 44% (N=188) of all the motion events in AdaSL were represented with directional verbs/directionals[89] as compared to GSL's 21% (81). Entity classifiers were used mostly by GSL signers (20%, N=76) as compared to AdaSL signers (4%, N=15). Handling classifiers depicting motion events were minimally used (GSL 12%, N=49; AdaSL 11%, N=44). About 2% CA was used by GSL (N=9) signers and AdaSL (N=8) signers. CA typically co-occurred with handling classifiers, but CA involved shifting the torso, moving the body towards left or right and moving the legs.



[89] Directionals on Figure 6.17 refer to both directional verbs and directionals as explained in §6.2.2.

Figure 6.17 Predicates for motion events

1. *Constructed Action (CA)*

Constructed action is overtly used to show spatial events with the signer's torso moving from one location to another. Depicting motion events with the body demands a shift in the body movement since the action is from the signer's viewpoint. It involves the signer shifting the torso and moving the hand or the legs simultaneously. The CA typically occurred together with handling and had other bodily movement in addition to the hand depicting the holding of an object and moving from one location to another. CA for motion expression depicted both path and the manner of the motion (with the signer as the figure) through the movement of the body. Data from both sign languages show that a mean proportion of 2% was used by GSL and AdaSL.

GSL

RH: CL_H (drag) CL_H (drag) CL_H (drag) CL_H (drag)
LH: CL_H (drag) CL_H (drag) CL_H (drag) CL_H (drag)
Body shift: ……torso shift to left………. ………torso shift to right ……….

AdaSL

RH: CL_H (hold) CL_H (hold) CL_H (hold) CL_H (hold) CL_H (hold) CL_H (hold)

LH:
Body shift: ……torso shift to left………. ………torso shift to left ……….
Leg mov: signer's legs move as body moves signer's legs move as body moves

Figure 6.18 Constructed action (with hands, torso and legs) depicting motion

2. *Handling classifiers*

The handling strategy depicted the human hand as hand performing an action of holding or grasping and moving from loc.$_1$ to loc.$_2$. The results indicated that both GSL and AdaSL signers used handling strategy to a similar degree (GSL 12%, N=49; AdaSL 11%, N=44). Handling classifiers representing motion events were mostly used by signers to express scenes with handling actions (hands holding or manipulating items). There were several scenes in the videos that depicted the actions of handling with movement from loc.$_1$ to loc.$_2$. Spatial relationships expressed with handling had life-sized representations with locomotive movement involving signers' hand(s) shifting to the left or right; up or down etc. to specific locations that involved spatial manipulations.

GSL

RH: CL$_H$ (lift basket) loc.$_L$ to loc.$_R$ CL$_H$ (set basket down) loc.$_{up}$ to loc.$_{down}$
LH: CL$_H$(lift basket) loc.$_L$ to loc.$_R$ CL$_H$ (set basket down) loc.$_{up}$ to loc.$_{down}$

AdaSL

RH: CL$_H$ (drags goat) loc.$_L$ to loc$_{forward}$
LH: CL$_H$ (drags goat) loc.$_L$ to loc$_{forward}$

AdaSL

RH: CL_H (lift boy)[90] $loc._{down}$ to $loc._{up}$
LH: CL_H (lift boy) $loc._{down}$ to $loc._{up}$

Figure 6.19 Handling classifiers with path for motion event

3. *Entity classifiers*

Entity classifier constructions in sign languages employ iconic morphemes to represent objects, depicting the referent with the handshape, i.e., the handshape represents an animate object such as a person or an inanimate object such as a train. Entity classifiers depict movement from $loc._1$ to $loc._2$. Entity classifiers expressing motion depicted the figure in motion, the path of the motion and (sometimes) manner of the motion using signers' handshape that moves in the token space from a signer's external viewpoint or in non-prototypical alignment in other perspectives. The upright entity classifier and the two-legged entity classifier were used by GSL signers whereas AdaSL signers used only the upright entity classifier (no record of the two-legged entity classifier was found for AdaSL signers). In Figure 6.20, both GSL and AdaSL signers used entity classifiers to depict the movement of two people moving towards each other in a far-away distance (*boy and girl ride towards each other*).

GSL

[90] This sign shows the signer as character helping the boy on the bicycle get up after he fell.

RH: CL_E (boy); mov.$_{\text{right to left}}$ CL_E (boy); mov.$_{\text{right to centre}}$
LH: CL_E (girl); mov.$_{\text{left to right}}$ CL_E (girl); mov.$_{\text{extreme periphery left to centre}}$

AdaSL

RH: CL_E (boy); mov.$_{\text{right to left}}$ CL_E (boy); mov.$_{\text{right to left}}$
LH: CL_E (girl); mov.$_{\text{left to right}}$ CL_E (girl); mov.$_{\text{left to right}}$

Figure 6.20 Entity classifiers with path for motion event

4. *Directional verbs/Directionals*

In both GSL and AdaSL, two types of *directional verbs/directionals* were identified as used to express motion concepts. The first type refers to verbs with internal path movement from one location to the other without any manipulation in their manner or intensity. These include GIVE[91] and FALL (see 4, 5, 6, 7 of Figure 6.21) which inherently indicate location and movement. The other type refers to directionals that typically express the notion GO with hand movement and can sometimes show the nature of path by indicating straight or winding movement. This directional is represented with different handshape variants in both sign language. Two types of the directional [GO] were identified in both GSL and AdaSL; one signed with the *index finger* (that traces the path of the movement) and one indicated with the *whole palm or two palms*. (see 1, 2, 3 of Figure 6.21)

Directionals were used in both sign languages to depict movement from loc.$_1$ to loc.$_2$. AdaSL signers typically used the directional GO to express a straight motion or other winding motions that typically shows the nature of the path, e.g., “go all the way round” (see 2 & 3 of Figure 6.21). GSL signers depicted two types of this directional; GO and GO AWAY (see 1 of Figure.6.21 for GO AWAY) and both depicted movement from loc.$_1$ to loc.$_2$. The signs GO and GO AWAY involved a change in location and when expressed in character perspective, the signer shifted the body to the left or right (as depicted in 1 of Figure 6.21). In both GSL and AdaSL, the directional GO sometimes accompanied other lexical verbs depicting movement as exemplified in 1, 2 & 3 of Figure 6.21 (but not always).

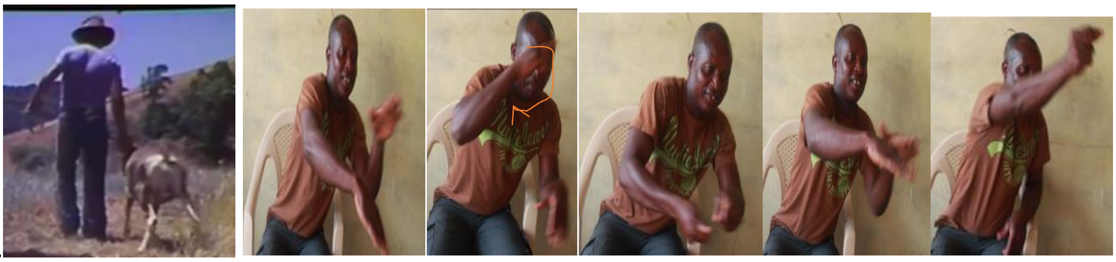
GIVE depicted movement from loc.$_1$ to loc.$_2$ and indicated the agent and the recipient. In both sign languages, GIVE was mostly expressed with the signer internal to the event space

[91] GIVE was classified as a directional verb since it allows the signer to change the subject and object through a change in the direction of the verb

and therefore the signer's body becomes the loc.$_1$ from which the object moves to a loc.$_2$ in the sign space. Few GSL signers signed GIVE with signers being external to the event space, and the object moving from loc.$_1$ to loc.$_2$ in the space in front of signer (in 3rd person). GIVE in character perspective depicted the signer as an agent and movement from signer to a location iconically represented movement from agent in video to recipient in video. There were not many scenes depicting GIVE in the video vignettes. The following are examples of GIVE actions in the videos: *The boy with the hat gives it to the boy (holding the bicycle); The boy with the bicycle gives the boy (who brought the hat) three pieces of pear; The boy distributes or gives the pear among/ to his friends* (as shown in examples 4 & 5 in Figure 6.21).

The directional FALL had inherent spatial representation from loc.$_1$ to loc.$_2$ and typically expressed movement from a higher position to a lower position (see e.g., 6 & 7 in Figure 6.21). The handshape for FALL in GSL resembles a frozen two-legged entity classifier. FALL was typically used in character-narrator perspectives in both sign language (with the signer's body/torso shifting location). Furthermore, there were few representations of FALL in only narrator perspective (without body/torso shift) in GSL and AdaSL.

The analysis of the data showed 22% (N=81) of GSL motion events were expressed with directional verbs/directionals and 44% (N=188) of AdaSL motion events were expressed with directional verbs/directionals. AdaSL signers used twice as many directional verbs/directionals as compared to GSL signers.

1.  GSL

RH: WALK GOAT CL_H (drag) WALK **GO AWAY**
LH: WALK CL_H (drag) WALK
Motion expressed: ….…………towards loc.$_L$ ……………………
Perspective: ……………………. character-narrator…………………………………

2. 

AdaSL 

RH:	BOY	THREE	COME	MEET	**GO_1(RH)**		**GO**
LH:				MEET		**GO_2 (LH)**	
Motion expressed:					loc.$_L$	loc.$_L$	loc.$_R$ to loc.$_L$
Perspective:				……………narrator……………			

3. 

AdaSL 

RH: RIDE ………………………..GO……………………………..
LH: RIDE
Motion expressed: ……………………following path of way……………….
Perspective ……………………observer[92]……………………………..

4.  GSL

RH: CL_H (hold) give take give
LH: CL_H (hold) …………..(hold)…………………………………………
Motion expressed: loc.$_R$ loc.$_L$
Perspective: …………………character……………………..

[92] Showing the path of motion here expresses reduced-sized spatial projection of the path and as such uses an observer perspective view.

5.  AdaSL

RH: take give take give

LH: take ……..……………..(hold)……………………………… give

Motion expressed: loc.$_{R}$ loc.$_{front}$ loc.$_{L}$

Perspective: ……………..…………….character…………………………………………

6. 

 GSL

RH: ONE ……………..FALL…………………..

LH:

Motion expressed: loc.$_{up}$………………………...loc.$_{down}$

Perspective: …………narrator…………

7.  AdaSL

RH: ONE ..…………FALL……………

LH:

Motion expressed: loc.$_{up}$……………….….loc.$_{down}$

Perspective: ……..narrator……….

Figure 6.21 Directional verbs/directionals for encoding motion

5. *Lexical verbs*

Signers also expressed motion events with other lexical verbs. As explained in the beginning of this section lexical verbs are used here to refer to plain verbs, spatial verbs, and manner of locomotion verbs (not including directional verbs and directionals). Spatial verbs are modified to show the paths and movements showing the starting and ending locations.

Manner of locomotion verbs encode information about direction of motion (WALK, RUN). Signers also used plain verbs that are not modified at all to express motion. GSL signers had 43% (N=185) and AdaSL signers had 38% (N=169) of all motion events expressed with lexical items. Figure 6.22 gives examples of verbs that are modified for starting and ending locations in GSL and AdaSL.

GSL

RH: **WALK** GOAT CL$_H$ (drag) **WALK**
LH: **WALK** CL$_H$ (drag) **WALK**
Motion expressed: ……………………….towards loc.$_L$ ………………………………

GSL

RH: **RUN** TO BOY
LH: **RUN** TO index loc.$_L$
Motion expressed: towards loc.$_L$

AdaSL

RH: **RIDE** **RIDE**
LH: **RIDE** **RIDE**
Motion expressed: …………………towards loc.$_L$ ………………..

RH: BOY index loc.$_R$ BOY **WALK**
LH: **WALK**
Motion expressed: loc.$_R$ to loc.$_L$

Figure 6.22 Lexical verbs for motion event

6.5 Encoding Action

The focus of this section is to identify the strategies and perspectives used for action events in GSL and AdaSL. In retelling videos, signers can conceptually take on different roles to represent a real-world person that is involved in an action. Action event is a meaningful event which shows that a definite action occurred. Action representation in sign language include the iconic use of the signer's body as the agent performing the action or the signer as the observer retelling the action from an external viewpoint although this is least expected. When signers profile the action as human entities performing the action, the iconic strategy used is Constructed Action (CA). CA can be used overtly or subtly (Cormier, et al., 2015). When used overtly, the signer is in full character and the event is conceptualised on a life-sized scale. When CA is used subtly, signers use CA together with simultaneous lexical material. CA uses embodied gestures, and signers are visible actors in the story.

On the other hand, signers can dissociate themselves from the action by using observer perspective that present the event from the signer's external viewpoint although this is less expected in action events. That is, signers are more likely to project the action event with handling classifiers and lexical predicates as compared to entity classifiers. However, signers can use other predicates simultaneously with entity classifiers (in such cases, the entity classifier is an object as seen e.g., 2,4, & 6 in Figure 6.24). Entity classifiers expressing action events co-occur with other strategies to derive a blend of observer-related perspectives. Based on the nature of the stimulus video (Pear Story, see chapter 4), character related perspectives were expected as compared to observer related perspectives. Important to note is that the individual tokens for action were more because the Pear video was action-packed and few of the tokens coded for motion occurred simultaneously with other action elements.

6.5.1 Perspectives for encoding action

Figure 6.23 presents the proportion of perspectives for action event. The dominant perspective for encoding action in GSL and AdaSL is the character perspective which was used 55% (N=416) by GSL signers and 59% (N=424) by AdaSL signers. For instance, example 1 in Figure 6.24 shows the action of the signers putting paddle in their pockets and the GSL signer holds the hat at the same time. Character-narrator perspective was the next dominant perspective used by GSL (36%, N=279) and AdaSL (35%, N=261) signers. Example 5 in Figure 6.24 shows the action of dragging a goat (GSL) and the action of holding the pear fruit (AdaSL).

Other perspectives were barely used by signers to express action events and this was expected considering the events represented. Narrator perspective had a total of 4% (N=29) from GSL and 6% (N=44) from AdaSL signers. Example 3 of Figure 6.24 shows the action of *standing*, *hitting* and *bumping* signed with lexical verbs. Observer and observer-related perspectives were barely used by GSL and AdaSL signers. GSL had 3% (N=20) observer perspective, 2% (N=15) in character-observer and less than 1 percent (N=1) in observer-narrator. AdaSL had less than 1 percent (N=4) in all observer-related perspectives for action events. Example 2 of Figure 6.24 shows the action of holding the ladder (and moving up, i.e., motion) signed with entity classifiers, and the action of bumping into a stone (or boy bumped into girl) signed with entity classifiers. Examples 4 & 6 of Figure 6.24 shows a blend of the action related signs (eat- CA, SEE-lexical verb) and entity classifiers boy to depict *boy eats pear* and *boy sees hat*.

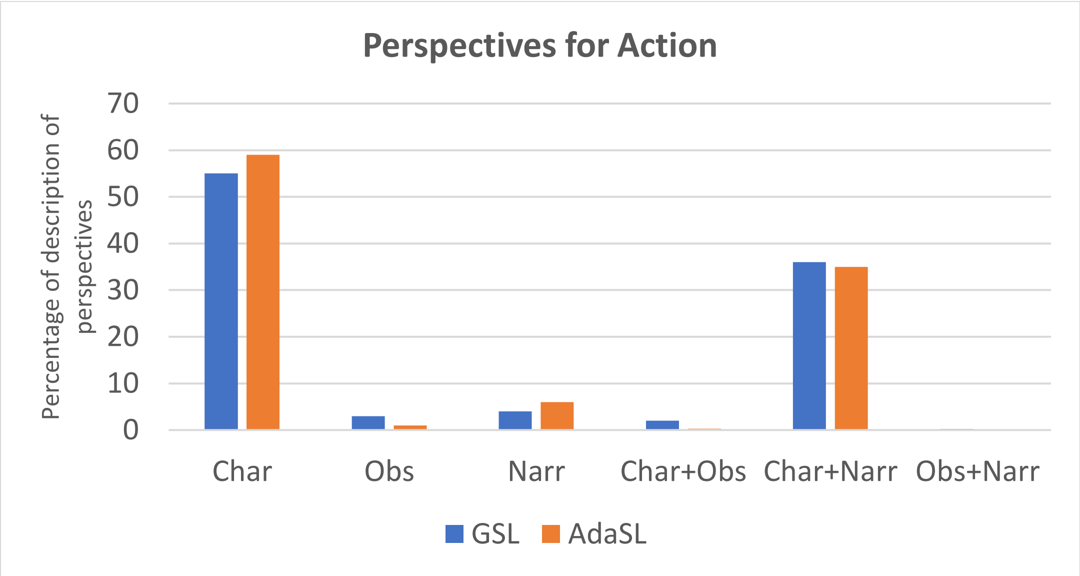


Figure 6.23 Proportion of perspectives for action event

1. *Character*

GSL

AdaSL

RH: CL_E (put paddle in the pocket)
LH: CL_H (hold hat) -action event

CL_E (put paddle in the pocket) – action event

2. Observer

GSL

RH: CL$_E$ (man, holds ladder and moves up)[93]- action event
LH: CL$_E$ (ladder)

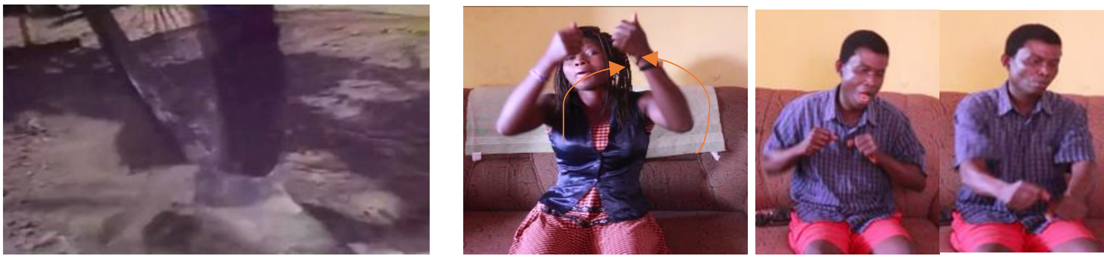
AdaSL

RH: CL$_E$ (boy bump into stone/girl) – action event
LH: CL$_E$ (girl bump into boy)

3. Narrator

GSL

RH: STAND (move up)- action event
LH: STAND



AdaSL

RH: HIT (boy hit stone) BUMP (boy bumped into a stone)
LH: HIT (bot hit stone) BUMP (boy bumped into a stone)

4. Character-observer

[93] This combines both action and motion events. The focus is the action of holding the ladder which is hard to see in the classifier predicate.

GSL

RH: CL_H (boy eat pear) – action event

LH: CL_E (boy)

AdaSL[94]

RH: ……………CL_L (leg) ……………

LH: ……………CL_H (hold bicycle)….. action event

5. Character-narrator

GSL

RH: GOAT

LH: CL_H (hold/drag) -action event

AdaSL

RH: MAN

LH: CL_H (holds fruit) -action event

6. Observer-narrator

[94] This scene was represented with three different strategies by this signer. The first was using handling classifier (§6.6.1- on character perspective), the second and third used limb classifier and handling classifiers. The second showed the limb classifier moving in motion while the left hand held the bicycle in the AdaSL example on character-observer in §6.5.1. The third also used the limb classifier but this time with a different handshape and again depict limping. In the third example, the signer first touches the leg in still one and uses the hand as limping leg (indicated with the wavy line). The focus of the example above is the simultaneous action of holding the bicycle together with the limb classifier.

  GSL

RH: SEE -action event
LH: CL_E (boy)

Figure 6.24 Perspectives for action event

Character and character-narrator perspectives were the most-used perspectives for action events by signers of both sign languages. This did not come as a surprise as the Pear Story used for the data elicitation was action packed, with different actors involved in doing different things (see description in chapter 4, §4.2.2) and as such character perspective was highly expected. Signers depicted these actions with character perspective where the signer is internal to the sign event. AdaSL signers used more character-based perspectives (59%, N=416 -character; 33%, N=279 -character-narrator) as compared to GSL (55%, N=416 -character; 35%, N=279 -character-narrator). Narrator perspective was expressed in 6% (N=44) of AdaSL action event and 4% (N=29) of GSL's action event. In instances that signers used lexical verbs to depict action, the lexical verbs had inherent action like the AdaSL example 3 in Figure 6.24 where BUMP and HIT depicted an action of bumping into a stone or hitting a stone.

GSL signers used more observer-related perspectives for action as compared to AdaSL signers. The only record of observer perspective in AdaSL was from signers who depicted the scene of bicycle hitting a stone as two animate entities hitting each other. Most AdaSL signers who used entity classifiers to depict the boy and girl moving towards each other depicted the action of bumping into a stone as the two figures bumping into each other before they signed BUMP or FALL. It seems most AdaSL perceived the boy bumped into the girl. Thus, it was expressed as [two entity classifiers from a distance move towards each other and bumped onto each other].

There was no record of observer-narrator perspective for AdaSL. Even GSL signers used observer-based perspective minimally and had 3% (N=20) observer perspective, 2% (N=15) in character-observer and less than 1% (N=1) in observer-narrator, as expected.

6.5.2 Strategies for encoding action

In this section, the strategies used by signers to depict action events in the video retelling tasks are presented (see Figure 6.25). Handling classifiers, constructed action, and lexical items were the most used strategies. These three were mostly expressed in character and character-narrator perspectives which were the dominant perspectives used by GSL and AdaSL signers.

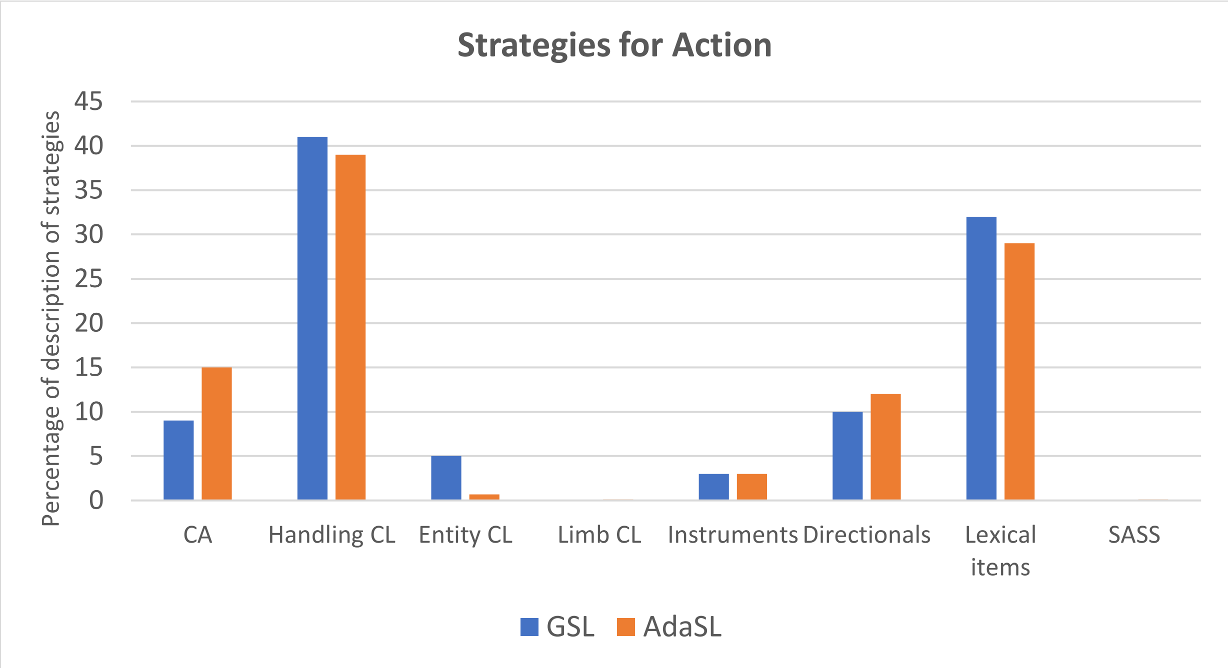


Figure 6.25 Predicates for action event

1. *Constructed Action (CA)*

Constructed action is overtly used to depict action events with the signer as the agent performing the action. Action CA involved body movements (hands and legs), torso shifting, and other actions of the body depicted in the action event (see Figure 6.26). As seen also in the motion events, action CA can co-occur together with handling classifiers. CA was mostly used by AdaSL signers (15%, N=130) to depict action events as compared to GSL signers (9%, N=86).

GSL

AdaSL

RH: CL_H (picks fruit)
LH:

CL_H (picks fruit)

Body shift: torso shift to right | torso shift to right
Gaze: on the floor | on the floor



GSL

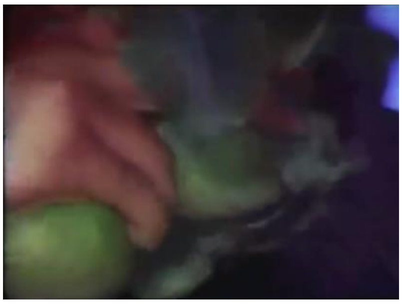
AdaSL

RH: CL_H (picks up hat) | CL_H (picks up hat)
LH:
Body shift: torso shifted forward | torso shifted forward
Gaze: on the floor | on the floor

Figure 6.26 Constructed action in action events

2. *Handling classifiers*

The most frequently used strategy by GSL and AdaSL signers was handling classifiers which shows the hands handling an entity. Handling classifiers and CA are very similar in that both typically align with character perspective. Here, the distinction between handling classifiers and CA is based on the fact that CA used other bodily movement besides handling handshapes as exemplified in Figure 6.26. Handling alone typically depicted an agent holding an entity without involving the body (see Figure 6.27). The large percentage of handling classifiers is motivated by the events in the Pear Story. The action of holding and picking was carried through all the 6 vignettes of the pear videos that were shown to signers. GSL signers had 41% (N=319) handling classifiers and AdaSL signers had 39% (265) handling classifiers.



GSL

AdaSL

RH: CL_H (picks fruit) | CL_H (picks fruit)
LH:

Figure 6.27 Handling classifiers in action event

3. *Entity classifiers*

As expected, entity classifiers were not used much for action events in either GSL or AdaSL; very few instances of use were identified. Entity classifiers were used in observer related perspectives. Whereas GSL had 5% (N=34) use of entity classifiers, AdaSL had less than 1 percent (N=5).

  GSL

RH: STONE (one hand)
LH: CL_E (boy hit stone) -action event

  AdaSL

RH: CL_H (holds basket and places it on the bicycle)- action event
LH: CL_E (bicycle)[95]

Figure 6.28 Entity classifiers in action event

4. *Instruments*

Both GSL and AdaSL used instrument strategy to represent the action of *hitting the ball on the paddle*. The instrument strategy uses an entity handshape but performs a canonical action of the object. Both GSL and AdaSL used this strategy to the same proportion (about 3% each, i.e., GSL N=27; AdaSL N=24).

  GSL  AdaSL

RH: hit ball on paddle (Instr.) hit ball on paddle (Instr.)
LH:

Figure 6.29 Instrument in action event

5. *Directionals*

Directionals typically express motion events and as such were not expected to be a strategy for action event. However, in this subsection, directionals refer to dynamic actions that

[95] In this example, the handshape (B-HS) for bicycle is the entity classifier depicting the object.

expressed physical actions such as falling. It is also worth noting that FALL has inherent movement and in §6.5.2 FALL was coded as a directional indicating movement (*fruit falling from tree*). This is different from FALL OVER coded as action event with an *animate entity* falling from a bicycle. Signers used the directional FALL OVER to express the action of falling from the bicycle. For instance, in Figure 6.30, the boy falling from the bicycle involved both motion (moving from higher location to a lower location) and action (hitting the floor). In both GSL and AdaSL, the sign FALL OVER was signed with a movement from a higher location to a lower location and some signers had facial expressions indicating pain resulting from the fall. GSL signers used 10% (N=76) directionals expressing action, while AdaSL signers on the other hand used 12% (N=86)

GSL

AdaSL

	GSL	AdaSL
RH:	FALL OVER	FALL OVER
LH:		FALL OVER

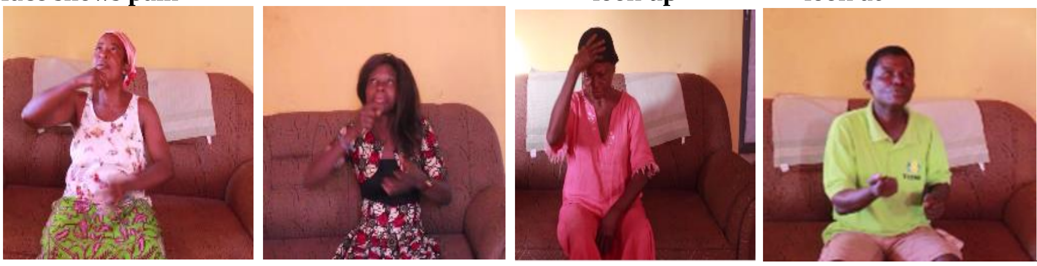
Figure 6.30 Directionals for action events

6. Lexical items

Lexical items were also used by signers to represent action. GSL signers had 32% (N=265) and AdaSL signers had 29% (N=218) representation with lexical items. Action based lexical verbs were modified in manner or intensity. Other lexical nouns were modified with constructed action that reinforced the information as exemplified in Figure 6.31 (see MAN, HAT). The lexical verb PAIN had location modified to show the place of the pain; WATCH had location modified (up & other towards the lexical sign GIRL) and the lexical verb STEAL was used to indicate the action of the boy carrying away a basket of pear fruit. Other non-action lexical verbs combined with CA to indicate action (AdaSL-look up & look down). Lexical items were typically expressed in character-narrator perspective in both sign languages.

GSL

RH:	**PAIN**	**PAIN**	**WATCH**	GIRL
LH:	**PAIN**	CL$_H$ (hold bicycle)		**WATCH**
CA:	**face shows pain**		**look up**	**look at**



AdaSL

RH:	**MAN**	**MAN**	**HAT**	**STEAL**
LH:	BICYCLE	CL$_H$ (hold fruit)		
CA:	**look up**	**look up**	**look down**	**look around**

Figure 6.31 Lexical items in action event

7. *SASS*

SASSes were used only by AdaSL signers to depict action and used in less than 1% (N=7) of action event descriptions. GSL did not have any SASS use for action event. SASSes were in character perspective. The example in 6.32, was coded as SASS because the hand shows the size and shape of the object (hat) as compared to handling where the hands are the hands and does not show the structural features of the object.

AdaSL

RH: SASS (hold hat)
LH: SASS (hold hat)

Figure 6.32 SASS for action event

6.6 The relationship between classifier predicates and signing perspectives

This section considers the relationship between signers' use of classifiers predicates and the signing perspectives that are employed in depicting location, motion, and action events.

Handling classifiers align with character perspective as seen in previous research on sign languages and entity classifiers align with observer's perspectives (Perniss, 2007a; 2007c) and this is referred to as prototypical alignment (Perniss, 2007c). Prototypical alignment is exemplified in the first 2 rows of Figure 6.2. On the other hand, when the classifier predicates do not align with perspectives as stated above but use a blend of perspectives with classifiers predicates, we have non-prototypical alignment (Perniss, 2007c) as in the last 3 rows of Figure 6.2. Research on DGS indicated that it is not absolutely prototypical nor non-prototypical (Perniss, 2007c). Non-prototypical alignments appear frequently in signing, and have been described, for example, with respect to communicative efficiency as prototypical alignments are comparatively limiting in the information that can be expressed at one time. In fact, Perniss (2007c, p. 1335) quoted that non-prototypical alignment "contributes to discourse efficiency in the mapping of meaningful location between perspectives". The data from GSL and AdaSL show a blend of prototypical and non-prototypical alignments with handling and entity classifiers.[96] In this section, fused 1 refers to character-observer, fused 2 refers to character-narrator and fused 3 refers to observer-narrator perspective.

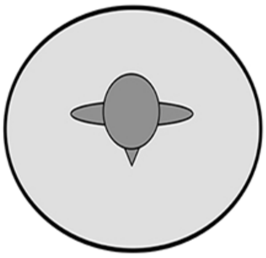
6.6.1 Handling classifiers and perspectives

This section focuses on handling classifiers and the perspectives it occurs within a prototypical and non-prototypical alignment. Handling classifiers were not used in the observer and observer-narrator perspectives by either GSL or AdaSL signers (and there is no section dedicated to these).

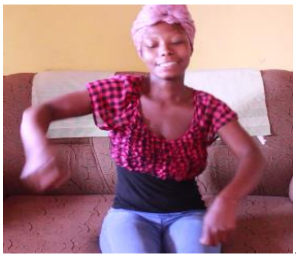
1. *Handling classifier aligns with character perspective (prototypical alignment)*

Handling classifiers aligned mostly with character perspectives in both GSL and AdaSL. GSL signers had 91% (N=357) and AdaSL signers had 82% (331) prototypical alignment with handling and character perspective. In the example below, we see the signer as the actor taking the role of the boy limping along with the bicycle.

[96] Chapter 7 presents an in-depth analysis of these prototypical and non-prototypical alignments in simultaneous constructions.

GSL



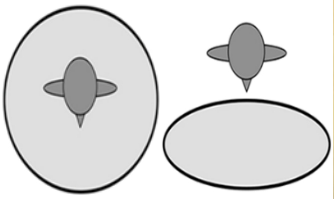
AdaSL

	GSL	AdaSL
RH:	CL_H (bicycle) hold	CL_H (bicycle) hold
LH:	CL_H (bicycle) hold	CL_H (bicycle) hold
Signer:	Hold bicycle towards right	Hold bicycle towards left
Perspective:	character	character

Figure 6. 33 Handling classifiers and character perspective

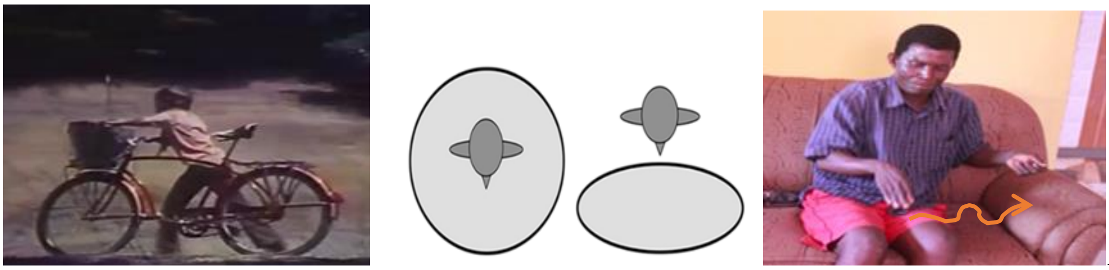
2. *Handling aligns with character-observer perspective (non-prototypical alignment)*

Handling classifiers also aligned with character-observer perspective in a non-prototypical alignment. This alignment was only used 1% by signers of both GSL (N=4) and AdaSL (N=3). In the GSL example below, the signer is the character holding the goat in character perspective but at the same time the RH of the signer represent the man who is holding the goat with the two-legged entity classifiers in observer perspective. The AdaSL signer in the example below assumes the character of the boy on the bicycle by holding the handlebars of the bicycle with the LH and the left hand assumes a limb classifier with a direction of movement depicted at the lateral axis to suggest the use of observer perspective.


GSL

RH: CL_E (man)
LH: CL_H (goat) hold
Signer: Hold goat towards right
Perspective: character-observer



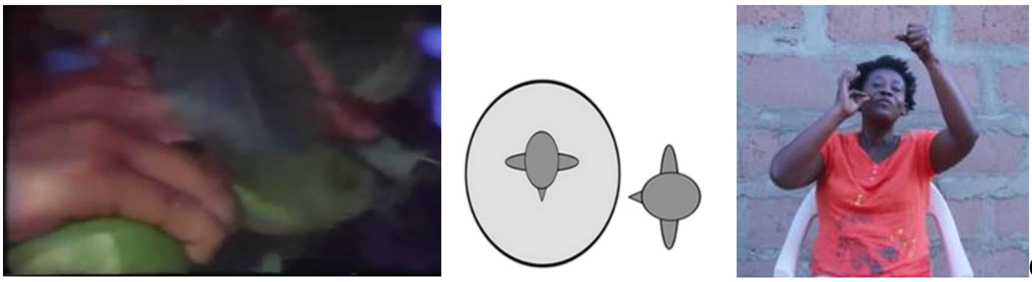
AdaSL

RH: CL$_{L}$ (limping leg)
LH: CL$_{H}$ (holds bicycle- character)
Signer: Hold bicycle
Perspective: character-observer

Figure 6.34 Handling classifiers with character-observer perspective

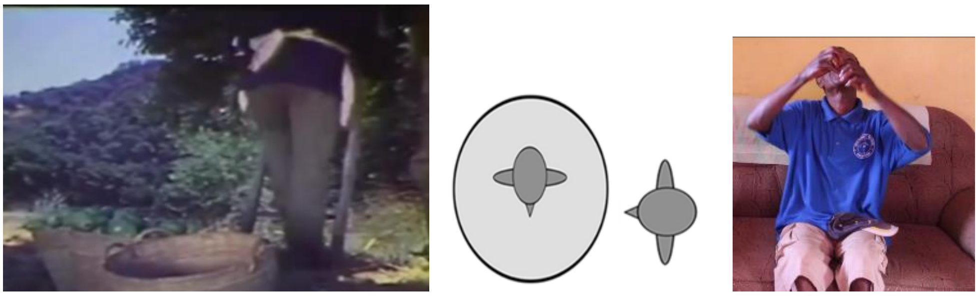
3. *Handling classifiers aligns with character-narrator perspective (prototypical/non-prototypical alignment)*

Further, handling classifiers also aligned with blend of character-narrator perspective. In this alignment, signers either signed lexical items in addition to a CA hold or a lexical sign that is inherently handling in character perspective. The former was used mainly by GSL signers as shown in the GSL example in Figure 6.35, while the latter was used by both GSL and AdaSL signers shown in AdaSL example in Figure 6.35. This alignment was used mostly by AdaSL signers (16%, N=68) as compared to GSL signers (7%, N=26). In the GSL example below, the lexical sign FRUIT is signed with the right hand in narrator perspective and signer holds fruit with her left hand in character perspective. This alignment is prototypical as the focus is on the expression of action and the referent (FRUIT) is not a predicate (simultaneous expression of referent and predicate). On the other hand, the AdaSL example [man CLIMBS ladder] represent a simultaneous expression of two predicates indicating action (lexical verb-CLIMB and CA climb).



GSL

RH: FRUIT
LH: CL$_{H}$ (fruit) hold
Signer: Hold fruit
Perspective: character-narrator



RH: CLIMB
LH: CLIMB
Signer: man
Perspective: character-narrator

Figure 6.35 Handling with character-narrator perspective

The graph in Figure 6.36 summarises the use of handling classifiers with prototypical and non-prototypical alignments.

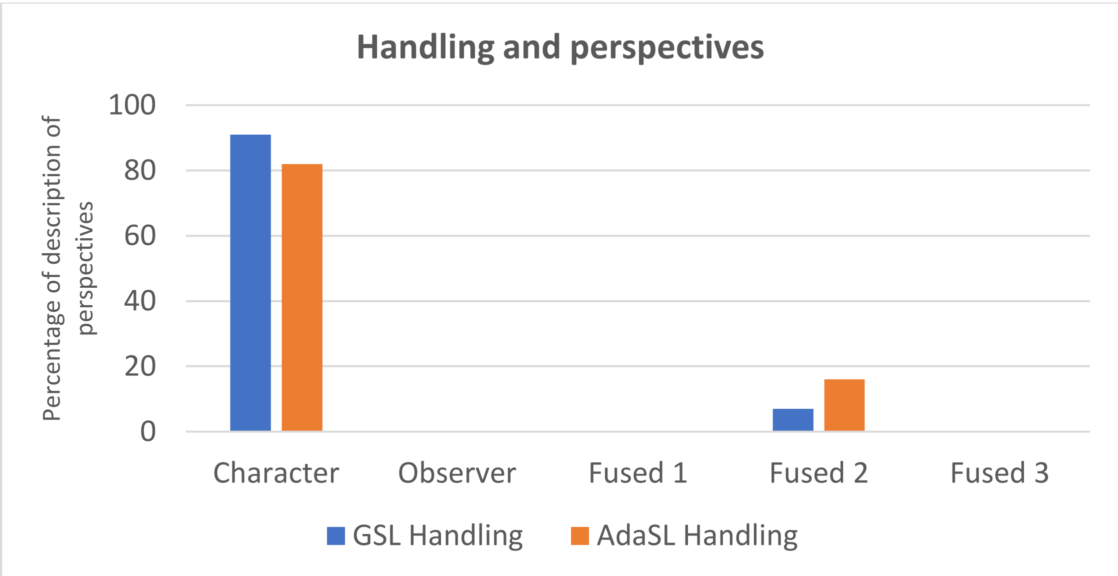


Figure 6.36 Handling classifiers with perspective alignments

6.6.2 Entity classifiers/handshapes and perspectives

This section focuses on entity classifiers and entity depictions and the perspectives they occur within prototypical alignment and non-prototypical alignment. Entity classifiers were found to be very fluid in aligning with different perspectives except character-narrator perspective in both GSL and AdaSL. Entity handshapes or entity depictions on the other hand aligned with only character related perspectives. As explained earlier, entity classifiers are expressed in reduced-sized spatial projection and entity depictions are expressed in real-size spatial projection.

1. *Entity classifiers align with observer perspective (prototypical alignment)*

Entity classifiers typically aligned with observer perspective in both sign languages; GSL signers recorded 65% (N=81) prototypical alignment and AdaSL signers recorded 30% (N=20) prototypical alignment.[97] That is, most of the instances of use of entity classifiers in AdaSL occurred within blends, i.e., together with other perspectives. In the examples below, both signers expressed the boy and the girl with entity classifiers with signer external to the event.

 GSL  AdaSL

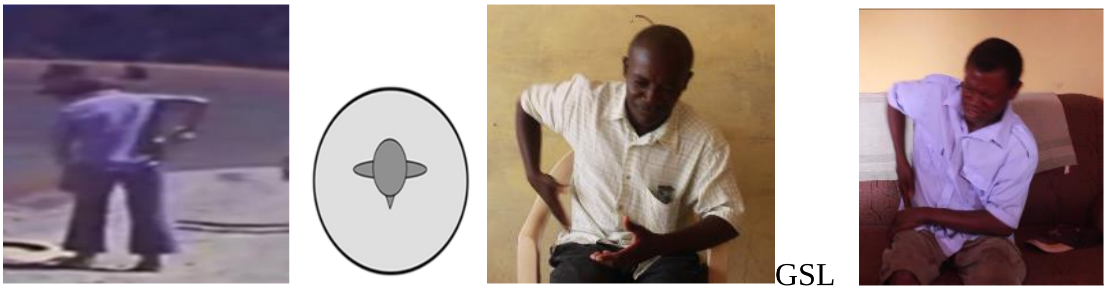
	GSL	AdaSL
RH:	CL_E (boy)	CL_E (boy)
LH:	CL_E (girl)	CL_E (girl)
Signer:	external	external
Perspective:	observer	observer

Figure 6.37 Entity classifiers and observer perspective

2. *Entity handshapes occur with character perspective (non-prototypical alignment)*

Entity handshapes were mostly instrument and other entity related signs. Instruments have entity handshape as seen in chapter 5. Entity handshapes were also found to aligned with character perspective where the signer is a character in the signing event and uses an entity handshape to depict an object or an animate referent. This alignment was mostly used by AdaSL signers (67%, N=25) as compared to GSL signers (12%, N=15). In Figure 6.38, both GSL and AdaSL signers were in the character perspective and their hands depicted the tennis paddle not the hand of the boy.

[97] These percentages are of descriptions that contained entity classifiers



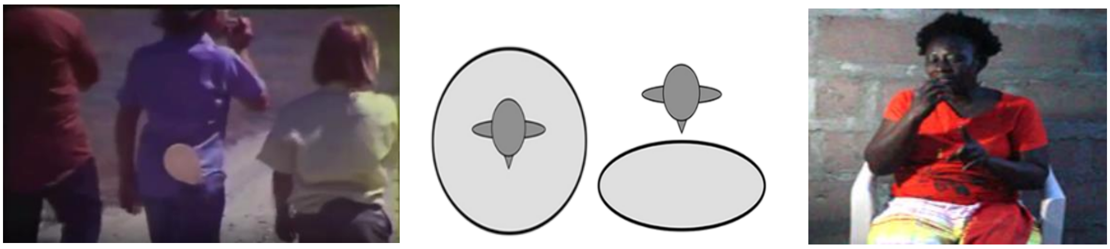
GSL AdaSL

	GSL	AdaSL
RH:	paddle (Instr.)	paddle (Instr.)
LH:	CL_H (hold hat)	
Signer:	boy	boy
Perspective:	character	character

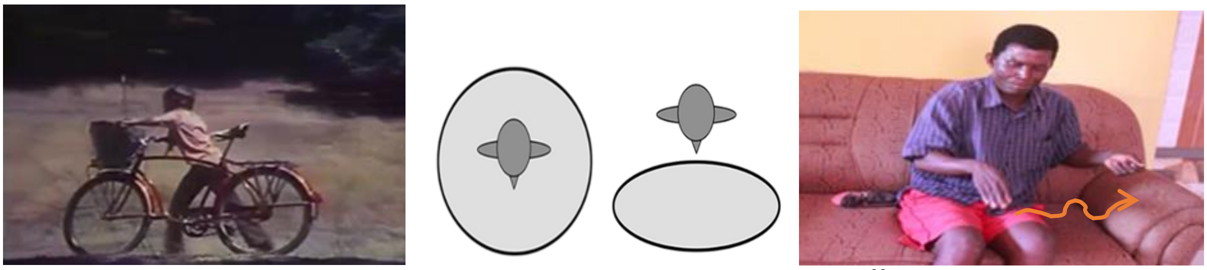
Figure 6.38 Entity handshapes with character perspective

3. *Entity classifiers occur with character-observer perspective (non-prototypical alignment)*

Furthermore, entity classifiers occurred with character-observer perspectives in both GSL and in AdaSL. With this alignment, the signer is not fully in character, neither is the signer fully an observer as both perspectives are blended. Character-observer perspective in general was not popular in both sign languages, and AdaSL showed very little preference as compared to GSL. In all, GSL had 19% (N=27) occurrence in this category and AdaSL had 2% (N=3).



RH: CL_H (eat)
LH: CL_E (boy)
Perspective: character-observer



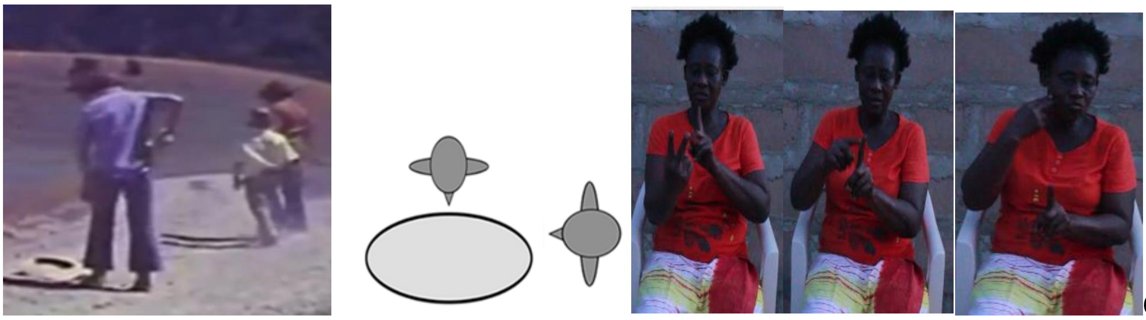
RH: CL_L[98] (boy's leg)
LH: CL_H (boy's hand)
Perspective: character-observer

Figure 6.39 Entity classifiers with character-observer perspective

[98] Limb classifiers were grouped together with entity classifiers in this subsection. However, as explained earlier, this example uses character-observer perspective because the movement of the limb classifier was on the lateral axis.

4. *Entity classifiers with observer-narrator perspective (non-prototypical alignment)*

Entity classifiers also occur with the observer-narrator (fused 3) perspective and this was only used by GSL signers. Out of the total signs that had entity classifiers, 5% (N=7) were found to be in this non-prototypical alignment. An example of this construction type in GSL is seen below in still 3 of Figure 6.40; the lexical sign SEE is simultaneously signed with the entity classifier *boy*. The signer used observer perspective in still 1 by indicating the spatial locations of the three boys; in still 2 signer point to the one boy and in still 3 uses signer uses the lexical sign SEE and the entity classifier (*the third boy saw the hat*).



GSL

RH:	SEE
LH:	CL_E (boy)
Perspective:	observer-narrator

Figure 6.40 Entity classifiers with observer-narrator perspective

The graph in Figure 6.41 summarises the use of entity classifiers/entity handshapes with prototypical and non-prototypical alignments.

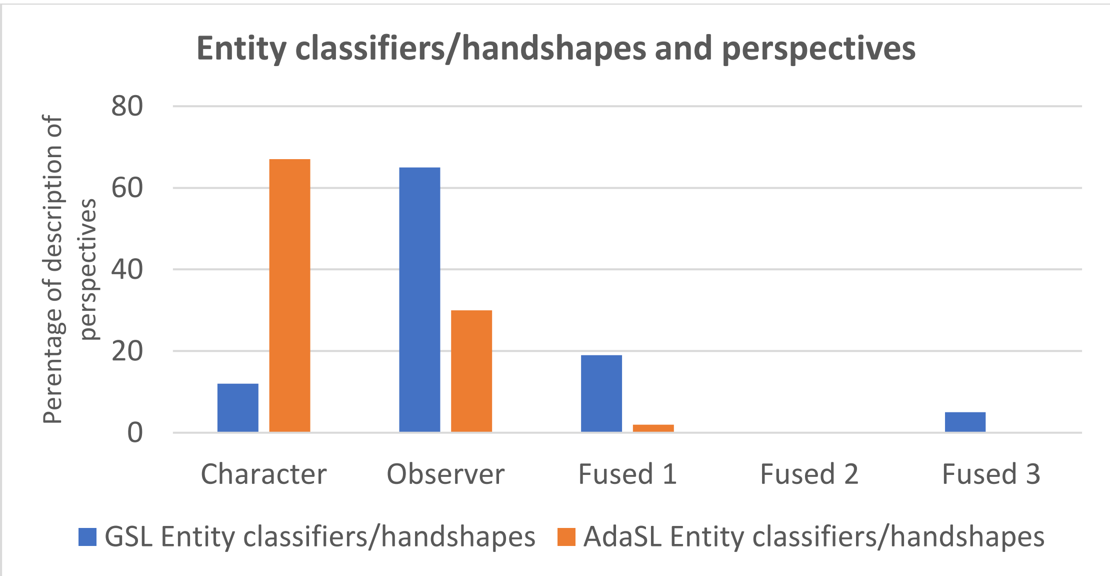


Figure 6.41 Entity classifiers with perspective alignments

6.7 Discussion: Encoding location, motion & action

Several studies have discussed the expression of location, motion and action in sign languages (Perniss, 2007a; 2007c; Galvan & Taub, 2004; Perniss & Özyürek, 2008; Perniss, et al., 2011; Wilcox, 2002; de Vos, 2012) in Europe, America and Asia and the similarity within different sign languages in the expression of location, motion and action is generally attributed to the presence of iconicity and the affordances of space in sign languages. On African sign languages, there has been little research and the most cited example in most literature for the expression of motion in an indigenous sign language in Africa is AdaSL (Nyst, 2004; 2007a). The striking feature of AdaSL in most literature is the absence of entity classifiers expressing motion (Nyst, 2007a). With this view, anyone researching on motion expression in AdaSL least expects to identify the presence of entity classifiers expressing motion event. Unlike AdaSL, research on other indigenous sign languages have indicated the use of entity classifiers for motion events. In Kata Kolok, for example, de Vos noted that an "entity classifier combined with a verb of movement" (de Vos, 2012, p. 178). Comparing the expression of location, motion, and action in the current dissertation to previous literature, we identify more similarity between sign languages in general. There were also language specific differences that were identified between the two languages investigated in this dissertation.

Locative expressions

Strategies for locative expressions in sign languages include classifier and lexical predicates (Perniss, et al., 2015; Eberle, 2013). Specifically, entity classifiers and SASS (which are sometimes added to the category of classifier predicates) have been identified in most sign languages as the preferred strategy for locative expression. In locative expressions, signers have also been identified to provide the relationship between the figure and the ground object (Özyürek, et al., 2010; Eberle, 2013) and this is often done with simultaneous classifier constructions (Perniss, 2007a). However, as noted earlier in this chapter, the expression of locative events in GSL and AdaSL did not strictly conform to the patterns described in earlier literature because the stimulus material for the data elicitation did not conform to what has been used previously (still images as compared to film). The results from GSL and AdaSL show the use of SASS, lexical predicates, classifier predicates (specific to GSL) and pointing (indexing). Classifiers were only used by GSL signers to express location and the expression of figure-ground in locative expressions was only done by GSL signers with entity classifier predicates (*basket on ground*, Figure 6.12) and the lexical sign STAND which was situated in three locations to depict the ground (GSL e.g., in Figure 6.9).

In contrast to research works that used still images for locative descriptions such as DGS and TİD (Perniss, 2007a; Özyürek, et al., 2010), locative constructions in GSL and AdaSL did not align directly to the conventions identified. Notwithstanding that, few of the descriptions of locative expressions identified in the data coincided with the conventions identified in Western sign languages. For example, although the locative scenes in the Pear Story were part of an ongoing event, most signers named the referents before giving spatial information about them (similar to the convention 1 found among Western signers). Further, we identity the use of entity classifier predicates by GSL signers (2 signers) to identify the relevant spatial location. Both sign languages used SASS to express the location of objects. One GSL signer used entity classifiers that depicted the relationship between the figure (basket) and the ground object (floor) as shown in example 2 of Figure 6.12.

In encoding location in event narratives in DGS, Perniss (2007a) identified the predominant use of character perspective (72%) as compared to observer perspective (28%). This finding from Perniss supports what was found for GSL and AdaSL in this dissertation; GSL had 64% character-narrator and AdaSL had 79% character-narrator. However, unlike DGS, observer perspective was not popular among GSL and AdaSL signers. In fact, GSL had 8% use of observer perspective and AdaSL had none. On the other hand, GSL and AdaSL used narrator perspective (GSL 4%; AdaSL 11%) which was not considered in the DGS event narratives. Locative scenes in event narratives therefore contrast with locative scenes in still images; the former is expressed primarily in character perspective and the latter is expressed in observer perspective (based on the present data and as noted for DGS, see Perniss (2007a) on locative scenes expressed with still images). The motivation for signers to use character-related perspectives to encode locative scenes in event narratives for DGS and also for GSL and AdaSL is the fact that the film used for data elicitation present animate characters involved in action and inanimate entities in a location. Thus, the stimuli motivated signers to depict the locative scenes in character perspective. In the Pear Story, the major characters are the man on the tree and the boy on the bicycle. All the other characters support the unfolding of the narrative. Also, all the locative scenes were immediately preceded or followed by dynamic events.

Finally, different sign languages have been found to use indexes or pointing signs to express locations or entities in space (Perniss, 2007a; de Vos, 2012). Indexing or pointing show syntactic locations in sign space or show the locations of physically present items in meaningful spatial locations (Perniss, 2007a). As noted by Perniss, the studies on indexing "do not explicitly specify the use of pointing signs in relation to the use of different perspectives" (Perniss, 2007a, p. 196). In the current work, both GSL and AdaSL signers used indexing to a similar degree (GSL 22%, N=5; AdaSL 21%, N=9) to indicate the location of physically present items in meaningful spatial locations.

Motion expression

Previous research on motion events in ASL identified the "deep influence of iconicity on ASL descriptions of motion events" (Galvan & Taub, 2004, p. 205). In other words, in signed language, iconicity plays a major role in the expression of motion. Motion expression in sign languages has also been shown to rely on classifier and lexical predicates (Perniss, 2007a; 2007c; Wilcox, 2002; Galvan & Taub, 2004). The use of classifier predicates for motion events also aligns with the perspective used. As stated in §6.8, entity classifiers have prototypical alignment with observer perspective and non-prototypical alignment with character and narrator related perspectives. DGS, ASL, TİD, Kata Kolok, BSL, Hong Kong Sign Language (HKSL) and many others have been shown to use entity classifiers for motion expression (Perniss, 2007a; Galvan & Taub, 2004; Özyürek, et al., 2010; de Vos, 2012; Cormier, et al., 2015; Tang & Yang, 2007). It seems the use of entity classifiers for motion is 'generic' to most sign languages. Although Nyst found that AdaSL "uses virtually no entity classifiers in space to express motion" (Nyst, 2007a, p. 196), in the current research, about 4% (N=15) of all AdaSL motion events were signed with entity classifiers expressed in a token space. GSL signers represented 20% (N=76) of the motion events using entity classifiers. GSL signers depicted more motion events with entity classifiers compared to AdaSL signers and the presence of entity classifiers in AdaSL to depict motion events suggests the possibility of the emergence of an entity classifier system in AdaSL.[99]

The results from the current study identified that entity classifiers mostly aligned with observer, character-observer, and observer-narrator perspectives. In DGS, Perniss identified a higher preference for character perspective for motion events (Perniss, 2007a) and a lower preference for observer perspective. This also supports what was identified in the current data for GSL and AdaSL. Character-related perspectives were more preferred in both sign languages as compared to observer-related perspectives.[100] Observer-related perspectives

[99] Although Nyst found that AdaSL "make extensive use of entity depiction, as compared to other sign languages (Nyst, 2007, p. 164), the use of entity classifiers (which also have entity handshapes) were not identified to be used for motion events.

[100] Recall that GSL had 49% (N=200) character-narrator and 15% (N=61) character perspective: AdaSL had 46% (N=196) character-narrator and 17%(N=66) character perspective. GSL had 18% (N=65) preference for observer perspective and AdaSL had only 3% (N=14) observer perspective.

were minimally used by both GSL and AdaSL signers. Although other blends with observer perspective were identified, the proportions were still minimal for GSL and <1% from AdaSL. Comparing DGS with GSL and AdaSL, character perspective seems to be the most preferred for retelling of motion events.

In an analysis of previous work considering the relationship between entity classifiers and intransitive verbs, on one hand, and handling classifiers and transitive verbs, on the other hand, Perniss (2007c, p. 1318) identified that "the expression of motion and location aligns with the use of entity classifiers, while the expression of object manipulation aligns with the use of handling classifiers". In other words, grasping action (depicted with handling classifiers) expressed in character perspective would "require[s] the signer to actually move her own body" (Perniss, 2007c, p. 1319). Handling classifiers for motion events are therefore regarded as non-prototypical alignment and in DGS these can be seen in extended discourse. GSL and AdaSL signers used this non-prototypical alignment (i.e., handling classifiers in motion events) to express motion from loc.$_1$ to loc.$_2$ as expressed in example 1 of Figure 6.16 (holding the handlebars of the bicycle and moving the hands towards specific direction). Although the frequency of use is lower (GSL 12%, N=49, AdaSL 11%, N=44), it is an important finding considering that Nyst (2007a, p. 206) identified that "handle classifier predicates expressing motion are infrequent" in AdaSL. Further, handling classifiers for motion event sometimes coincided with the use of constructed action (CA) where signer literally moves body/torso or the legs to the left or right to the depict the narrative event (see Figure 6.18). Although movement of signer's body is permissible in GSL and AdaSL for expressing motion, in DGS, it is infelicitous "for a signer to actually move her body to indicate a referent's change of location" (Perniss, 2007a, p. 195).

Action representation

Signers used different strategies to depict action including lexical and classifier predicates. Action representation in narrative tasks in different sign languages has relied mainly on character perspective because signers represent the actions and thoughts of another character. In other words, signers reconstruct the action using articulators such as the hands, face, torso, eyes, legs etc.). For instance, BSL signers use constructed action (CA), depicting constructions, or lexical verbs, to represent action (Cormier, et al., 2013). DGS signers were also found to use character perspective to express action (and motion events) in narrative tasks (Perniss, 2007a). For example, to depict the handling of an item, signers use both handling classifiers and lexical items indicating action. Entity classifiers are deemed less suited for action event of the expression of manual activity (Perniss, 2007a) because the entity classifiers are not enough to express action as some part of the referent (like the hands, face, head) are not represented. In the current data, entity classifiers were simultaneously used with other strategies that reinforced the activity of the classifier. For example, in Figure 6.28, entity classifiers were used together with another entity, a handling strategy or a lexical sign. The example, *boy bumped into a stone* was expressed simultaneously as:

RH: STONE (one hand)
LH: CL_E (boy bumped into stone)- action event

In character perspective, the signer is an agent or an experiencer in the action. As seen in the examples in the dissertation, in character perspective, the signer is inherently a character in the signing and the event progresses through the signer's internal viewpoint within a life-sized use of space. The hands of the signer present real hands holding or manipulating things with life-sized spatial projection. Further, the events in the Pear Story prompted the use of the character perspective by signers of both sign languages. Comparing GSL and AdaSL with previous research on action representation, we identify a similar preference for character-related perspectives. On the other hand, when observer perspective is used for an action event, the signer projects the event in the space in front of the body and signer is external to the event which is represented in reduced-sized. In the few instances where observer-related perspectives were used by GSL and AdaSL signers, a simultaneous blend of entity classifiers and other strategies (such as handling or lexical signs) were used.

6.8 Chapter summary

This chapter compared the representation of location, motion, and action in GSL and AdaSL. The following questions guided the discussions in this chapter; (1) How do GSL and AdaSL signers encode information about location, motion, and action? (2) Do both sign languages use classifier predicates? (3) What other devices are used? (4) Does the amount of use (preference for use) of different devices differ? The chapter begun by defining the different perspectives signers used to express location, motion, and action and six different perspectives were identified: character, observer, narrator, character-narrator, character-observer, and observer-narrator.

The chapter identified the preference for character-narrator perspective for location by both GSL and AdaSL signers. The most preferred strategies for location depiction were found to be lexical items, SASSes and indexing. Although few static scenic representations were given in both sign languages, 5 patterns on location representation were presented (1) referents are named; (2) lexical signs in location; (3) referents are placed in space by indexing; (4) signer as character (or character-narrator) perspective; and (5) use of entity classifiers to code information about referent in observer perspective (specific to GSL). The major difference between the two sign languages in the representation of location is the use of entity classifiers depicting spatial locations found in GSL but absent in AdaSL.

In the representation of motion, both sign languages showed a high preference for character-narrator and narrator perspectives. Further, the chapter identified devices that are employed by signers of GSL and AdaSL to depict spatial information. These devices include handling classifiers, SASS, entity classifiers, lexical items, directional verbs/directionals and CA. All these were employed in different proportions by GSL and AdaSL signers. GSL signers demonstrated a preference for lexical items, directional verbs/directional (less than AdaSL) and entity classifiers. It was identified that lexical items and directional verbs/directionals were the most preferred strategies by AdaSL signers although a greater preference for directional verbs/directionals was identified. One major difference seen between the two sign languages was the greater preference for entity classifiers by GSL as compared to AdaSL signers. Further, the presence of entity classifiers for motion events in AdaSL suggests its emergence in AdaSL.[101]

For the representation of action events, similar strategies across both sign languages were identified. The data indicated that character and character-narrator perspectives were used mostly by signers of both sign languages. For the strategies, handling classifiers and lexical items were the most used across both sign languages. The major difference in this category is the preference for observer related perspectives which was seen mostly in GSL. However, there were traces of observer related perspectives and entity classifiers which again suggest their emergence in AdaSL.

The analysis in this chapter has demonstrated similarities and differences in GSL and AdaSL in narrative tasks. Although iconicity is the underlying feature in the depiction of spatial information, we see different ways in which signers of both sign languages use the resources available to them to depict iconic structures showing dynamic events or static scenes. Further, the depiction of dynamic events and static scenes in GSL and AdaSL seems to be influenced by the affordance to express the information as iconic as possible without losing information, i.e., the event being depicted. In other to achieve this, signers used both

[101] This will be discussed in chapter 9.

classifier and lexical predicates to succinctly give information about the event. In some scenes, signers used lexical predicates to depict location, motion, and action; and in other scenes, classifier predicated were used. A blend of both classifier and lexical predicates were used by signers in other occasions. Chapter 7 shall specifically consider these blends.

Further, with regards to the iconic strategies and perspectives used, we see a general preference for handling classifiers/CA/SASS and character/character-narrator perspectives which situate the signer as an agent in the signing event. The preference for character-mediated events is seen in static scene depictions where signers locate entities using their bodies as the referent points.

Finally, the analysis in this chapter has demonstrated the differences and similarities in GSL and AdaSL in the descriptive task given. The major differences between the two sign languages include the higher preference for entity classifiers and observer perspective for motion event by GSL signers as compared to AdaSL signers. Further, AdaSL signers used more directionals to express motion event as compared to GSL. However, a very important finding of this research is the presence of entity classifiers for motion event by AdaSL. This finding is transformational to the linguistics study of AdaSL as the possible emergence of entity classifiers for motion event in AdaSL may be as a result of either internal factors (data collection stimulus materials) or external factors (language contact and diachronic change). Interestingly, AdaSL signers used entity classifiers (mostly) for motion seen from a distance (*riding bicycle across field*). Chapter 9 will explore these internal and external factors and how these might have influenced the presence of entity classifiers in AdaSL in more detail.

Although this chapter gives extensive treatment on the topic of spatial representation, further research on static scene depictions with static props or images is considered relevant for a better comparison of static scene depictions in GSL and AdaSL. The next chapter presents a detailed analysis of events in GSL and AdaSL with a focus on simultaneous constructions. The chapter seeks to analyse in detail the perspectives for simultaneous constructions, the strategies used, the number of events represented, and the number of referents represented.

Chapter 7

Simultaneous constructions in GSL and AdaSL

7.0 Introduction

One of the modality differences between signed and spoken languages is the presence of a complex articulatory system in sign languages that uses a range of articulators to express linguistic information including the hands, torso, eye gaze, mouth, and facial actions (Vermeerbergen, et al., 2007). The hands, the active articulators for sign languages, can be manipulated to do two different things at the same time. In addition to the hands, the body and other nonmanual elements can combine with the manual parameters to simultaneously represent information. In spoken languages, the decision to say two things at the same time using the same oral articulators may be out of the question. However, the addition of gestures and other so-called paralinguistic features can give extra information in addition to speech; for example, *shrugging the shoulders and saying NO at the same time*. The ability to simultaneously represent independent information (related or unrelated) is a feature of the visual-gestural modality using manual parameters and other nonmanual parameters available to signers. That is, simultaneity is inherent to communication in both spoken and signed languages, but there are modality restrictions on what can be done in speech as compared to sign.

Iconic constructions are easier to store and retrieve because “the code is maximally isomorphic to the experience” (Givón, 1985, p. 188). Simultaneity can be motivated by iconicity (but not always); that is, the meaning mappings have a resemblance relationship between the linguistic code and the experience.[102] In signed language, “the availability of multiple independent articulators makes possible the simultaneous representation of independent meaningful elements” (Perniss, 2007b, p. 27). One interpretation is that when signers use simultaneous constructions, they depict the event as informatively as possible using structures that represent the event succinctly without losing information (however, this is not a necessary feature of simultaneous constructions).

In sign language structure, simultaneity has been identified in bimanual signs (two autonomous hands representing two different signs, also known as manual simultaneity); lexical signs with the addition of mouthings that are distinct from the meanings of the lexical signs (manual-oral simultaneity) and the simultaneous use of the other (manual and

[102] Not all simultaneous constructions are iconic. Some constructions use lexical predicates that do not have form-meaning resemblance mappings.

nonmanual) articulators (Vermeerbergen, et al., 2007). In this dissertation, simultaneity and simultaneous constructions will refer to the same phenomenon. Simultaneous constructions (SC) have been defined in the literature in relationship to linguistic parameters like phonology, morphology, syntax etc. (Vermeerbergen, et al., 2007). For this dissertation, SC is defined as sign constructions that combine two or more meanings at the same time. These signs could be lexical signs, constructed actions (CA), classifiers (handling and entity), nonmanual segments (excluding oral segments),[103] or a combination of one of these at the same time. The focus of this chapter is to identify the following:

1. What SCs are used to express location, motion, and action in GSL and AdaSL?
2. How many events and referents are represented in SC?
3. What devices are used?
4. Does the amount of use (preference for use) of different devices differ?

The rest of the chapter is organised as follows: §7.1 gives a brief background to simultaneous constructions in sign languages. §7.2 presents the relevant coding and data analysis for this chapter. §7.3 gives an overview of the SCs found in GSL and AdaSL. §7.4 presents a quantitative analysis of the SCs expressing location, motion, and action in GSL and AdaSL. §7.5 gives a quantitative analysis of event representation with SCs in GSL and AdaSL. §7.6 presents the number of referents represented in SCs in GSL and AdaSL. §7.7 gives a summary of the types of SCs found in GSL and AdaSL. Finally, §7.8 presents the summary and discussion of the chapter.

7.1 Simultaneous constructions in sign languages

Simultaneous constructions (SCs) have been documented in many sign languages of the world (Vermeerbergen, et al., 2007) and these are "produced in more than one articulatory channel, whereby each channel bears distinct and independent meaning units, which stand in some relationship to each other" (Perniss, 2007b, p. 27). SCs in sign languages can be iconic representations of events giving specific information about the entity or entities (as an agent, location, manner, path, recipient, experiencer etc.) and these are the SCs this chapter seeks to discuss. SCs are syntactic representations of real-life events and can be motivated by iconicity. When motivated by iconicity, the linguistic structure represent reality and this

[103] The dissertation will draw examples from manual simultaneity and manual & nonmanual simultaneity. However, the dissertation will not consider manual-oral simultaneity in either sign languages. Nyst discusses manual-oral simultaneity in AdaSL (Nyst, 2007b).

support the iconic motivation that states that "linguistic structure may reflect the structure of the physical world as human beings perceive it" (Tai, 1993, p. 153). Studies on simultaneous constructions in sign languages have indicated the following functions that were summarised in Perniss (2007b, p. 28);

a. referent representation on both hands to express locative information (in the depiction of the spatial relationship between two referents).

b. referent representation on both hands to express the temporal and locative simultaneity of events (in the depiction of action or interaction between referents).

c. the expression of temporal simultaneity of events or states (aspectual information).

d. the hold of a topic on one hand while the other hand signs related information (topic – comment structure).

e. the hold of an enumeration morpheme on one hand while the other hand signs one or more related signs.

f. the hold of an index sign on one hand while the other hand signs one or more related signs.

The examples in this chapter will focus more on features (a), (b), (c) and (f) because (d) and (e) are discourse structuring functions. Further, (f) in this chapter is a SC of an index sign and another sign (lexical or classifier predicates) whereby the index signs are topographic and show where the referent is located. Features (a), (b), (c) and (f) are exemplified in GSL and AdaSL in Figure 7.1. and these examples demonstrate the sharp contrast between the visual modality and the oral modality in the representation of simultaneous constructions.

a. Referent representation on both hands to express locative information (in the depiction of the spatial relationship between two referents)


GSL


AdaSL

	GSL	AdaSL
RH:	CL_E (two boys)	CL_E (boy)
LH:	CL_E (one boy)	CL_E (girl)
	Two boys ahead, one boy behind	*Boy and Girl ride towards each other*

Simultaneous referent representation showing spatial information

b. Referent representation on both hands to express the temporal and locative simultaneity of events (in the depiction of action or interaction between referents)


GSL

RH: WATCH
LH: WATCH
Mov. HS moves towards each other
Boy and girl watch each other as they move


GSL

WATCH
WATCH
HS moves towards each other
Boy and Girl watch each other as they move

Simultaneous referents representation showing temporal and locative events

c. The expression of temporal simultaneity of events or states (aspectual information)


GSL

RH: CL_E (man)
LH: CL_H (drag goat)
Man drags animal along


AdaSL

CL_E (boy moves away)
CL_H (hold handlebars of bicycle)
Boy riding bicycle moves away


GSL

RH: CL_E (boy along path)
LH: RIDE (hold)
Boy riding bicycle appears from the right


AdaSL

GO (directional)
CL_H (ride-hold)
Person riding bicycle moves in a path

Simultaneous expression of temporal events or states

f. The hold of an index sign on one hand while the other hand signs one or more related signs.


GSL

RH: HEAR | DEAF
LH: index$_3$ (ref. boy loc.$_{down}$); | index$_3$ (ref. man loc.$_{up}$)
Can't hear boy below | *person (man) up there is deaf*

AdaSL

RH: index$_3$ (ref. Pear loc.$_{up}$) | index$_3$ (ref. man loc.up)
LH: CL$_E$ (Pear) | CL$_E$ (Pear)
Pear hanging on tree | *man picking fruits is up on ladder*

Simultaneous construction of an index sign and another related signs

Figure 7.1 Examples of manual SCs in GSL and AdaSL

All the above examples show SCs that rely on both hands representing two different things or actions at the same time. However, as noted by many researchers working on simultaneity in sign languages, the body and all that it entails (face, torso, mouth etc.) are taken as independent articulators and can co-occur with the hands to present SCs (Vermeerbergen, et al., 2007). Specific examples of this kind of SCs in a Western sign language (DGS) and an African (AdaSL) are presented by Perniss and Nyst, respectively (Perniss, 2007b; Nyst, 2007b). For example, Nyst's (2007b) research on SCs in AdaSL stated that both manual and oral elements are used in simultaneous constructions in AdaSL.

The summary of the features of SCs presented by Perniss (2007b) and exemplified above with GSL and AdaSL indicates the shared features of SCs used by signers of GSL and AdaSL. This chapter presents SCs expressing location, motion and action and focuses on events and referents representations. Event representation focuses on the number of events and event components that are represented in the SC; referent representation focuses on the number of referents represented in the SC (and whether referents represented in the SC are animate or inanimate). The discussion on SCs in this chapter presents different signing perspectives. As identified in chapter 6, the choice of perspective(s) influences a signer's choice of strategies used to represent events. For instance, observer perspective aligns with entity classifiers in a prototypical alignment, and with handling classifiers in non-prototypical alignment. For example, when entity classifiers are used together with handling classifiers in character-observer perspective, we identify a SC. Again, the conceptualization of the role of the signer influences the selection of iconic (or non-iconic) devices for the SC. In character perspective, the signer takes on an agentive role as an active participant in the event representation with his or her body performing actions that are related to the event being narrated or described. In the observer perspective, the signer is external to the events and entity classifier handshapes may be used to represent agentive functions like moving, standing, hopping etc. but the signer's body is separated from the signing event. On the other hand, a string of lexical items can be used simultaneously to narrate the event in narrator perspective. In SCs, signers use one or more perspectives to present more than one sign/action at the same time. For example, two events occurring simultaneously (e.g. *holding Pear and hitting the ball on the paddle*); two referents indicated by the handshapes (e.g. two entity classifiers referring to *boy and girl riding towards each other*) or two referents indicated by manual and nonmanual features (e.g. *man watches three boys who pass in front of him* expressed with CA and entity classifier) etc.

7.2 Coding and data analysis

The Pear Story was used to elicit data for this section and the task was performed by all GSL (N=10) and AdaSL (N=10) signers. The movie was divided into six vignettes (about 1 minute each) to facilitate retelling and to deal with memory limitations. The six divisions were named Pear 1, Pear 2, Pear 3, Pear 4, Pear 5, and Pear 6 (see chapter 4 for details).

7.2.1 Summary of data

In total, 120 video vignettes of the Pear Story were coded for GSL and AdaSL signers. The 6 vignettes of the Pear Story comprised of videos with both dynamic and static events with different levels of complexity. Relevant for this chapter are simultaneous representations of location, motion, and action. SCs coded for this chapter are bimanual SCs and manual & nonmanual SCs.[104]

Table 7.1 Tokens and SCs from the data

Pear 1-6	**GSL (n=10)**	**AdaSL (n=10)**
All sign tokens	2177	1888
All events (Location, Motion, Action)	1185	1204
All SC	330	143
Event-based SC (Location, Motion, Action)	**278**	**119**
Location SC	**3**	**0**

[104] Examples will focus more on the bimanual signs for the comparison. Both sign languages used more bimanual SCs as compared to manual and nonmanual SCs.

Motion SC	**90**	**30**
Action SC	**185**	**89**
Other SC	52	24

7.2.2 Data coding

Responses from signers were coded in ELAN (Wittenburg, et al., 2006) to identify the simultaneous constructions in GSL and AdaSL. The data was coded for constructions involving manual and/or nonmanual articulators that presented two or more independent pieces of information (event(s) and/or referent(s)). Therefore, lexical two-handed signs where the hands do not convey information independently were not considered as SC. In the same way, one-handed signs with facial and body movements that presented different information were coded as simultaneous constructions. Signing perspectives were also considered in the analysis. The relevant elements coded for this chapter are:[105]

1. Gloss- signs identified as lexical (verb & noun), number, classifier (entity, handling & limb), indexing (pointing signs), SASS.
2. Event component- dynamic scenes and static scenes (path, entity-path, entity-path-manner, entity-ground).
3. Perspectives- viewpoint of signers, character, observer, narrator, and simultaneous blends.
4. All events (signs depicting location, motion, and action)
5. All SC in the data (location, motion, action and other)

7.3 Simultaneous Constructions in GSL and AdaSL

The total number of SCs used by both GSL and AdaSL signers is as follows: GSL signers used a total of 15% (N=330) and AdaSL signers used a total of 8% (N=143) as shown in Figure 7.2. SC in both languages expressed information about action and motion and only one signer used SC depicting information about location in GSL. There were other narrative descriptions with SCs that did not depict information on location, motion, or action in both sign languages.[106] These were classified as *other* in the analysis. As stated in chapter 6, there

[105] Chapter 6, §6.2.2 gives detailed description of some of these categories.

[106] Or presented information that was not directly represented in the Pear Story video. E.g. *Can't hear boy below*; *Person (man) up there is deaf* although depict locative information is not directly shown in the Pear Story narrative but was the interpretation of a signer.

were few representations of location in the narrative tasks in both sign languages and signers rarely signed locative scenes as compared to motion and action scenes. SCs were counted in relation to all sign tokens and in relation to all events. The total number of SCs produced by both sign languages were further categorised according to the information represented. Location SC expressed locative information, Motion SC expressed motion events, Action SC expressed action events and Other combined those SC that expressed narrative information (not necessarily focused on location, motion, or action). Action SC was the primary category used by signers of both sign languages as compared to the other categories identified. In all, there was a greater use of SC by GSL signers as compared to AdaSL signers. The total number of SCs according to the total token of signs per each sign language (15% for GSL and 8% for AdaSL) was calculated by taking all the sign tokens individually (each lexical item).

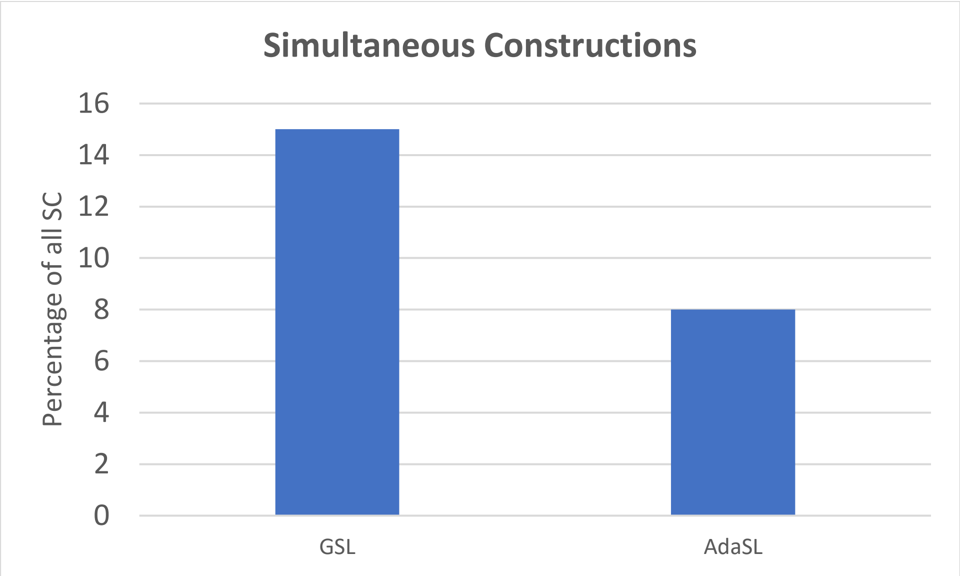


Figure 7.2 Total percentage of simultaneous constructions

However, since the focus of this chapter is on event representation (Location, Motion and Action), all sign tokens were further categorised into events and SC that do not give information on events were taken out (see Figure 7.3).

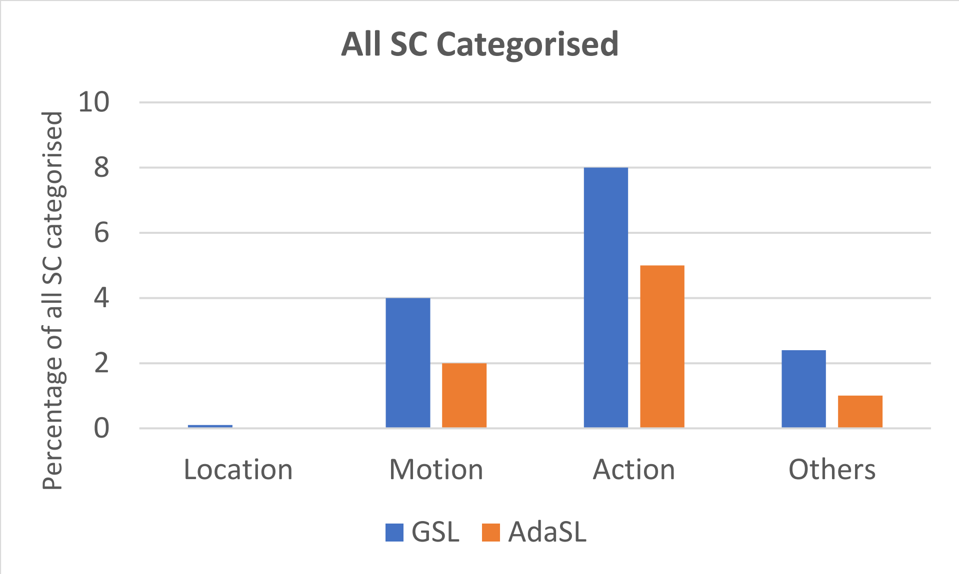


Figure 7.3 Total percentage of SCs by type (Events + others)

7.3.1 Other Simultaneous constructions

The category named *other* is first discussed and exemplified to show the reader what did not count as event-based SCs. Signers of both sign languages used other SCs that presented narrative information other than location, motion, and action. These were mainly on other information pertaining to description and other extra information signers gave about the videos. These SCs were separated from the SCs giving information on location, motion, and action. Strategies (predicate types and manual/nonmanual) that were used to represent *other* SC are same as those used to represent SCs depicting motion and action. However, entity classifiers and the observer perspectives were not used to represent SC that were categorised as *other*. The use of lexical signs, SASS and indexing (pointing) were dominant in the category coded as *other*. For example, in Figure 7.4, two lexical signs are used simultaneously in the constructions: BEAUTIFUL + WATCH, ONE+ PEAR, LIKE + BICYCLE.

One feature identified from the category classified as *other SC* is the deletion of one sign segment in two-handed signs. For instance, the second hand for the sign PEAR assimilated to the sign ONE; BICYCLE had just one handshape instead of two hands. SASS *basket* used by the GSL signer got one hand deleted as the other hand simultaneously signed ORANGE. Pointing or indexing combined with lexical items and other indexes. For instance, a GSL signer signed HEAR + index (hear person below) and an AdaSL signer signed index_1 $+\text{index}_2$ (pointing to herself and a second person). The *other* category highlighted the discourse and information structure function of the SCs. Important to note is that the SCs analysed in this chapter are discourse-based and as such the use of the *other* category reinforced or highlighted signers quest to be informative and precise in their description of the events in the Pear Story (this can be said of the event-based SCs). GSL had a little over 2% (N=52) and AdaSL had 1% (N=24) of these SCs that were categorised as *other*. Figure 7.4 gives examples of SCs coded as *other*.




GSL

RH: ORANGE — HEAR — BEAUTIFUL — TREE + index$_3$
LH: basket (SASS) — index$_3$ — WATCH — TREE
Orange in the basket — *Can't hear boy below* — *Watch beautiful girl* — *Point to the man on the tree*



AdaSL

RH: LIKE — ONE — index$_1$
LH: BICYCLE — PEAR — index$_2$
The boy on the bicycle like (the pear) — *One (basket of) pear* — *(The pear they are holding are mine)*

Figure 7.4 Other SCs used by signers

7.4 Simultaneous Constructions expressing Location, Action and Motion

SCs that gave information on location, motion and action were referred to as event-based SCs. These SCs expressed information on location: static scene depiction; motion: movement from one location to the other, and action: agentive action. In the following subsections, event-based SCs are discussed, and examples are presented from the data to show how GSL and AdaSL signers depicted such SCs. Further, the section also considers the percentages of location, motion, and action SCs used in both sign languages in event depiction. The event-based SC were categorised based on the number of events represented in the data. As stated earlier, events here refer to signs/tokens that gave information on location, motion, and action. The graphs in Figures 7.5 and 7.6 give the total percentage of all event-based SCs used by signers of both sign languages and the percentages for location, motion, and action. Whereas the graphs in Figures 7.2 and 7.3 were calculated from the total sign tokens taken from the sign languages, the proportions for the event-based SCs were calculated from the total of all event-based tokens (see Table 7.1).

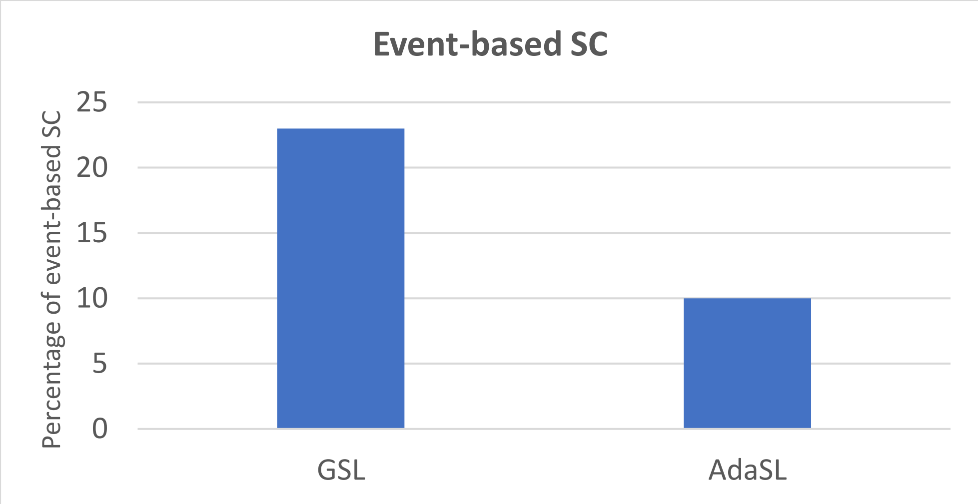


Figure 7.5 Total percentage of event-based SCs

Categorising SCs based on event-based signs, GSL signers had a total of 23% (N=278) of SC use whereas AdaSL signer had 10% (117) SCs, as shown in Figure 7.5. Out of these percentages, the following categories were separated out from all the event-based SC tokens. This is represented by Figure 7.6 below;[107]

1. Location- GSL <1% (N=3), AdaSL none
2. Motion- GSL 7 % (N=90), AdaSL 3% (N=30)
3. Action-GSL 16% (N=185), AdaSL 7% (N=89)

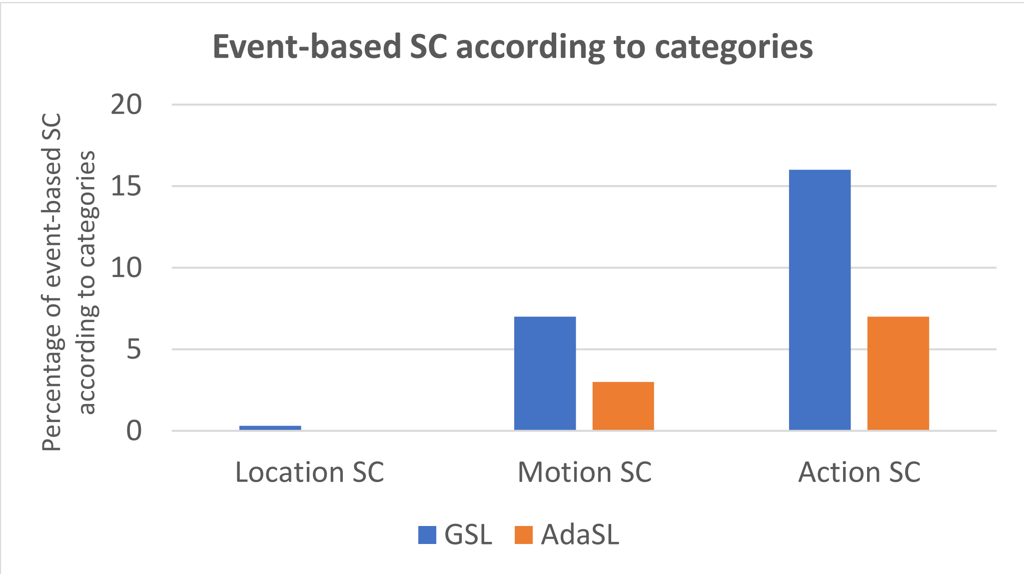


Figure 7.6 SC in GSL and AdaSL according to event-based representation

Finally, the proportion of use of SCs for each event type was compared between the two languages, based on the total amount of SC use. From this comparison, we can identify

[107] All proportions were rounded to the nearest figure.

that signers of GSL and AdaSL were similar in their relative proportion of use of motion and action SC's as seen in Figure. 7.7.

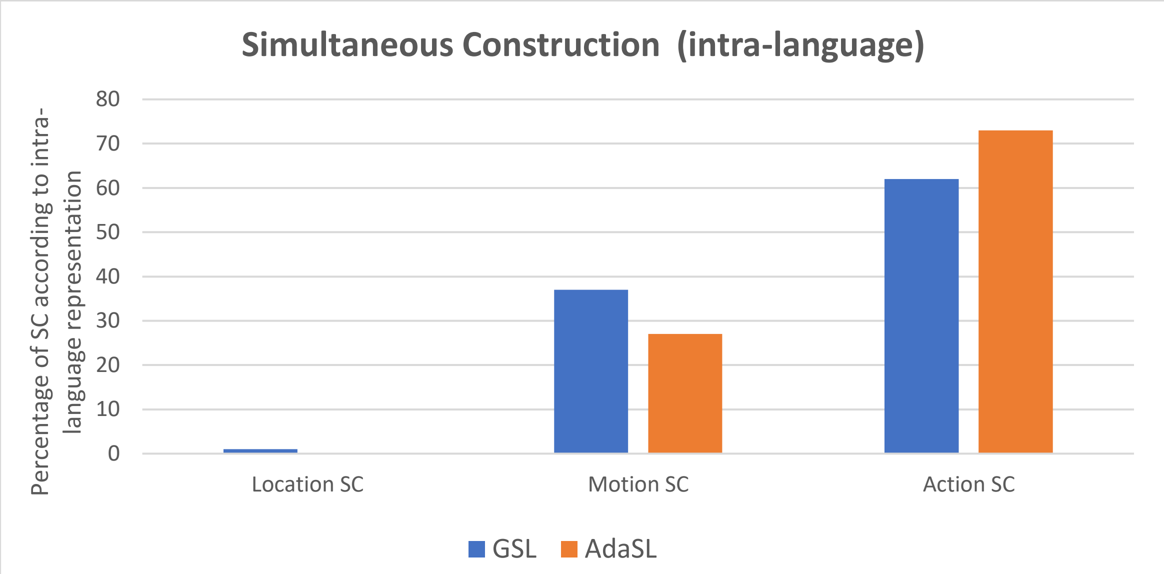


Figure 7.7 Percentage of location, motion, and action SCs used in GSL and AdaSL

Whereas the comparison between SCs in relation to event-based representation showed a vast difference between GSL and AdaSL, intra-language representation of SC showed similarities in motion and action SC representation. Again, the intra-language comparison also presented similarities and differences in terms of the proportion of the SC types used in the two sign languages. On the whole (Figure 7.7), GSL signers used 37% (N=90) SC to depict motion and 62% (N=185) SC for action and 1% (N=3) for location. AdaSL signers on the other hand used 27% (N=30) motion SC and 73% (N=89) action SC. Only one signers used location SC in GSL and as such not enough to justify it as a point of difference between GSL and AdaSL. Both sign languages showed a preference for SC depicting action events as compared to SC depicting motion events. GSL showed a greater numerical preference in their use of motion SCs in comparison to AdaSL. On the other hand, AdaSL signers showed a greater preference for action SCs in comparison to GSL.

7.4.1 Perspectives for Simultaneous Constructions

GSL signers used all the six different perspectives identified in chapter 6 to represent SCs. AdaSL signers depicted SCs in four of the perspectives listed in chapter 6 but no token of SC in narrator and observer-narrator was identified from the AdaSL data. Character-related perspectives were the most used and this was particularly expected as the representation of motion and action in both sign languages as seen in chapter 6 was found to use a high proportion of character-related perspectives. Both GSL and AdaSL signers had a similar proportion of character (GSL 42%, N=124; AdaSL 43%, N=58). AdaSL had a higher preference for character-narrator (48%, N=48) as compared to GSL (33%, N=96). Both sign languages used a fair amount of observer perspectives (GSL 10%, N=26; AdaSL 8%, N=11). Narrator perspective was only used 2% (N=4) by GSL signers and not recorded in AdaSL. Character-observer perspective was mostly used by GSL (12%, N=24) as compared to AdaSL (1%, N=3). The major difference in the perspectives for SC is the preference for narrator, character-observer, and observer-narrator perspectives.[108] Whereas the character-observer was mostly used by GSL signers as compared to AdaSL signers, the narrator and observer-narrator was not used by AdaSL signers at all. Beside the narrator, character-observer and observer-narrator perspectives, the preference for other perspectives looks quite similar overall for both GSL and AdaSL.

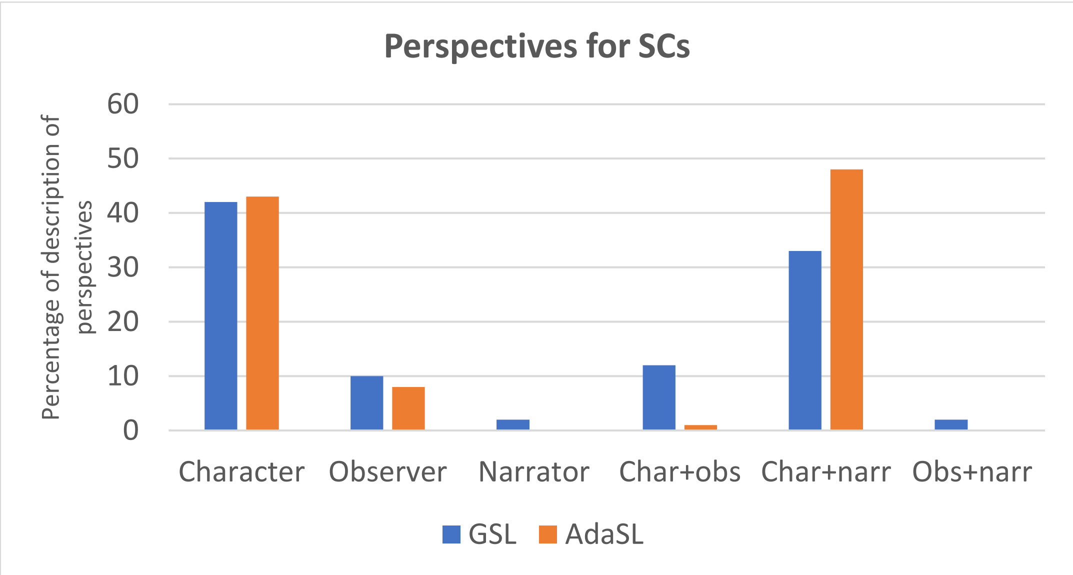


Figure 7.8 Perspectives used in simultaneous constructions

7.4.2 Simultaneous constructions expressing Location

Signers of both sign languages barely depicted locative scenes. SCs depicting location were rarely used and only a single signer was recorded in GSL to have expressed location with SC (<1%, N=3). The GSL example below was depicted in observer perspective.

 GSL

[108] Important to note is that observer-narrator was barely used by GSL signers.

RH:	basket (SASS)	CL_E (basket)	CL_E (basket)	CL_E (basket)
LH:	basket (SASS)	CL_E (ground)	CL_E (ground)	CL_E (ground)
Perspective:		observer	observer	observer
		Three baskets arranged side by side on the ground		

Figure 7.9 SC depicting location in GSL

7.4.3 Simultaneous constructions of Motion Events

SCs depicting motion events were used by signers of both GSL and AdaSL. About 37% (N=90) of event SCs in GSL depicted motion events and 27% (N=30) of the event SCs in AdaSL depicted motion events (see Figure 7.7). Overall, GSL signers showed a greater preference of SC for motion events as compared AdaSL signers. Motion events were represented in character and observer related perspectives in both sign languages. Strategies for SCs depicting motion events included the use of entity classifiers, handling classifiers, lexical signs, and a combination of these.

As identified in chapter 6, the use of entity classifiers for motion events was not limited to GSL; signers of AdaSL also used entity classifiers to depict motion events with SCs. Both sign languages used the upright entity classifiers for person depiction and some signers of GSL also used the two-legged entity classifier. For instance, in Figure 7.10, the GSL signer uses two-legged entity classifiers whereas the AdaSL signer uses the upright entity classifier. Handling classifiers depicting motion event SCs typically aligned with character related perspectives. In Figure 7.11, both signers depict the boy on the bicycle with both entity and handling classifiers: an upright entity classifier that moves from loc.$_1$ to loc.$_2$ whereas the left hand holds the bicycle. In Figure 7.12, signers used lexical signs (and handling classifiers) to represent the motion event. The GSL signer signs WATCH on both hands and the hands move closer to each other representing the boy and girls approaching each other. On the other hand, the AdaSL uses the lexical sign GO (that moves from loc.$_1$ to loc.$_2$) simultaneously with the handling classifier (as the boy holding the bicycle). Figure 7.11 and the AdaSL still in Figure 7.12 represent the same motion event with SCs and different iconic strategies (entity classifiers and handling classifiers/ directionals and handling classifiers). There was just a single depiction of a motion event with limb and handling classifiers by an AdaSL signer represented in Figure 7.13 (where the limb classifier represents the limping leg and the handling classifier represents the hand holding the bicycle).

 *Boy and girl ride towards each other*

 GSL  AdaSL

	GSL	AdaSL
RH:	$CL_{\text{two-legged entity classifier}}$ (boy)	$CL_{\text{upright entity classifier}}$ (boy)
LH:	$CL_{\text{two-legged entity classifier}}$ (girl)	$CL_{\text{upright entity classifier}}$ (girl)
Perspective:	observer	observer

Figure 7.10 SC depicting motion events with entity classifiers

 *Boy on the bicycle moves away*

 GSL  AdaSL

	GSL	AdaSL
RH:	CL_E (boy)	CL_E (boy)
LH:	CL_H (hold bicycle)	CL_H (hold bicycle)
Perspective:	character-observer	character[109]

Figure 7.11 SC depicting motion events with entity and handling classifiers

[109] Whereas the axis of motion of the entity classifier for the GSL signer typically aligns with an observer spatial representation, the axis of motion for the AdaSL signer moves from the signer on the sagittal axis in a character event space.



GSL

RH: SEE/WATCH
LH: SEE /WATCH
Perspective: character-narrator
Boy and girl watch each other as they move



AdaSL

RH: GO (directional)
LH: CL_H (hold bicycle)
Perspective: character-narrator
Boy on the bicycle move away

Figure.7.12 SC depicting motion events with lexical items (narrator) and character perspective



AdaSL

RH: CL_L (limping leg, limb CL)
LH: CL_H (holds bicycle- character)
Perspective: character-observer
Boy holding the bicycle limps as he moves along

Figure 7.13 SC depicting motion events with limb and handling classifiers

7.4.4 Simultaneous constructions of Action Events

GSL and AdaSL both used SCs depicting action information. Out of the total event-based SCs, GSL signers had about 62% (N=185) SCs for action representation and AdaSL signers had 73% (N=89) for action representation (see Figure 7.7). We identify that AdaSL show a greater preference for the use of SCs depicting action event as compared to GSL.[110] Action

[110] Remember that numerically, GSL has more SC tokens recorded than AdaSL.

SCs used strategies like entity and handling classifiers, lexical items, and a combination of these. Action SCs were mostly in character perspective, character-observer perspective, and character-narrator perspective. Only two instances of observer perspective demonstrating action were found in AdaSL data (Pear 4, signers signed [CL_E boy hit CL_E girl] instead of boy hit stone). GSL had limited use of observer perspective depicting: 28 instances with 4 of the signers using it only once.[111] The very limited representation of action with observer perspective implies the maximal use of the signer's body for iconic representation of action events. For instance, in most depictions in which signers used entity classifiers in action SC, signers' bodies were also involved in the action representation.

In Figure 7.14,[112] the GSL signer in the first example uses entity CL (boy), lexical sign (stone) and shifts his torso to demonstrate that the boy (riding the bicycle) turned around and bumped into a stone. This simultaneously represents both the boy's turning around and bumping into the stone. This scene was coded as action because of the action of the bicycle hitting the stone and the turning around. The example uses both observer-narrator and character perspectives (multiple blend). Similarly, the other examples in Figure 7.14 presents two predicates with one predicate performing an agentive action (e.g., eating pear or lifting basket) and the other pointing to the agent (CL boy) or the patient (CL bicycle) in character-observer perspective.

On the other hand, when signers are in full character perspective, constructed actions are used to represent the action event in signer's viewpoint as a character internal to the event. In Figure 7.15, both GSL and AdaSL signers take on the role of the boy hitting the ball on the paddle and holding/eating the fruit. Interesting to note is that although the signers in Figure 7.15 are in character perspective, different iconic strategies are used to represent hitting the ball with the paddle (handling/instrument).[113] The examples in Figure 7.16 combines lexical items and handling classifiers to show that the man on the tree holds the pear fruit.

[111] Comparing GSL signers' use of observer perspective (28 instances) to character (128 instances) and character-narrator (100 instances), the preference for observer is limited. As noted, the nature of the Pear Story motivated the use of character-related perspectives as compared to observer-related perspectives.
[112] Figure 7.14 uses a multiple blend with each encoding strategy (Lexical sign, entity classifier, CA) contributing different information regarding the actions of looking back and hitting a stone accidentally.
[113] The instrument strategy uses an entity handshape. Chapter 5 gives more elaboration on this.

GSL

RH: STONE (one hand instead of two)
LH: CL$_{E}$ (boy)
Perspective 1: observer-narrator
Perspective 2: character (shift torso to depict turning around)

Boy on bicycle bumped into a stone

GSL

RH: CL$_{H}$ (eat)
LH: CL$_{E}$ (boy)
Perspective: character-observer

Boy eats pear

AdaSL

RH: CL$_{H}$ (hold basket)
LH: CL$_{E}$ (bicycle)
Perspective: character-observer

(Boy) put basket on bicycle

Figure 7.14 SC Depicting action events with entity classifiers, lexical items, and handling classifiers in character-narrator/character-observer perspectives

 GSL  AdaSL

	GSL	AdaSL
RH:	CL_H (hold fruit)	CL_E (hit ball on paddle)
LH:	CL_H (hit ball on paddle)	CL_H (eat fruit-holding)
Perspective:	character	character
	Boy holds fruit and hit ball on paddle	*Boy holds/eat fruit and hit ball on paddle*

Figure 7.15 SC depicting action event with classifiers in character perspective

 GSL  AdaSL

	GSL	AdaSL
RH:	FRUIT	MAN
LH:	CL_H (hold fruit)	CL_H (holds fruit)
Perspective:	character-narrator	character-narrator
	(Man) holds fruit	*Man holds fruit*

Figure 7.16 SC depicting action with lexical items and handling classifier

7.5 Event representation with SCs

SCs in sign languages represent events and these could either be one event or two individual events represented simultaneously. For example, in Figure 7.15, the signers represented two simultaneous events of holding/eating fruit and hitting the ball on the paddle, whereas in Figure 7.11 we see a single event of boy riding a bicycle split into entity classifier “boy” and handling classifier “holding the bicycle handlebar”. In this section, the focus is on identifying the number of events represented by the SCs in both sign languages. When the SC refers to one event, aspects of the same event is represented simultaneously. However, when SC refer to two events, the signer depicts two separate action events using the hands or other nonmanual features or both. Signers of GSL and AdaSL used SCs depicting both single and dual events. Figure 7.17 gives the total percentage of event types (one or two) used by signers in representing event-based SC. The next subsections of §7.5 will discuss one event and two events SC and give examples from GSL and AdaSL.

As identified in Figure 7.5, GSL signers had a total of 23% (N=278) SCs and AdaSL signers had 10% (N=119) SC of all events. This categorisation takes into consideration all event-based SC and their total representation with regards to all events represented in the data. All event-based SCs were categorised according the number of events depicted. Of these, GSL signers had 15% (N=179) events SC that depicted one event and 8% (N=99) event SC that depicted 2 events. AdaSL signers had 6% (N=69) of their event SC depicting one event and 4% (N=50) depicting two events.

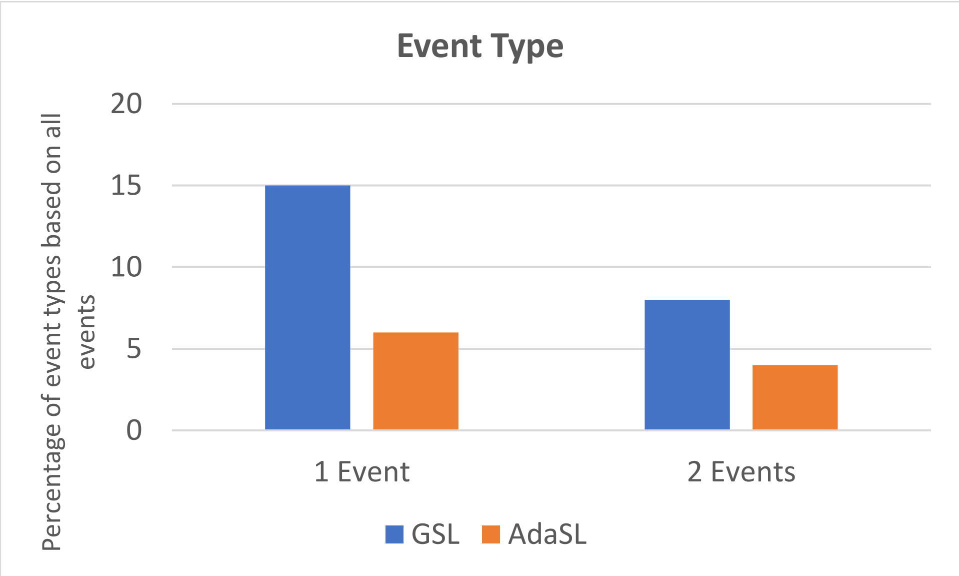


Figure 7.17 Event types based on all events

Further, event types represented with SCs were compared according to the total percentage of SC used by each sign languages. This categorised the event types based on the total percentage of SC used and not the total percentage of event tokens. The result of this is represented in Figure 7.18. For GSL, 64% (179) of all their SCs depicted one event and 36% (N=99) depicted two events. Very similarly, AdaSL signers had 58% (N=69) of their SC depicting one event and 42% (N=50) depicting two events. Thus, there was the general preference for one event SC as compared to two events SC.

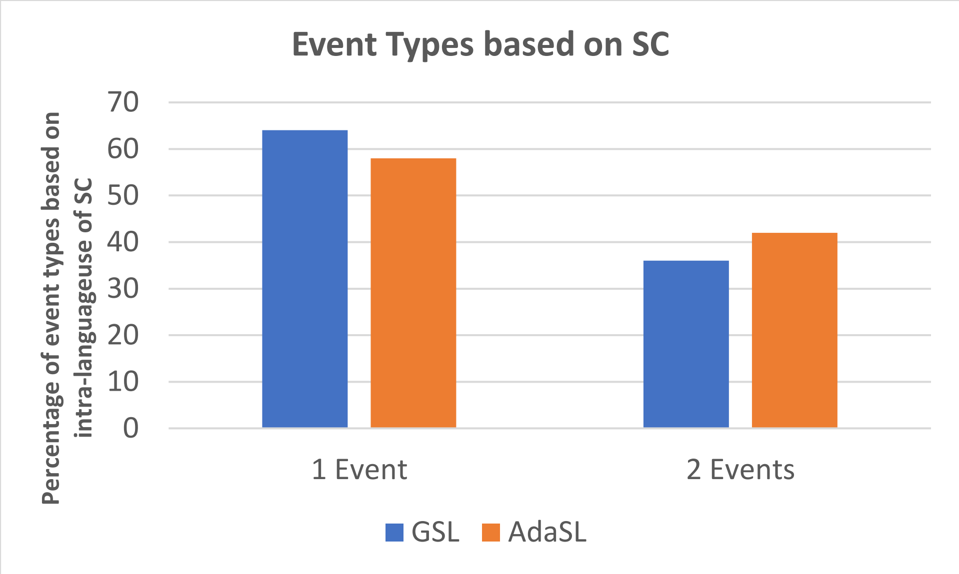


Figure 7.18 Event types based on SC

7.5.1 Simultaneous Event type 1

This section will consider SCs that present one event and the strategies signers employed to represent one event SC. In SC with one event type, aspects of the same event are represented simultaneously. The strategies signers of both sign languages used to represent one event SC include classifiers (handling and entity), lexical items (including nouns, verbs), constructed actions (CA) and index or pointing signs. Figure 7.19 shows the proportions of the strategies used to represent 1 event SC.

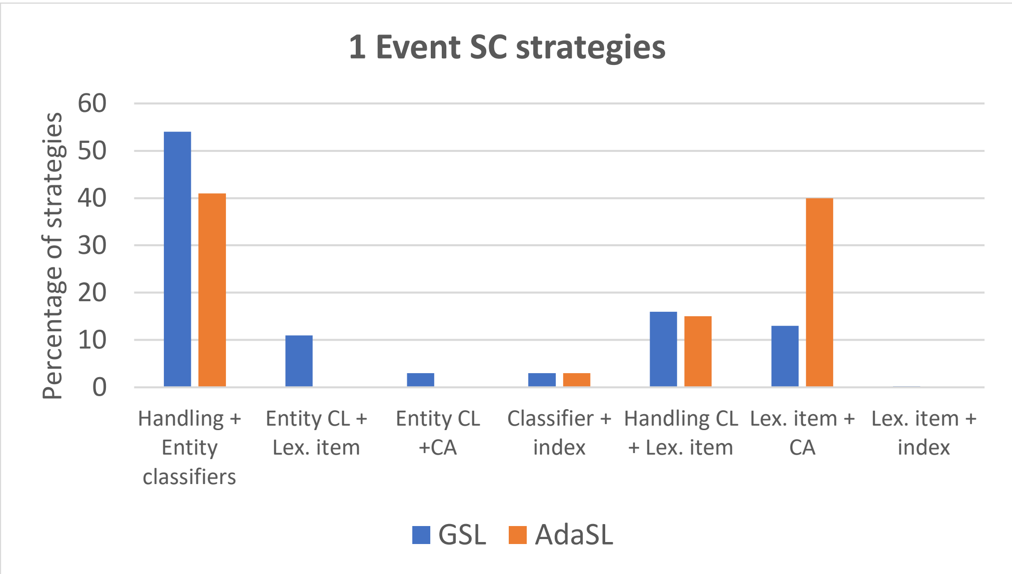


Figure 7.19 Strategies for 1 Event SC

1. *Classifier predicates (Manual simultaneity)*

Classifier predicates (entity and handling) were used by signers to depict one event SC. Two simultaneous classifier predicates depicted one of the following categories: (1) entity and handling classifiers where the entity classifier refers to a *animate entity* and the handling classifier refers to the action of the animate entity as seen in *boy rides bicycle* in example 1 of Figure 7.20; (2) entity and handling classifiers where the entity refers to an *inanimate entity* and the handling classifiers refers to the hand of an animate entity working on the inanimate entity as seen in *boy placed basket on bicycle* in Figure 7.14; (3) two entity classifier predicates where one classifier refers to the figure (*animate/inanimate*) and the other entity classifier refers to the ground object (*inanimate*).[114] In Figure 7.20, the example *man climbs ladder* is depicted by the signers' right hand (finger(s)) using the two-legged entity classifiers for *man* and the left hand as the *ladder* (entity). In this example, the signer's right hand is the entity *man* and the left hand is the *ladder* that is leaning against the tree. In the *man climbs ladder* example, the two-legged entity classifier refers to the animate entity and the ladder classifier is the inanimate object that is being acted on by the animate entity.

Other example of classifier use in 1 event SC is *man picks pear* in Figure 7.20, which uses the handling and entity classifiers representing the hand and the apron (which is a ground object in this event). Classifier predicates depicting one event were used more by GSL signers (54%, N=103) as compared to AdaSL signers (41%, N=39).


Boy rides away with basket of pear on bicycle


GSL


AdaSL

RH:	$CL_{E\ 2\text{-legged}}$ (boy)	$CL_{E\ \text{uprignt}}$ (boy)	$CL_{E\ \text{upright}}$ (boy)
LH:	CL_H (hold bicycle)	CL_H (hold bicycle)	CL_H (hold bicycle)

[114] This is different from two animate entity classifiers in motion from different directions as expressed in *boy and girl move towards each other*. That shows two events performed by two animate agents


Man (wearing white apron) picks pear.


GSL


AdaSL

RH: CL_H (pick) CL_H (pick)
LH: CL_E (apron) CL_E (apron)


Man climbs ladder


GSL

RH: CL_E (man)
LH: CL_E (ladder)

Figure 7.20 Classifier predicates in one event SC

2. *Entity classifier with lexical items (Manual simultaneity)*

SCs representing one event were also represented with a combination of entity classifiers and lexical items. In such examples, the lexical items and the entity classifier contribute to the meaning conveyed by the construction. This strategy was used by only GSL signers (11%, N=16) and no record was found for AdaSL signers. Moreover, two-handed lexical signs like STONE in Figure 7.21 become one-handed, i.e., there is a weak-hand drop. The perspective used mostly for this category include observer-narrator, but in the *boy hit stone*[115] example, the signer shifts his torso and turns his head, and as such adds character effect to the perspectives.

[115] This construction combines character-observer-narrator perspectives.

GSL

RH: SEE
LH: CL_E (boy)
Boy sees hat on the floor

GSL

RH: STONE (one hand)
LH: CL_E (boy)
Body: turns to the right
(Boy) turns to the right, Boy bumped onto a big stone

Figure 7.21 Entity classifier and lexical items in one event SC

3. *Entity classifier with constructed action (Manual or nonmanual simultaneity)*

Furthermore, signers used constructed action (CA) in addition to entity classifiers to depict one event SC. This strategy used manual (entity classifier) and manual or nonmanual articulators (constructed action) simultaneously. The signer is an active character and is involved in life-sized representation of the event (CA). In the GSL example in Figure 7.22 the signer uses the two-legged entity classifiers depicted in reduced-sized representation in token space and the signer's body performs the nonmanual CA. Important to note is that entity classifiers and constructed action are not always bimanual SC, it could be a manual sign (here the entity classifier) and other nonmanual segments expressed on the signer's body. In Figure 7.22, the example *man moves towards the ladder* the signer uses the two-legged entity classifier for the *man* and signer's body (head and torso) simultaneously turns with the entity classifier. The signer re-enacts the man's action by turning her torso and face. Entity classifiers with CA was used by 4 signers of GSL representing 3% (N=5). No example was found in AdaSL.

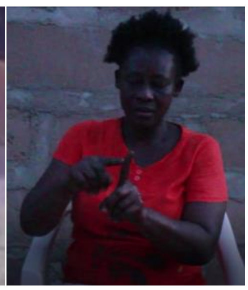
GSL

RH: CL_E (man)
Signer: character moving around
SC: Manual and nonmanual
Man turn round (and moves to the ladder)

Figure 7.22 Entity classifiers with constructed action

4. *Classifiers (Entity/handling) and indexing (Manual simultaneity)*

This strategy used classifiers and indexing simultaneously to refer to the same event. Signers used this strategy to make something more specific. For example, in the first GSL example in Figure 7.23, the signer points to the thumb in the plural entity classifier (depicted with the thumb, the index and the middle fingers) to show that she was specifically referring to that person but not the two ahead. Then this reduces to one finger for one boy to make further statement on the entity she was describing by still pointing to it. In the AdaSL examples in Figure 7.23, one signer point to the fruit he holds to show that it was this particular fruit that fell and another signer holds the fruit and points up to indicate that the fruit that is being held is up on the tree. This type of SC identified the referent that the signer gives information about and has discourse function as well. For example, the GSL signer shows the location of the third boy by pointing to show that he is the specific boy being referred to. Both AdaSL signers in Figure 7.23 show the action of holding the Pear and give further discourse information about the specific Pear fruit: i.e., *the one that fell* or *the one hanging on the tree*. 3% (N=11) of 1 event SCs in GSL were expressed in this strategy and 3% (N=3) in AdaSL (thus, showing very similar proportions).



GSL

RH: index (points to third in row)
LH: CL_E (three people in a row)
The third boy in the row

RH: index (points to entity classifier)
LH: CL_E (boy)
This specific boy

AdaSL

RH: index (points to fruit)
LH: CL_H (holds fruit)
Points to the pear fruit in his hands

AdaSL

RH: $index_3$ (ref. Pear $loc._{up}$)
LH: CL_E (Pear)
Holds pear with left hand and point to the tree

Figure 7.23 Classifiers and indexing

5. *Handling classifiers with lexical items (Manual simultaneity)*

Classifiers seem to be the most versatile element of SCs in sign languages. Signers of GSL and AdaSL expressed one event SCs with handling classifiers and lexical items.[116] Lexical items in this category included all types of lexical nouns and verbs (including directionals). In using handling classifiers and lexical items, signers used the character-narrator perspective. Handling classifiers and lexical items expressed motion and action information. This type of manual SC depicted three functions; (1) The meaning of the lexical sign expresses an event and this event is reiterated by the handling classifier, (2) The lexical sign states the name of the entity doing the handling, (3) The entity being handled is named by the lexical sign.

In the function (1), both elements of the SC relate to the action been described, but in functions (2) and (3) the agent or the patient is identified by the lexical sign (and thus performs a discourse function besides identifying the action performed by the agent or to the patient). An example of function (1) is the GSL example *climb up ladder* where the lexical sign GO expresses an event which is depicted by the classifier *hold* (climb up the ladder). Function (3) is exemplified by the GSL depiction of *man holds **goat*** and *man holds **fruit*** in

[116] This strategy is similar to entity classifiers with lexical items. The difference between the two strategies is the perspective that signers use. Handling classifiers typically align with character perspective and character-narrator perspective. On the other hand, the entity classifiers align with observer-related perspectives (character-observer and observer-narrator).

Figure 7.24, that is, holding the goat/fruit and signing GOAT/ANIMAL/FRUIT at the same time. Function (2) is exemplified by the AdaSL constructions for ***man** holds fruit* and ***boy** holds/ride bicycle*. Both GSL and AdaSL had similar proportions for this strategy (GSL 16%, N=19; AdaSL 15%, N=11).

GSL

RH: GO
LH: CL_H (hold ladder)
Man climbs up the ladder

AdaSL

BOY
CL_H (hold bicycle)
Boy rides away

Man drags goat away

GSL

RH: GOAT — ANIMAL
LH: CL_H (hold/drag) — CL_H (hold/drag)

AdaSL

RH: MAN
LH: CL_H (holds pear)

GSL

FRUIT — FRUIT
CL_H (hold) — CL_H (hold)
Man holds pear fruit

Figure 7.24 Handling classifiers with lexical items

6. *Lexical items with constructed action (Manual or nonmanual simultaneity)*

One other strategy used by signers to represent one event SCs is the use of lexical items and constructed action (CA). Signers used lexical items (which sometimes had the location parameter changed depending on the direction) and signers' bodies as an active agent in the signing event. This strategy performed two functions: (1) signers presented a lexical verb and CA simultaneously to enforce the information given by the lexical sign, as exemplified by the GSL signer in Figure 7.25; and (2) signers simultaneously used a lexical noun and CA whereby the CA presents the action of the signer in relation to the lexical noun, as exemplified by the AdaSL signer in Figure 7.25. For example, the GSL signer signed WATCH/SEE (location up) with CA showing his head raised up like the boy in the stimulus video. The AdaSL signer signs HAT and looks down just as the boy in the Pear Story looked down to look at the hat. This strategy was mostly used by AdaSL signers (40%, N=18) as compared to GSL signers (13%, N=24).



GSL

RH: WATCH
CA: signer looks up
Boy looks up



AdaSL

RH: HAT
CA: signer looks down
Boy sees the hat

Figure 7.25 Lexical items with constructed action

7. *Lexical item with index*

Lexical items with index indicating one event SC were barely used. Only one example was identified in GSL and no example was found in AdaSL. In the example in Figure 7.26 the signer signs SNEAK and point up to refer to the boy on the bicycle sneaking up on the man in the tree.


RH: SNEAK (one hand drop)
LH: index (up)

Figure 7. 26 Lexical sign with index

7.5.2 Simultaneous Event type 2

This section focuses on two events SCs and considers the strategies signers employed to represent these events. In all, a total of 37% (N=99) of all GSL's event-based SC represented two events and 40% (N=50) of the event-based SC in AdaSL represented two events. SC with two events represented two separate or different actions by the signer. When bimanual signs are used in 2 events SCs, each hand represents a different event. Furthermore, in bimanual signs, one sign segment could be a hold from the previous sign event. Besides bimanual signs, other simultaneous constructions had both manual and nonmanual articulators to represent two events; the hand represents one event, and the body action (constructed action) represents another event. Signers of both GSL and AdaSL used similar strategies to represent two events SCs. The strategies used by signers of both sign languages include classifiers (handling and entity), lexical items (including nouns and verbs), constructed actions (CA) and index or pointing signs.

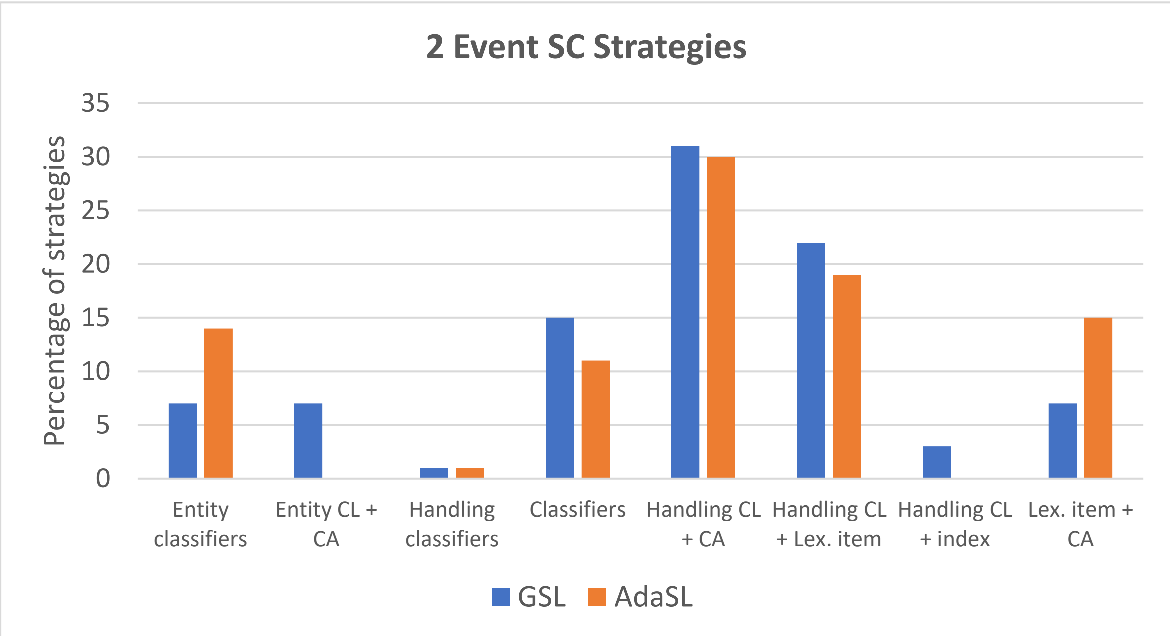


Figure 7.27 Strategies for 2 events SC

1. *Entity classifiers (Manual simultaneity)*

Signers of both GSL and AdaSL made use of classifier predicates for two events SC. In this category, both GSL and AdaSL signers used entity classifiers on both hands to depict two actions taking place simultaneously. The use of two entity classifiers representing two events simultaneously depicted mostly motion events (e.g., two entities in motion from different directions). For example, *the boy and girl riding bicycles* (one from the left and the other from the right) resulted in the use of two entity classifiers depicting two events.[117] This example depicted the figures (boy and girl) and the path of the motion (moving towards each other as exemplified in Figure 7.28). GSL signers had 7% (N=9) and AdaSL signers exhibited a higher proportion of use for this strategy (AdaSL 14%, N=8).

Boy rides from right to left, girl rides from left to right

GSL

AdaSL

	GSL	AdaSL
RH:	CL_E (boy)	CL_E (boy)
LH:	CL_E (girl)	CL_E (girl)

Figure 7.28 Entity classifiers for two events depiction

2. *Entity classifiers and constructed action (Manual and nonmanual simultaneity)*

GSL signers used entity classifiers and constructed action to represent two events simultaneously (no example was found in AdaSL). In this construction, the entity classifier refers to one entity performing an event and the signer takes on another character performing a different event. This combination of entity CL and constructed action was only used by GSL signers to depict the scene with the two simultaneous events: *three boys walk in front of man and man looks on curiously*. In this example, the entity classifier refers to the boys and the signer takes the character of the man. In the examples in Figure 7.29 the upright entity classifier is in motion (moving from one location to another) and the signer as the *man* looks on intently as the classifier handshape (boys) moves. The signers turn their head as the boys (entity classifier) moves by. These two events (*three boys walking* and *man looking at them*

[117] This was coded as two events because the two referents (boy/girl) were considered to perform two different events although their events were similar. Not only that the events were similar but could potentially be construed as a single reciprocal event. Furthermore, the boy turned to look at the girl (while riding the bicycle) and the girl continued to ride on maintaining her specific event while the boy added additional event (riding bicycle and turning round).

curiously) take place simultaneously and gives an iconic representation of the events as they happened in the Pear video. 7% (N=9) of 2 event SCs in GSL were depicted in this strategy.

The three boys walk in front of the man and man looks at them curiously

GSL

RH:	CL_E (boys)	CL_E (3 boys)
Signer:	man looking on intently	man looking on intently

Figure 7.29 Entity classifiers and constructed action

3. *Handling classifiers (Manual simultaneity)*

Furthermore, two handling classifiers were used simultaneously to represent two events as shown in Figure 7.30. The GSL signer holds the fruit (event 1) and hits the ball on the paddle (event 2) with a handling strategy. The AdaSL signer touches the head (event 1) and holds the handlebars of the bicycle (event 2) at the same time.[118] Both GSL and AdaSL had same proportion for this strategy (GSL 1%, N=2; AdaSL 1%, N=1).

GSL

RH: CL_H (hit ball on the paddle)
LH: CL_H (hold fruit)
Boy holds fruit and hit ball on paddle

[118] In the stimulus video, the boy on the bicycle holds his hair because his hat fell off his head as he turned to look at the girl riding the bicycle.

AdaSL

RH: CL_H (touches head)
LH: CL_H (holds bicycle)
Boy holds the handlebars of the bicycle and touches head

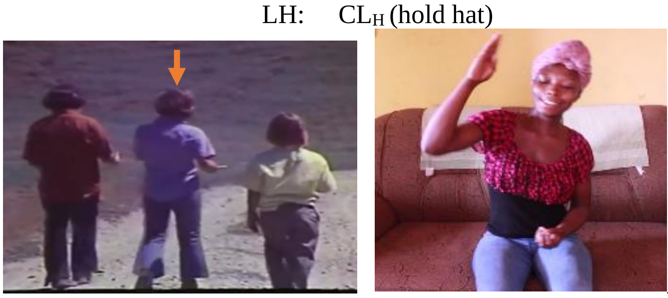
Figure 7.30 Two handling classifiers

4. *Classifiers: Handling, entity, limb, and instrument (Manual simultaneity)*

Another strategy used by signers of both sign languages to depict two events SC is the use of handling classifiers and entity/limb/instrument handshapes. The *handling* hand holds an item, and the entity handshape acts as an instrument or as an entity classifier. For example, in Figure 7.31, the GSL example *boy holds the hat and puts the paddle in his pocket* the signer's left hand holds the hat while the right hand acts as an instrument depicting the paddle. In the AdaSL example *the boy eats the fruits and hits the ball on the paddle*, the signer simultaneously uses the handling handshape for the holding/eating and an instrument strategy for hitting the ball on the paddle. Another example of handling classifier and limb classifier is the AdaSL example, *the boy holds the bicycle and limps along*. In this example, the signer uses the handling classifier for the holding, but uses the limb classifier to represent the limping. GSL had 15% (N=9) of 2 event SC represented with classifiers and AdaSL had 11% (N=6).

GSL

RH: CL_E (tennis)
LH: CL_H (hold hat)



AdaSL

RH: CL_E (play tennis)
LH: CL_H (hold fruit)

Boy holds fruit and hit ball on paddle

AdaSL

RH: CL_L (limping leg)
LH: CL_H (holds bicycle)

Figure 7.31 Handling classifier and entity handshape

5. *Handling classifiers and constructed action (Manual and nonmanual simultaneity)*

Signers of GSL and AdaSL also used handling classifiers and CA to represent two events simultaneously. The handling hand depicts how the entity is held, and the CA performs a related action being done in addition to the handling. However, these are two different events and in spoken languages would be represented with a conjunction or an adverb. For example, *the man was holding the fruit and (while) removing bandanna from his neck,*[119] *the boy was carrying the basket and (while) looking up, the boy was holding the bicycle and (while) limping* etc. Figure 7.32 depicts two events that are represented simultaneously as the signer uses the handling strategy to hold fruit/bicycle and the CA strategy to depict removing bandanna, looking up and limping, respectively. In the example *the boy was holding the bicycle and limping*, CA (with legs and body) was used to show limping. The examples below depict both bimanual SCs and manual & nonmanual SCs. Handling classifiers and CA strategies expressed in character perspective were the most used strategy by both GSL and AdaSL signers to express two events SC (see Figure 7.27). GSL had 31% (N=34) and AdaSL had 30% (N=15) of 2 events SC depicted with this strategy.

[119] In this example, signers raised their heads or shifted their heads to depict the action with overt character perspective.


GSL


AdaSL

RH: CL_H (hold) CA remove bandanna CA remove bandanna
LH: CA remove bandanna CL_H (hold) CL_H (hold)

Man remove kerchief/ bandanna from the neck while holding fruit


GSL


AdaSL

RH/LH: CL_H (hold bicycle) CL_H (hold basket)
CA: limping leg CA look up

Boy limps while holding his bicycle *Boy holds the basket while looking up*

Figure 7.32 Handling classifiers and constructed action

6. *Handling classifiers and lexical items (Manual simultaneity)*

Another strategy used by signers to show two events was the simultaneous use of handling classifiers and lexical items. In this strategy, the handling classifiers and the lexical items depicted two different events. Lexical items in this section refer to all lexical verbs including directionals. However, unlike handling classifiers and constructed action discussed above (no. 5), handling classifiers and lexical items seem to act like relative clauses.[120] Research on relative clauses in sign languages have revealed typological variations found across different sign languages (Pfau & Steinbach, 2005; Branchini & Donati, 2009; Kubuş, 2016). In both GSL and AdaSL, handling classifiers in combination with lexical items/ directionals act as relative clauses that answers the question *who* or *which*. In other words, different sign languages use different approaches to depict relative clauses. In Figure 7.33, *boy (holding the hat) signals to the other boy*, we identify the action of *holding the hat* and the action of *signalling*. In the GSL example *the boy's (riding the bicycle) pear fell*, the event FALL is distinct from the handling classifier *holding bicycle*. However, the two events complement each other to give the information; *the boy (who was) riding the bicycle's Pear fell*. This strategy is similar to relative clauses and present a noun phrase (NP) and the example *the*

[120] Relative clauses in GSL and AdaSL have not been studied prior to this research. Therefore, more research and analysis are relevant to establish the nature of relative clauses in the two sign languages.

boy's pear fell is qualified with the dependent clause *(who was) riding the bicycle*. The examples in Figure 7.33 may represent relative clauses in GSL and AdaSL. Handling classifiers with lexical items are expressed in character-narrator perspective. This strategy was used to similar proportions in GSL (22%, N=23) and AdaSL (19%, N=8).



GSL

AdaSL

RH: CALL — CL_H (hold hat)
LH: CL_H (holds hat) — CALL

Boy (who was) holding hat signals (the boy with the bicycle)




AdaSL

RH: SEE — CL_H (hold fruit)
LH: CL_H (hold fruit) — SEE

Boy (who was) holding the pear looks up



GSL

RH: FALL
LH: CL_H (hold)

The boy (who was) riding the bicycle's pear fell

Figure. 7.33 Handling classifiers and lexical items

7. *Handling classifiers and indexing (Manual simultaneity)*

This strategy uses handling classifiers and indexing to simultaneously represent two events. The handling hand performs the action of holding an entity whereas the index finger points to a location or to another item which is related to the action in event 1. Instances of the use of this strategy were found in only the GSL data representing 3% (N=3) of 2 events SC. This retelling technique used character perspective and combined CA in other instances as exemplified in Figure 7.34.[121]

GSL

RH: CL_H (hold fruit) index (points to Pear)
LH: index (points to bandanna) CL_H (hold bicycle)

Man remove bandanna from the neck and holds pear *Boy holds handlebars of bicycle and point to baskets*

Figure 7.34 Handling classifiers and indexing

8. *Lexical verbs with constructed action*

This strategy used lexical items and CA to represent two events. The lexical verb depicted one event and the CA depicted another event. AdaSL signers demonstrated a higher proportion of use of this strategy (15%, N=9) as compared to GSL signers (7%, N=8). In the GSL example in Figure 7.35, the lexical sign WORRY is different from the CA in opening the palm (imitating the man's action of counting) and looking down at the baskets. The AdaSL signer depicts *three boys walk in front of man and man looks on curiously*[122] with the directional GO (referring to the movement of the three boys) and the signer as the man looking on intently.

GSL

RH: WORRY
LH: open palm
Signers: looks down

[121] AdaSL signers used the handling classifier and indexing to show one event but not two events. E.g. Figure 7.23. The RH: index (points to fruit) and the LH: CL_H (holds fruit) and this is translated as *Points to the pear fruit in his hands.*

[122] This scene was depicted with entity classifier and CA by GSL signers but AdaSL signers used lexical verb with CA.

AdaSL

RH: GO
Signer: looking on intently
The three boys walk in front of the man and man looks at them curiously

Figure 7.35 Lexical item with CA

7.5.3 Numeral Incorporation (Manual simultaneity)

Incorporating number in lexical signs and representing both (number and lexical sign) simultaneously was expressed by signers of both GSL and AdaSL. This type of numeral incorporation is a blend of a lexical sign and a number to express motion. Although this type of incorporation represented 1 event, it is represented as a separate subsection because the type of simultaneity is different from the other SCs discussed in § 7.5.1. Numeral incorporation is a morphological process that attaches a number to a meaningful segment to derive new meanings (Valli, et al., 2011). The type of numeral incorporation depicted in this section used phonological assimilation to blend the handshape of the number sign into the directional.[123] Although recent research on GSL attests to different ways in which signers incorporate number (MacHadjah, 2016), for AdaSL, Nyst (2007a, p. 206) reports that "no convincing examples of numeral incorporation had been found".

Incorporating number simultaneously to depict motion used two approaches: (1) directional GO/GO AWAY/COME and (2) number sign. These two properties were blended into one sign and expressed the motion X-GO/ X-GO AWAY[124] or X-COME (where X refers to the number of persons). Whereas with GO the movement is away from the signer, the movement is toward the signer with COME. SCs that express numeral incorporation in GSL are differentiated from entity classifiers that express number of entities and motion such as example (a) in Figure 7.1. Entity classifiers that indicate the number of entities express figure(s), path and sometimes manner of motion. Numeral incorporation expressed number and path, and use the same movement, location, and orientation for the blended GO/GO AWAY or COME movement. The handshape sometimes changes from the number to the handshape of the depicted movement (GO/COME) at the final stage of the sign as exemplified by THREE-GO

[123] Numeral incorporation only occurred with directionals.
[124] X-GO AWAY is specific to GSL.

AWAY in GSL or the handshape remains the same (as in all other examples in Figure 7.36). Numeral incorporation (directional + number) was not so popular and only three examples were identified in GSL and three examples were in AdaSL.

GSL

RH: THREE-GO AWAY THREE-GO

AdaSL

RH: TWO-GO THREE-GO THREE-COME[125]

Figure 7.36 Simultaneous numeral incorporation

7.6 Referent information in Simultaneous constructions

Figure 7.38 shows that both GSL and AdaSL signers produced more SCs with one referent performing two tasks as compared to SCs that had two referents performing two different tasks. 74% (N=214) of all SC produced by GSL signers and 86% (102) by AdaSL had one referent performing dual actions. On the other hand, GSL signers produced 26% (N=64) of SC with two referents, while AdaSL had 14% (N=17) of SC with two referents.

In a simultaneous construction, the event depicted could have an animate or inanimate referent. Animate referent refers to the human and animals whose actions are depicted by the sign tokens. Inanimate referent refers to things and object that are depicted by the tokens. For event-based SCs, the referent could either be in stationary or involved in an activity. For example, most GSL and AdaSL signers depicted *the man picking fruits* or *the man put the fruits in his apron* as one event but two referents; the animate referent is the man picking the fruits and the inanimate referent is the apron (the non-dominant hand) that remains in stationary position. In such examples, the inanimate referent is the ground object that is

[125] This signer borrows GSL THREE for the SC. This could be an indication of a more recent emergence of this type of numeral incorporation through contact with GSL.

incorporated into the SC. The ground object is another referent depicted by the SC and as such the whole construction is taken as depicting two referents.

Figure 7.37 Ground incorporation in SC

There were other SCs that depicted two events, but with one referent. These types of simultaneous constructions referred to one person performing dual actions. For example, the signer holding bicycle and limping at the same time is regarded as two simultaneous events, but the referent is one. In other words, the two actions are performed by one animate referent. The difference between one referent with two events SC and ground incorporated SC is that with the former, the two events are simultaneously performed by one referent, whereas the latter shows one event (picking fruit or putting in the apron) and one ground object (the apron) which does not perform any action, but it is acted on by the animate referent.

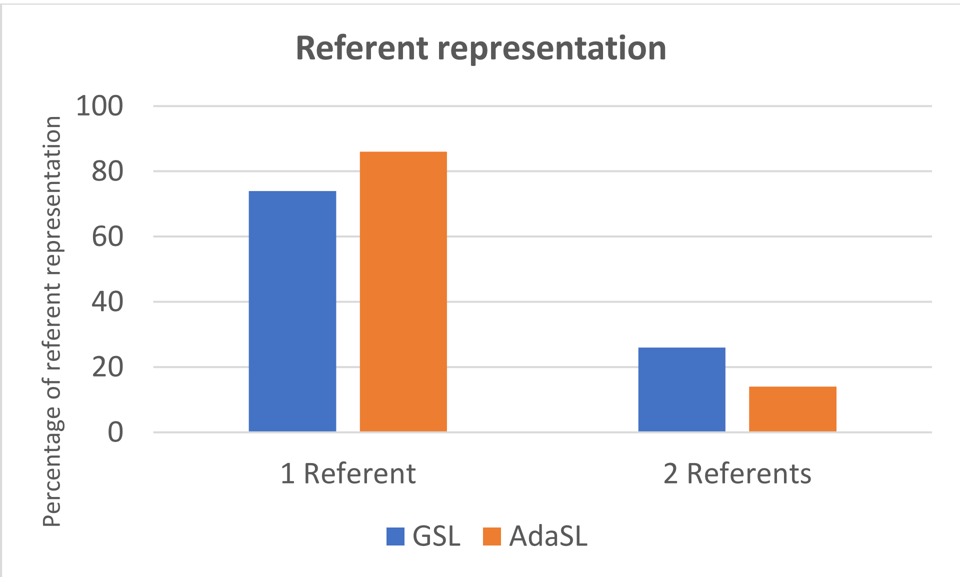


Figure 7.38 Referents representation in SC

7.6.1 One Referent representation (Manual)

As stated in §7.6, one referent could be involved in two simultaneous acts and these were depicted with various iconic strategies including the use of classifiers, constructed action, and lexical items. One referent SCs refer to an animate referent that performs two actions simultaneously. Most of the examples given in the earlier sections refer to one referent SCs.

Different perspectives used by signers to depict one referent performing simultaneous actions include character, character-observer, and character-narrator. The examples in Figure 7.39 show one referent performing two actions simultaneously.



GSL

AdaSL

	GSL	AdaSL
RH:	CL_H (hold fruit)	CL_E (play tennis)
LH:	CL_H (play tennis)	CL_H (hold fruit)
Perspectives:	character	character

The boy was hitting the ball on the paddle and eating (Pear)



GSL

AdaSL

	GSL	AdaSL
RH:	HAT (touches head)	CL_H (hold bicycle)
LH:	CL_H (hold bicycle)	CL_H (touch head)
Perspectives:	character-narrator	character

The boy was riding the bicycle and touching his hat/ head

Figure 7.39 One referent performing simultaneous tasks

7.6.2 Two Referents representation (Manual and nonmanual simultaneity)

SCs with two referents showed two participants at the same time. For example, *the **boy** and **girl** riding towards each othe*r has two referents, and *the **man** looking at the **three boys*** has two referents. Simultaneous constructions referring to two or more referents rely on the hands, the body, and facial expressions. First, the hands alone can represent two simultaneous entities without the addition of facial expression using classifiers (manual simultaneity). Second, the hands and facial (and bodily) expressions can represent two referents (manual and nonmanual simultaneity). Moreover, the strategies used to represent two referent SC are the same as the events representation strategies listed in the earlier sections. Two referents SC were realised in all the six identified perspectives: character, observer, narrator, character-observer, character-narrator, and observer-narrator. Referents could be animate or inanimate and the events could be from the viewpoint of one of the animates referents being represented.

1. *Two animate referents*

Both sign languages represented two animate referents performing two different tasks. The scene that triggered the most of such representations in both sign languages was *the* ***boy*** *and* ***girl*** *moving towards each other*. This was represented with two entity classifiers moving towards each other in observer perspective in both sign languages.

GSL signers also depicted two referents with entity classifiers and lexical items in observer-narrator perspective. The entity classifier referred to one referent and the lexical item (usually with character perspective) referred to the second animate referent as exemplified in ***boy*** *looks at* ***girl***. In this example, the boy and girl are both animate referents that are represented in the SC. The signer is the boy who looks intently at the girl.

GSL signers again depicted two referents with entity classifiers and constructed action (CA) in character-observer perspective. The entity classifier refers to one animate referent performing an event and the CA refers to the action of the second referent as exemplified with the ***man*** *looking at* **the boys** *passing in front of him.*[126]

GSL signers also used two lexical signs to depict two referents simultaneously. The two lexical signs (verbs) referred to two different events being performed by two referents. For example, *the boy and girl moving towards each other* was also expressed with two lexical verbs WATCH moving towards each other. In this example, the signer tilts the head briefly (CA) as one of the referents performing the action of *watching*. Each hand indicating WATCH in this example, referring to *the* ***boy*** *and the* ***girl*** *moving towards each other* in the Pear Story video. This example was expressed in character-narrator perspective.

SCs indicating two referents were also expressed in character perspective in both sign languages. In character perspective, the signer becomes the *agent* and the *patient* at the same time. For example, in ***man*** *drags* ***goat*** exemplified in Figure.7.40, the signer is the agent performing the action of dragging and at the same time playing the role of the entity being dragged. The GSL and AdaSL (1) signers drag their right hands and the AdaSL signer (2) depicts pulling her own neck.

[126] In this example, GSL signers depicted the entity, manner and path of movement. The entity classifiers moved in sync with the way the boys moved before the man.

Boy rides from right to left, girl rides from left to right

GSL

AdaSL

	GSL	AdaSL
RH:	CL_E (boy)	CL_E (boy)
LH:	CL_E (girl)	CL_E (girl)

Two animate referents using entity classifiers

Boy turns around to look at girl

GSL

RH: CL_E (girl)
LH: WATCH
Signer: turns his head (boy)

Two animate referents using entity classifiers, lexical items and CA

GSL

RH: CL_E (3 boys) CL_E (3 boys)
LH:
Signer: …………..looks intently (man)…………….

The three boys walk in front of the man and man looks at them curiously

Two animate referents using entity classifiers and CA

GSL

Boy rides from right to left, girl rides from left to right

RH: WATCH WATCH
LH: WATCH WATCH
Signer: …………………tilts head………………

Two animate referents using lexical items

GSL

AdaSL

Man drags goat away

RH: CL_E (goat) — CL_E(goat) CL_H (drag)
LH: CL_H (drag) — CL_H(drag)
Signer: both man and goat — ……. both man and goat …….

Figure 7.40 Examples of two animate referents

2. *Two inanimate referents*

Two inanimate referents barely existed in event SCs indicating location, motion, and action. There were none found in AdaSL and GSL had just one example of a SC that had two inanimate referents and indicating location. The GSL example in Figure 7.41 depicted the inanimate referents *basket* and the *ground*. The *ground* in the example below refers to the actual ground or floor on which the basket is set on. This example was given in observer perspective.

GSL

RH: CL_E (basket) CL_E (basket) CL_E (basket)
LH: CL_E (ground) CL_E (ground) CL_E (ground)

Three baskets arranged sided by side on the ground

Figure 7.41 Location SC indicating two inanimate referents

3. *One animate and One inanimate referent*

There were instances in both sign languages where the two referents depicted were an animate referent and an inanimate referent. Such instances were mostly identified in figure-ground relationships where one hand is the figure, and the other hand is the ground object.

The figure in both languages was a human entity and the ground was an inanimate entity that remained stationary or was acted upon. In Figure 7.42, the example, *man picks fruit* depicts the animate referent as the signer picking the fruits and the inanimate referent as the stationary apron depicted by the nondominant hand. The AdaSL example *boy set basket on bicycle* depicts the event with the handling classifier hand (animate) and an entity classifier bicycle (inanimate). The GSL example, *man climbs ladder* is depicted with one animate referent and another inanimate referent.

GSL

AdaSL

Man (wearing white apron) picks pear RH: CL_H (pick) LH: CL_E (apron) — CL_H (pick) CL_E (apron)

GSL

AdaSL

Man climbs ladder RH: CL_E (man) LH: CL_E (ladder)

set basket on bicycle RH: CL_H (hold basket) LH: CL_E (bicycle)

Figure 7.42 Animate and inanimate SC constructions

7.7 Types of Simultaneous constructions

Signers used various strategies to depict simultaneity as demonstrated in the previous sections. This subsection will present the summary of the strategies used to depict simultaneity considering the differences and similarities between GSL and AdaSL signers. The proportions of these strategies can be found in Figures 7.19 and 7.27. The Tables in this section just outline the different strategies used for location, motion and action, and these strategies were jointly represented with 1 event SC and 2 events SC. Lexical nouns (including numbers), lexical verbs, directional verbs and directionals were coded together as lexical items in Figures 7.19 and 7.27. Manner predicates as exemplified in the Tables in this section refers to handling classifiers that indicate riding a bicycle. All nonmanual features were coded as constructed action (CA) across all categories in 1 event and 2 events SC. Further, §7.5.1 and §7.5.2 indicated which of the strategies used manual simultaneity, nonmanual simultaneity, or both. The proportion of use of the strategies can therefore be inferred from the strategies used for the event types.

SC will be grouped into (1) manual (two autonomous hands representing two different signs) and (2) manual and nonmanual (combination of the hands and the body).

1. *Manual Simultaneity*

Bimanual simultaneous (two hands depicting two autonomous signs) constructions of various types were used by signers of both languages. In bimanual simultaneity, the two hands performed different functions. Bimanual SC depicting location was used only by GSL signers. However, there was a considerable amount of bimanual SC depicting motion and action. The Tables below show the types of bimanual simultaneity used by signers.

a. Location

Table 7.2 Bimanual simultaneous constructions depicting location[127]

Hand 1	Hand 2	GSL	AdaSL	Example
Entity classifier	Entity classifier	✓	×	Basket (CL_E) on ground (CL_E)

b. Motion events

Table 7.3 Bimanual simultaneous constructions depicting motion

Hand 1	Hand 2	GSL	AdaSL	Example
Entity classifier	Entity classifier	✓	✓	Boy (CL_E) and girl (CL_E) riding towards each other
Entity classifier	Handling classifier	✓	✓	Man (CL_E) moving while dragging goat (CL_H)
Entity classifier	Lex. verb	✓	×	Boy (CL_E) moving + WATCH
Directional verb	Manner predicate	✓	✓	GO + ride bicycle
Handing classifier	Limb classifier	×	✓	Boy holds (CL_H) bicycle and limp (CL_L)
Entity classifier	Ground	×	✓	Boy (CL_E) moves from place

127 A tick implies the presence of the strategy in the sign language (even if it was used by only one signer) and a cross implies that the absence of the strategy.

Lex. noun (subject referent)	Manner predicate	✓	✓	GIRL + ride bicycle
Directional verb	Handling classifier	✗	✓	GO + dragging goat (CL$_H$)
Lex. verb	Lex. verb	✓	✗	WATCH + WATCH (motion)[128]

c. Action events

Table 7.4 Bimanual simultaneous constructions depicting action

Hand 1	Hand 2	GSL	AdaSL	Example
Handling classifier	Entity classifier/ Entity HS	✓	✓	Put basket (CL$_H$) on bicycle (CL$_E$)
Lex. verb	Index (to referent loc.)	✓	✗	HEAR + index$_3$ (boy there)
Entity HS (Pear)	Index (to referent loc.)	✗	✓	Pear fruit (E) +index$_3$ (up)
Handling classifier	Index (to referent loc.)	✓	✓	Give Pear (CL$_H$) + index$_3$ (there)
Entity classifier	Lexical verb	✓	✗	Boy (CL$_E$) + SEE
Handling classifier	Handling classifier	✓	✓	Hold fruit (CL$_H$) + play tennis (CL$_H$)
Handling classifier	Instrument (entity HS)	✓	✓	Hold fruit (CL$_H$) + play tennis (Inst.)
Handling classifier	Lex. noun	✓	✓	Hold fruit (CL$_H$) + FRUIT
Entity classifier	Lex. noun	✓	✗	Boy (CL$_E$) + STONE
Entity classifier	Index (reference to loc.)	✓	✗	Boy (CL$_E$) + index$_3$ (point to CL$_E$ in a row)
Handling classifier	Lex. verb	✓	✓	Hold fruit (CL$_H$) + CALL
Handling classifier	Ground	✓	✓	Hold fruit (CL$_H$) + apron

[128] This is exemplified in the GSL example in Figure 7.12. The lexical sign is modified for spatial depiction. This example also combined the two autonomous signs and other nonmanual features (see Table 7.7 below).

Handling classifier	number	✓	✗	Give pear (CL_H) + three

2. *Manual and nonmanual simultaneity*

This type of simultaneity involved the hand(s) and certain parts of the signer's body. This type of simultaneity is referred to as the "simultaneous use of other (manual or nonmanual) articulators" by Vermeerbergen, et al. (2007, p. 3). This subsection will look at the types of manual and nonmanual simultaneity used by GSL and AdaSL and exemplified in this chapter and chapter 6. The domains relevant for this subsection are motion and action. There were few examples of multiple blends with both bimanual and nonmanual representation. (Important to note is that manual and oral simultaneity were not investigated in this dissertation. Nyst (2007b) gives examples of this type of simultaneity in AdaSL).

a. Motion events

Table. 7.5 Manual and nonmanual simultaneous construction for motion

Hand(s)	**Nonmanuals**	**GSL**	**AdaSL**	**Example**
Entity classifiers	Torso shift	✓	✗	Man (CL_E) moves back
Entity classifiers	Eye gaze	✓	✗	Man looks at boy (CL_E)
Lex. verb	Eye gaze and torso shift	✓	✓	GO + man looks at boy
Handling classifier	Torso shift	✓	✓	Man drags goat

b. Action events

Table 7.6 Manual and nonmanual simultaneous constructions for motion

Hand(s)	**Nonmanuals**	**GSL**	**AdaSL**	**Example**
Handling classifier	Torso shift and eye gaze	✓	✓	Man picks pear up from ground
Lex. verb	Torso shift and eye gaze	✓	✓	WATCH + look up
Lex. noun	Torso shift and eye gaze	✗	✓	HAT + look down

c. Multiple blends (bimanual and nonmanual simultaneity)

Table 7.7 Bimanual and nonmanual simultaneity for motion and action

Hand 1	Hand 2	Nonmanual	GSL	AdaSL	Example
Lex. verb	Entity classifier	Eye gaze and torso shift	✓	✗	WATCH + girl (CL_E) Torso shift and eye gaze (*boy turns around to watch girl*)
Lex. noun	Entity classifier	Torso shift	✓	✗	STONE + boy (CL_E) Torso shift (*boy bumped into a stone*)
Lex. noun	Handling classifier	Eye gaze fixed up	✗	✓	MAN + hold fruit (CL_H) Gaze up to tree (*man on the tree was picking Pear*)
Lex. verb	Lex. verb	Eye gaze and torso shift	✓	✗	WATCH + WATCH Torso shift and eye gaze (boy and girl watch each other)

7.8 Chapter summary and discussion

This chapter presented an analysis of event representation focusing on simultaneous constructions (SC) in GSL and AdaSL. From the analysis, it was identified that GSL signers used more SCs in all the tokens as compared to AdaSL signers. On the level of event-based SC, GSL had 23% (N=278) and AdaSL had 10% (N=119) representation. These figures imply a greater preference for SC by the urban GSL signers as compared to the rural AdaSL signers. However, comparing the percentage of how SC is represented in the languages, not much difference was found except the absence of SC for location in AdaSL. GSL signers had just one signer depicting location information with SC and this indicates the lack of preference for SC for location information in GSL. The finding of the absence of SC for location information is also linked to the methodology used: i.e. video with both dynamic and static scenes as compared to other research on location depiction in sign languages that used still images (Perniss, 2007a; Perniss & Özyürek, 2008). Motion and action SCs were expressed in both sign languages with more preference for action SC (GSL- 62%; AdaSL- 73%) as compared to motion SC (GSL- 37%; AdaSL-27%). Overall, GSL and AdaSL were similar in their classification of SC into location, motion, and action in terms of proportion of use.

The choice of perspectives for SC were almost similar except for the greater preference for observer-related perspectives[129] in GSL as compared to AdaSL. Overall, character and character-narrator perspectives were the most used by both sign languages but with AdaSL demonstrating a higher preference. Character-observer was used mostly by GSL signers with only one AdaSL signer using this perspective for SC representation. Narrator and observer-narrator was just used by GSL signer for SC representation. The SCs represented by GSL and AdaSL mostly depicted one event type rather than two event types. Furthermore, both sign languages showed a preference for SCs with one referent performing two events rather than two referents performing separate events.

In addition to the perspectives, event type and the referent type, the specific iconic strategies used by signers were investigated. Although the distribution of SCs, the perspectives, the event types and the referent types showed similarities, the specific strategies exhibited differences in the representation of SCs. For example, while AdaSL signers used more strategies with character-related perspectives, GSL signers on the other hand were more fluid with perspectives that were character, observer, narrator, and a blend of these. Another major difference is the preference for entity classifier-related blends by GSL signers as compared to AdaSL signers. Although both sign language used non-aligned perspectives, GSL was more versatile with the strategies used for these non-aligned perspectives. For example, entity classifiers and lexical items were used by GSL signers in SCs depicting motion and action. Whereas AdaSL signers were not found to make use of this iconic strategy.

The difference between the SCs in GSL and AdaSL is within the main categories of the strategies used. For instance, although both sign languages used classifier predicates for event representation, we identify for both 1 event and 2 events SCs that GSL signers systematically used more classifiers in their depiction (1 event- 54%- GSL and 41%- AdaSL: 2 events- 15%- GSL and 11% -AdaSL). Again, entity classifiers together with lexical items and CA were only used in GSL. Contrastively, lexical items and CA were mainly used in AdaSL for both 1 event and 2 events representation (1 event- 41%-AdaSL and 13%- GSL: 2

[129] Observer perspective was used almost at the same level by GSL and AdaSL signers for SC, i.e. the representation of events projected in space (*boy and girls moving towards each other)*. Especially for motion seen from a distance (e.g., riding bicycle across field) which depicted less of a reduced-sized event space representation.

events-15%- AdaSL and 7%- GSL). Furthermore, considering the perspectives used in SCs, we can see that AdaSL signers did not have a single response for narrator (SC of 2 lexical items) and observer-narrator (specifically, entity classifiers with lexical items). Character-observer had only 1% representation as compared to 12% in GSL.

The similarities between GSL and AdaSL are found within the choice of perspectives and the strategies used to depict SC. Character perspective use had a similar proportion (GSL 42% and AdaSL 43%) in both sign languages. The nature of the Pear Story motivated the use of character perspective in both sign languages. Observer perspective has similar depictions (GSL 10% and AdaSL-8%) and this was mainly triggered by the scene *boy and girl ride towards each other,* which was expressed with entity classifiers in both sign languages (6 signers from AdaSL). Considering the strategies for SC, both sign languages demonstrated a similar preference for handling classifiers and lexical items (1 event- 16% for both GSL and AdaSL: 2 events- 22%- GSL and 24%- AdaSL). Two handling classifiers or handling classifiers with CA were used in similar proportions in both sign languages (2 handling classifiers 1% in both: handling classifiers with CA- 30%- GSL and 25% AdaSL). Comparing signers' depiction of bimanual SC, manual & nonmanual SC and multiple blends (bimanual and nonmanual simultaneity), we identify similarities between GSL and AdaSL. GSL and AdaSL demonstrated similarity in their preferences for bimanual and manual & nonmanual SC as compared to the multiple blends.[130]

Studies on SCs in sign languages have considered manual, nonmanual and oral constructions that contribute to simultaneity in sign languages (Vermeerbergen, et al., 2007). Different strategies have been documented to be used by sign languages in the presentation of simultaneity. Considering GSL and AdaSL in the light of other research done on different sign languages, we identify similarities in the use of strategies. For example, the use of classifiers in SCs have been identified in Jordanian Sign Language (LIU), DGS, Quebec Sign Language (LSQ), ASL etc. (Hendriks, 2007; Perniss, 2007b; Miller, 1994; Dudis, 2004). As noted by Dudis (2004, p. 224) "signers can effortlessly produce other visible elements" in a blend by introducing other visible elements to the sign. We identify this in the different ways GSL and AdaSL signers used simultaneity to introduce other segments of the narrative. For example, using the manual articulators, we can see different partitionable zones based on event or referent depiction. The example, *boy and girl ride towards each other* depicted with

[130] Specifically, GSL signers used more multiple blends than AdaSL signers.

entity classifiers shows two animate entities that are performing similar actions. That is, the upright or the two-legged entity classifiers present different movements of different agents.

Dudis (2004) writing about the use of viewpoint or perspective (global/observer and participant/character) in his work on body partitioning stated that "[t]he smaller scale of the global perspective depiction involving the |vehicle| is akin to a wide-angle shot in motion-picture production, while the real-space blend containing the participant |signer as actor| is akin to a closeup shot" (Dudis, 2004, p. 230). This seems to be true of the depiction of *boy and girl ride towards each other* which had wide-angle shot and elicited the use of global (observer) perspective from majority of the signers.

On the other hand, when a signer introduces a lexical verb WATCH on one hand (see the GSL example boy watches girl in Figure 7.40), while maintaining the entity classifier on the other hand, the event changes from *boy and girl ride towards each other* to *boy turns around to look at the girl*. Other strategies used by the signer in the above example are nonmanual cues including torso shift and eye gaze to depict that the signer has taken the role of the boy on the bicycle while maintaining the entity classifier as the girl. This SC (*boy turns to look at girl* expressed with entity classifiers, lexical verb and CA) was very specific to GSL and quite similar to what is found in other Western sign languages including DGS and ASL (Perniss, 2007b; Dudis, 2004).

To sum up, the argument by Nyst (2007b, p. 142) that "[s]imultaneous constructions seem to occur much less frequently in AdaSL than in the signed languages studied so far on this topic" seems to hold true (GSL used almost as twice the number of SCs used by AdaSL signers). However, AdaSL having about half of the SC used by GSL signers also depicted various types of SCs (bimanual /manual and nonmanual). Some of the categories identified in this dissertation for the depiction of SCs were not attested in Nyst (2007b). For example, Nyst quoted that "AdaSL uses neither simultaneous constructions involving classifiers predicates expressing motion or location in space" (Nyst, 2007b, p. 143). However, the data presented in this dissertation identified the use of simultaneous entity classifier predicates expressing motion in space.

The variety of SCs used in AdaSL may be attributed to language contact[131] with GSL or the methodology used in this research. For example, Nyst's data concentrated on spontaneous monologues and the retelling of Tweety and Sylvester cartoons (Nyst, 2007b; 2007a), whereas the current dissertation focused on the retelling of the Pear Story. The Pear

[131] Language contact between GSL and is discussed in chapter 9.

Story as described in chapter 4 presents human activities that signers are accustomed to. The choice of the Pear Story video over animated videos was motivated by an earlier investigation on iconicity in AdaSL with the same Tweety and Sylvester (canary rows) cartoons, monologues and conversations between signers (Edward, 2015a) that barely identified simultaneous constructions. The different types of SCs found in GSL and AdaSL are comparable to what has been identified in different sign languages (Leeson & Saeed, 2004; Vermeerbergen, et al., 2007). There are also SCs that are language specific. For instance, whereas GSL signers used SCs with entity classifiers and CA, AdaSL signers did not use a single CA of this type.

Finally, this chapter has provided a systematic representation of simultaneous constructions depicting event-related scenes in an urban (foreign-based) sign language and a rural (indigenous) sign language. The discussions on SC representation indicate the cross-linguistic similarities in typologically distinct sign languages. Again, the discussion shows language specific approaches for SC representation including the use and preference of specific strategies. On the flip side, language contact between GSL and AdaSL signers may have influenced the representation of SCs and the specific use of SCs with entity classifiers that depict motion and action.

The next chapter offers a theoretical analysis of the data (chapters 5,6 and 7) with the theory of cognitive linguistics. Chapter 8 seeks to give a cognitive linguistic view of lexical iconicity, spatial iconicity, and simultaneous constructions.

PART 4

COGNITIVE LINGUISTIC APPROACHES TO ICONICITY

Cognitive linguistic approaches to iconicity consider the different ways in which grammatical organisation mirrors experience. The discussions in part 4 focus on iconicity as the relation between construals of real-world scenes and construals of form. Based on a qualitative analysis of the different iconic strategies used by signers, part 4 identifies that iconicity in the lexicon and the grammar of GSL and AdaSL is instantiated by meaningful phonological parameters. Signers' choice of iconic strategies for imagic and diagrammatic iconicity depends on construals of different strategies that profile the real-world object or event with construals of form (phonological representation). Most importantly, iconicity is seen as a symptom of our cognitive experiences.

Chapter 8

Cognitive Linguistics and Iconicity in sign language

8.0 Introduction

The Cognitive Linguistics (CL) framework as introduced in chapter 3 is different from other approaches to language because the framework perceives language to reflect fundamental properties and our patterns of thought (Evans & Green, 2006). From the cognitive linguistics point of view, iconicity refers to “the way in which grammatical organisation mirrors experience” (Evans & Green, 2006, p. 197). In the cognitivist approach to grammar, “[l]anguage structure is the product of our interaction with the world around us”, that is “[t]he way we build discourses and develop linguistic categories can immediately be derived from the way we experience our environment and use that experience in species specific communication” (Heine, 1997, p. 3). Usage-based linguistics which has evolved from cognitive and functional linguistics seeks to “develop a framework for the analysis of the emergence of linguistic structure and meaning” (Diessel, 2017, p. 1). Furthermore, the cognitive perspective is of the view that all our thoughts and knowledge reside within the conceptual space (Langacker, 2008) from which the phonological and semantic poles reside closer or farther apart from each other. The phonological segment is a reflection of “our conceptualization of pronunciations, which range from the specific pronunciation of actual words in all their contextual richness to more schematic conceptions, such as a common phonological shape shared by all verbs, or a subset of verbs, in a particular language” (Wilcox, 2004, p. 122). In sign language, the phonological segment refers to the phonological parameters of the sign including Handshape (HS), Location (Loc), Orientation (Orn) and Movement (Mov). The semantics of conceptual space concern the meanings associated to the phonological segment. In other words, both the phonological and semantic segments reside in the same conceptual space (Wilcox, 2004).

The definition of iconicity relevant for this chapter is the cognitive iconicity stance developed by Wilcox (2004). Iconicity is a distance relation between the phonological and semantic segments (poles) of symbolic structures (Wilcox, 2004). This implies that the closeness of the phonological and semantic segments of structures presupposes an iconic relationship and the further the two are apart, the more an arbitrary relationship is presupposed. This definition considers both the lexicon and grammar of signed language and as such is relevant for the discussion in this chapter. The linguistic form and meaning and our interactions with the world around us are fundamental in the cognitive perspective.

Furthermore, in cognitive linguistics, we identify that language reflects the properties of the mind. Therefore, the linguistic form has a psychological reality drawn from the experiences of language users (i.e., the relationship between sensory image-form-meaning). These experiences of everyday physical and mental activities are referred to as the image schemas (Langacker, 2008). The relevance of these schemas to our understanding of language and its use are fundamental in the cognitive linguistics approach. In the analysis of lexical and grammatical iconicity, the phonological forms of the signs are emergent units of constant use and they reflect our patterns of thoughts. For example, the handshape of the iconic sign bears semantic features of the object based on association and different handshapes profile different semantic features of the object. In previous chapters, we identified that signers presented lexical and grammatical iconicity using different construals (alternate ways) that profiled particular semantic information. CL postulates that these different construals of iconicity revealed in chapters 5, 6 and 7 depend on signers' experiences, and the image schemas that were activated when they saw the pictures (lexical items) and the videos (Pear Story).

The focus of this chapter is to present the results expounded in chapters 5, 6 and 7 within the cognitive perspective. The chapter answers the second main research question: "*How is the CL representation of iconicity revealed in cross-linguistic data from different domains?*"

The discussion in this chapter will focus on iconicity as the relation between construals of real-world scenes (or construals of meaning) and construals of form (Wilcox, 2004). This chapter will consider some themes/topics mentioned in chapters 2, 3, 5, 6 & 7 and discuss how these themes are explored in signed language within the CL approach. The chapter is primarily focused on explaining iconicity in GSL and AdaSL in terms of the cognitive perspective and how signers depicted the construals of real-world scenes using the construals of form. A number of cognitive premises discussed in chapter 3 will be revisited to specifically discuss iconicity in GSL and AdaSL. The chapter does not seek to exhaust all the topics within a cognitive or usage-based approach to language. The main aim is to discuss how the data from GSL and AdaSL aligns with the cognitive premises introduced in chapter 3. Furthermore, this chapter will return to other strategies for depicting iconicity in the lexicon and grammar of sign languages discussed in chapter 2 and discuss the CL view of iconicity in those strategies. For example, the discussion of embodiment, use of space, manipulation, entity depiction and virtual depiction from the viewpoint of form-meaning mappings between construals of form and construals of real-world objects or events.

The chapter is arranged as follows: §8.1 considers conceptualizing the sign articulators using their conceptual properties. §8.2 discusses embodiment and the use of sign space with CL principles. §8.3 explains Wilcox's cognitive iconicity in relation to the domains investigated in the dissertation. §8.4 discusses construal and presents different examples for GSL and AdaSL that align with the different classes of construal. §8.5 considers the image schemas and thematic roles identified on the lexical and grammatical levels of iconicity in the data. §8.6 considers networks of association in the lexical task and conceptual integration networks in the grammatical task. Finally, §8.7 presents the summary of the chapter.

8.1 Conceptualizing the articulators

In chapter 3, we identified that sign articulators can move about and interact with each other. When sign articulators are conceptualised, the articulators take on some properties of the depicted object. The articulators of signed languages do not directly represent events and objects in the real world, conceptualizations of the articulators are mapped onto conceptualizations of the world (Wilcox, 2004). The most dynamic articulator in signed language is the hands and as noted by Dudis (2004), the hand is an instrument of action. Other phonological parameters depend somehow on the hand for their configuration (except nonmanual features). Wilcox presented certain conceptual properties of sign articulators that are relevant for conceptualizing the articulators (Wilcox, 2004). These are explained below drawing examples from GSL and AdaSL.

1. *The hands are autonomous objects and manifest in the spatial domain*

Handshape, the basic phonological parameter of sign language operates as an autonomous entity in the spatial domain. In both lexical signs and narrations of the Pear Story videos, we identify that the hands play a major role. Whether the hands act as entities, as the hands or in any other strategy for iconic mappings, the conceptual properties of the hands remain autonomous. For instance, when the hands act as manipulable tools, the conceptualization of the hand-as-hand or hand-as-object is dependent on the signer's profiling. As Wilcox puts it, the "[h]ands are prototypical objects in interaction, either with other hands or other objects" (Wilcox, 2004, p. 125).

In conceptualizing the hands as objects in the real-world, the hands take on certain features of the depicted object in a form-meaning mapping relation.[132] Iconicity has been argued to be a fundamental feature of human languages in general (Perniss, et al., 2010) and in sign languages the hands typically bear iconic reference to the depicted image in form-meaning mappings. In profiling the hands as objects or the hands as the hands, signers take on certain features of the depicted images. For instance, whereas, the palm(s) can profile a *mirror*, the conceptualization of the same palm as a *pen* will be far-fetched in many sign languages. In chapter 5, we identified that signers typically depicted *pen* with either a *handling* strategy or *instrument* strategy, both of which solely depend on depicting construals of the real-world *pen* through the profile of the hand. That is, in conceptualizing the hands as autonomous objects, certain structural features of the depicted images are considered. For example, using entity depiction, signers profiled flat objects like *mirror* and *plate* with the palm(s); little objects like *pen*, *spoon, fork*, *toothbrush*, *sewing needle*, *syringe* etc. with the finger(s). Signers (and gesturers) conceptualised the fingers to represent several iconic forms including legs or heels (HIGH-HEELED SHOE), eyes (MIRROR, TELEVISION), tines (FORK), sharp object (KNIFE, SYRINGE, SCISSORS) etc. The *handling* strategy also considered the size of the depicted image: bigger objects were conceptualised with a wider handling, whereas smaller objects were conceptualised with smaller handling.[133]

In the narrative tasks, the hands (whole hands and fingers) were the active articulators for both classifier and lexical predicates. Other parameters (movement/orientation) were dependent on the handshape. For example, the index finger(s) profiled animate referents (entity classifiers in motion or stationary); location of entities (pointing to the man on the tree, the third boy in a row or the pear fruit); lexical signs such as GO and ONE etc. In all the different profiles of the index finger, the spatial domain contextualises the specific construals of the handshape. For example, whereas the index finger as entity classifier or pointing sign needs to be contextualised at a meaningful spatial location, the same index finger as the lexical sign ONE (or even GO in some occasions) does not express a meaningful location. The V-HS was conceptualised by GSL signers to represent several iconic forms including pairs of things such as legs (two-legged entity classifier), eyes (WATCH) etc.

[132] Signs without resemblance mapping (non-iconic) relations would not be considered in this section as the focus is on iconic representations.
[133] Depicting the handling of a basket uses a wider handling strategy where both hands are involved in a wider signing space. On the other hand, depicting the handling of a small tool like TOOTHBRUSH, SPOON etc. will use a smaller handling involving one hand in a relatively small space.

2. *Location is a dependent property, manifest in the spatial and temporal domain*

According to Wilcox, the "location parameter spans the spatial and temporal domains" (Wilcox, 2004, p. 125). Unlike the hands that produce overt articulatory signs, location does not have an "overt articulatory manifestation; it is only by being the setting for objects that locations become manifest" (Wilcox, 2004, p. 125). The location could be real/actual place (maybe on the body as seen in *Entity at body location* and other strategies) or in the spatial domain (virtual depiction of syntactic and topographic placement). For example, signers represented most lexical signs in the neutral location in front of them. In the Pear Story narration, spatial location was meaningful for most depictions as signers placed objects in space and referred to them later in the narration by pointing to *meaningful locations* in space. As noted by Dudis, (2004, p. 226) "[i]n signed discourse, the real space of the addressee would consist of her conceptualization of the signer via visual input" and "the empty physical space is also a real-space element". The location then becomes a conceptualised property of the signer's visual input.

3. *Orientation is a dependent property of handshapes, manifest in the spatial domain*

Orientation which refers to direction of the palm of the dominant hand in signing is dependent on the handshape and it is manifested in the spatial domain. Orientation as a phonological parameter in sign language is not autonomous as it requires the handshape to function. Conceptualizing the hand as objects in the real-world uses the orientation of the handshape to map form-meaning relationships. Certain specific features of the hands are relevant to construe specific features of the depicted image. For example, in virtual depiction with 3D images, the orientations of the palms were very relevant for accurate depiction of the images.

In the narrative tasks, orientation was relevant for iconic representation of location, motion, and action. For instance, the DGS example in Figure 6.2 (chapter 6) depicted a man standing by a tree. The orientation of the handshapes (in this case the entity classifiers used) was relevant to conceptually depict two entities located at a specific place. The GSL example in Figure 8.1 represents 3 baskets on the floor and the palm orientations are employed in the entity classifiers to depict the basket and the ground.

RH: CL$_E$ (basket) ORN. $_{\text{palm face down}}$
LH: CL$_E$ (ground) ORN. $_{\text{palm face down}}$

Figure 8.1 Orientation of the palms

4. *Movement is a dependent property of handshapes, manifest in the temporal domain*

The phonological property of movement depends on the handshapes and its manifestation is in the temporal domain. Dependent structures (in this case movement) require the support of an autonomous one for their full manifestation (Langacker, 2008). In the Handheld tools, we identified that movement was specifically depicted with *handling* and *instrument* strategies and in such cases movement of the handshape conceptually represented the movement of the object or the hand holding the object in performing canonical actions. In the narrative tasks, movement in the spatial domain represented the movement of things and processes. For example, movement of the handshape conceptually depicted actual movement in real-life, that is, the movement of the hand performing handling tasks depicted actual movement. Entity classifiers depicting motion in space used movement for motion events. Movement is temporal as it depicts the movement of one entity from location 1 to location 2.

8.1.1 Conceptualizing the hands for the lexical tasks

In a nutshell, conceptualizing the articulators within cognitive approaches relies on the construals of form and construals of real-world image to specifically profile the hands. The use of *handling*, *instrument* or *entity* strategies are influenced by the different ways in which signers construed the objects. As Wilcox noted, in cognitive iconicity (Wilcox, 2004) the phonological and semantic domains reside in the same region of conceptual space. The iconic strategies used by signers encompass the phonological and semantic domains through the profile of the object. The phonological parameters (Handshape, Movement, Location and Orientation) and the semantics (meaning) contribute to the form-meaning resemblance mapping between the sign and the referent. The phonological and semantic domains of *both lexical and narrative tasks* in GSL and AdaSL have a resemblance relationship in iconic depiction (both imagic and diagrammatic). That is, all iconic handshapes profiled *form-meaning mappings* depending on signers' conceptualization of the object. This informs us that iconic handshapes share form-meaning mappings with the construals of real-world objects.

The phonology of iconic lexical items (Household tools and objects) discussed in chapter 5 is meaningful and the meaningfulness is associated with the semantic domains that are activated in the phonological parameters of the signs. In consideration, we can support claims that phonology is submerged in the semantics of the symbolic unit (Wilcox, 2004; Occhino, 2016; Langacker, 2008). In this sense, the different representations of the phonological segments by signers (and gesturers) are as a result of different usage-event representations that are triggered by the object. Let us consider *mobile phone* again looking at the phonological variants used by signers.

Table 8.1 Conceptualizing MOBILE PHONE

MOBILE PHONE	Signers' depiction
Phonology (Form) HS -> A/ B/G/Y handshapes L -> ear/cheek/neutral space O -> towards ear or cheek/ up M-> neutral to cheek/neutral 	
Semantics – (Meaning) A handheld instrument (with different shapes) usually placed at the ear or cheek or in front of user	A & B handshapes profiled the shape of *mobile phone* as shown in the stimulus picture. The G handshape profiled a mobile phone with an antenna. Y handshape profile a (bow shaped) telephone

The similarity between the concept *mobile phone* and the meaning is depicted in the construals of handshape (A/B/G/Y) used by signers. The iconic relationship between the form and the meaning is represented by the phonological representations that are submerged within the semantics of the sign. That is, all the handshapes profiled a handheld instrument (capable of making and receiving calls). However, not all the handshapes profiled the particular image of *mobile phone* in the stimulus picture. Signers' conceptualization of mobile phone differed based on both individual and community construals of mobile phone. In all, there were few objects that had the same phonological depictions across various signers. Examples include *paintbrush*, *broom* and *scissors*; signers profiled the same features for these tools. Based on these examples, we identify that the meanings of the iconic lexical signs are profiled based on signers' perception of the real-world and the construals of the object. Whereas objects like *paintbrush*, *broom*, and *scissors* profiled the same handshape, *mobile phone* profiled different handshapes highlighting the individual mappings associated to the object. Also, to note is that although all signers profiled the same handshape for *scissors*, the location parameter was different. While most signers depicted the handshape in the neutral space, very few specifically had other construals of the handshape and location that profiled barbering (located on the head).

In the same way, *bottle* was conceptualised as hands holding a *bottle* or the hands as the *bottle*. Both conceptualizations are iconic as they bear a resemblance relationship between the construal of the real-world object. The preference for a specific Handshape, Movement, Location and Orientation is also influenced by the image schemas that are derived from signers' experiential knowledge and have become informative in their perception. For instance, when the hand is perceived as the hand, we get responses that use a *handling* (or manipulative use of the fingers) strategy to name or refer to objects and when the hand is perceived as an object, we get strategies like *instrument* and *entity*. With the *hand-as-hand* schema, "the entire hand is profiled, and is construed as a hand" (Occhino, 2016:144), as exemplified in *handling* strategies used across the lexical tasks. On the other hand, some responses schematised the *handshape as object-shape schema* (Occhino, 2016) where the hand is an entity (or object) performing a canonical action or the hand only shows features of the object and does not perform any action, as seen in all *entity depiction* strategies used across the lexical tasks. Whereas lexical signs with entity handshapes (i.e., *entity depiction* & *instrument*) permitted diverse construed variants, the *handling* strategy had little allowance for profiling the hand-as-hand with construed variants. The handshape of the handling hand is only influenced by the sizes of the objects being depicted.

The meaning of linguistic forms could have one-to-one mappings or many-to-one mappings (Occhino, 2016). One-to-one mapping does not have contextual variants, and this is exemplified with the RED traffic light which always mean STOP (Occhino, 2016). In the data analysis, linguistic forms that had one-to-one mappings elicited single schemas (e.g., BOOK across signers). Different iconic strategies were construed for linguistic forms that elicited many-to-one mappings. There were some handshapes that had higher frequency than others. For instance, out of the 918 tokens recorded for all GSL signers across all semantic categories for the lexical elicitation task, 229 responses had B-HS[134] and 105 responses had A-HS. Comparing with AdaSL's 777 tokens recorded for all signers across all 5 semantic categories, 284 responses had B-HS and 91 responses had A-HS. Following the hypothesis of Occhino (2016), the higher numbers of association and frequency of the B and A handshapes found in the data, weakens the semantic correlations as it turns out to be more phonological than semantic. On the other hand, F-HS elicited only 26 responses from GSL and 31 from AdaSL signers: the lower the associations and frequency, the stronger the semantic associations for F-HS. Also, to note is that whereas the A/B related handshapes were more iconic depictions of both manipulation (*handling* and *instruments*) and *entity depictions*, F handshapes were iconic depictions of mostly *entity depictions* (see Figure 8.2 for the HS).

There were more objects that were construed with B-HS in the lexical elicitation task. The B-HS was used by signers to depict Handheld tools, Clothing & Accessories, Furniture & Household items, Appliances and Nature. The B-HS was used in *entity depiction*, *instrument*, *tracing* (3D), *presentable action* etc. Signers' choice of iconic strategies predicted the use of certain iconic handshapes considering the nature of such objects. For instance, signers construed most Handheld tools with *handling* strategy (A-HS) and *instrument* strategy (B-HS), and Furniture & Household items with *tracing* strategy (B-HS, 1-HS). Whereas *handling* strategy construed the object as it is grasped or held, *instrument* and *entity* depiction strategies construed the hand as the object.

Figure 8.2 A-HS B-HS F-HS 1-HS

8.1.2 Conceptualizing the hands for the narrative tasks

Comparatively, the handshapes for the narrative tasks had both one-to-one mapping and many-to-one mappings. For example, the index finger (1-HS) had many-to-one mappings as it was used by signers of both languages to depict the lexical sign ONE, indexing/pointing,

[134] Related handshapes were taken into account, e.g., Bent B, flat B, open B etc. The same was done for all other handshapes.

upright entity classifiers, directional GO/COME etc. It was used together with other lexical and classifier predicates in simultaneous constructions. Contrastively, the F-handshape was barely used in both sign languages in the narrative tasks.

The depiction of location, motion and action was construed by signers with different form-meaning mapping strategies. This section will focus on the use of classifier predicates in spatial event representation. *Handling, entity,* or *limb* classifiers used by signers were iconic depictions of motion and action in the stimulus videos. Handling (and limb) classifiers were more of embodied gesture (signers taking on the roles of an actor), whereas entity classifiers were less embodied gestures. In chapter 6, we identified the different perspectives that signers employed for spatial depiction; it was identified that the handling classifier prototypically aligns with character perspective whereas the entity classifier prototypically aligns with observer perspective. There were other non-prototypical alignments identified in the data for both GSL and AdaSL.

In conceptualizing the articulators for the narrative tasks, the perspective of the signer is determined by the predicates (classifier and lexical) used and the nonmanual segments added. Signers construed syntactic expressions in the video retelling tasks by taking on roles of character, observer, or blended perspectives (determined by the conceptualization of the hands). The depiction from the signer's chosen perspective can be from the signer's internal viewpoint (mainly with handling classifiers) or external viewpoint (entity classifiers) as a character or an observer. In either character or observer perspectives, signers could present a mirror-like depiction where the left side of one person corresponds to the right side of the other or their own chosen viewing arrangement.[135] However, signers also chose to construe the scene based on a *frame of reference* that specified the exact location of entities, i.e., the location of the figure and the ground. [136] In other words, the scenes were construed depending on (1) objects location in the stimulus films (e.g. *the basket is in front of the tree*); signers' viewpoint (e.g. *the boy hitting the paddle is behind two other boys walking ahead of him*) and (3) a binary relation using fixed bearings (e.g. *the girl on the bicycle appears from the west of*

[135] From the CL, perspective "*viewing arrangement*, the most obvious aspect of which is the vantage point assumed" (Langacker, 2008, p. 73). That is the "overall relationship between the viewers and the situation being viewed" (Langacker, 2008, p. 73).

[136] Frame of reference is a spatial coordinate system, i.e., the strategies for locating a referent (or figure) in a relation to (or ground). Frame of reference is defined according to the intrinsic, relative, and absolute frames of reference (Levinson, 1996).

the boy).[137] Character perspectives depict an imagic representation of the actual event and observer perspective depicts a diagrammatic representation of the actual event.

Signers' articulators mapped the depicted scene onto the preferred perspectives by choosing the hands-as-hands (character) or handshape as object-shape schema (character/observer). For example, the depiction of *the boy with the hat walks towards the boy on the bicycle* was conceptualised in both sign languages with character perspective (see Figure 8.3). The signers took the role of the boy and moved towards the other boy on the bicycle. For most AdaSL signers, the hands, legs, and the torso were conceptualised as active articulators for this scene. On the other hand, the use of entity classifiers for motion events conceptualised the hands as objects in motion (see Figure 8.4). The entity classifier depicting a motion event profiled the index fingers as real-world objects. That is, objects are construed with the hands representing the size and shape of the entities being depicted. The conceptualised handshape profiled the hands and fingers as entities moving in space; the signing articulators are conceptualised as real-world entities that are stationary, moving, or involved in some activities. For example, in some cases the fingers represented legs of a person and in other cases the fingers represented a person seated on a bicycle.


AdaSL

Figure 8.3 Signer as actor conceptualization


GSL

Two-legged entity classifier


AdaSL

upright entity classifier

[137] There was no evidence of number 3 in the data.

Figure 8.4 Construals of animate objects based on finger selection

As defined by Engberg-Pedersen (1993, cf. (Wilcox, 2004, p. 127)) "[c]lassifier predicates are polymorphemic forms consisting of morphemes for movement, manner of movement, semantic characteristics of the moving object, location in space, and so forth". Examples of entity classifier predicates presented in chapters 6 & 7 give information on both animate and inanimate categories. The two-legged and upright entity classifiers as exemplified in Figure 8.4 profile the category of human and depicts the movement of this animate object.

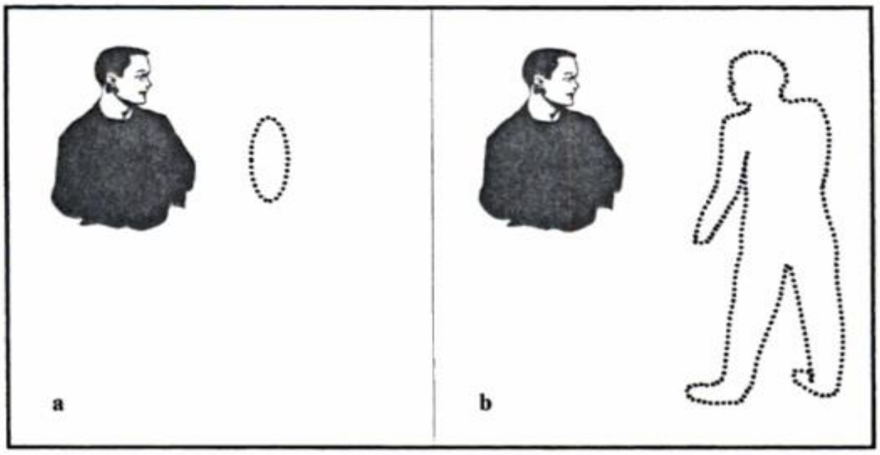
8.2 Embodiment and use of space

Form-meaning mappings between construals of real-world scenes and construals of (linguistic) form reflect experiences of language users and the world, and this is known as embodiment. According to Occhino, "embodied language means that we take into account the role our existence in these bodies, as we interact and move through the world, plays in our understanding and construction of language" (Occhino, 2016, p. 111). A cognitive approach to linguistics perceives language to be externally motivated by the experiences of language users. Language users construe such external motivations and experiences with linguistic forms that have resemblance in form-meaning mappings. Iconicity thereby becomes a symptom of language users' experience with the real-world. There is cross-linguistic perception of iconicity and as found by Occhino, et al. (2017), 'iconicity lies in the eyes of the beholders'. That is "[w]hat is iconic for one, might not be iconic for another; and what might be internally related (morphologically) to one, might not be related to another" (Occhino, 2016, p. 110). The differences in experiences by signers of different language typologies might contribute to the emergence of different embodied schemas in sign languages. For instance, whereas GSL signers are privileged to linguistic domains of science and technology, AdaSL signers have limited exposure to these domains as most adult signers do not have formal education and certain gadgets (Appliances) might be relatively new to these older AdaSL signers. In chapter 5, AdaSL signers demonstrated lower consistency and reduced agreement of signs in the semantic category of Appliances in comparison with GSL signers.

Explaining embodiment, Occhino (2016) notes that signers' bodies act as perceptual tools that grasp and process linguistic information. That is, language users perceive the world in a grounded experience as creatures with bodies and who interact with the environment through physical processes that involve both mental and motor actions (Langacker, 2008). Proponents of the cognitive view of language have argued that “grammar is an embodiment and a reflection of the way we both conceptualize the world around us and use the knowledge acquired to communicate with others of our species” (Heine, 1997, p. 107). Janzen explains that “language that is purely of a visual nature has much to offer our understanding of the embodied experience of interactions with each other, our environments, and our linguistic expression of that experience” (Janzen, 2006, p. 372). The discussion in this section will consider character and observer perspectives mostly using the terms real, surrogate and token spaces as explained in chapter 2 §2.5.

As established in chapters 6 and 7, signers give grammatical information about location, motion and action using lexical and classifier predicates. Classifier predicates are iconic forms that express information in character or observer perspectives or both. Iconic lexical predicates involve modification of the place of the sign, movement of the sign or other nonmanual gestures produced simultaneously with the lexical sign. Lexical predicates are not always inherently depictive of the action. Whereas lexical predicates like directionals and directional verbs mirror experiences through the direction and movement of hands, others like the plain verbs can either have iconic or arbitrary mappings. The use of character (real/surrogate spaces) and observer (token space) perspectives deal with invisible conceptual entities (Liddell, 2000) that are located in space. Whereas the real and surrogate spaces allow the signer to profile things as though they are present in a life-sized scale, the token space is a reduced-size space. As Liddell states, the token space can have a house which is an inch tall. Both surrogate and token spaces (expressed as character and observer perspectives) reflect different mental spaces. Fauconnier defines mental spaces as mental objects that are distinct from linguistic structure (Fauconnier, 1986. cf (Liddell, 1995, p. 21)). According to Liddell, “[a] persons mental representation of his or her immediate physical environment is a type of mental space (Liddell, 2000, p. 342).

The conception of a real space is different from surrogate and token spaces. Whereas real space refers to a person’s conception of their physical environment, i.e., the actual space in front of the signer where movement of the hands (and body) takes place, surrogate and token spaces refer to people and things not present in the physical environment (Liddell, 1995). In the narrative tasks, signers presented the conceptual entities in surrogate and token spaces and a blend of these spaces. Two mental spaces can form a blend and create a new mental space that shares properties of the two (Liddell, 2000). As seen in chapters 6 and 7, signers produced different blends which combined two different perspectives. For example, in Figure 8.5, the GSL signer (d) uses both character and observer perspectives that profile the boy on the bicycle (who is looking at the girl) and the girl riding a bicycle and moving along. In this example, the signer takes on the role of the boy who is looking at the girl; but the girl is limited in a token space with a relative height expressed with an entity classifier. In contrast, the AdaSL signer in (c) makes use of a life-sized space and the invisible surrogate is at the same height as the signer. Comparing the GSL signers (b & d) and the AdaSL signer with Liddell's depiction of token and surrogate spaces (a), the AdaSL signer embodies the action in character perspective and thereby gives the *invisible hat* to the surrogate that is located in space (signer and surrogate are of the same height).

a 

Comparing a token and a surrogate representation Figure 16.3 on page 339, in " Blended spaces and deixis in sign language " –Liddell S., in " *Language and Gesture*" (ISBN 9780521771665), (2000), McNeil D. - editor. Published by Cambridge University Press. Cambridge. Reprinted with permission from publisher.

b.   GSL

Token space

c.   AdaSL

Surrogate space

d.   GSL

Blended space (real, surrogate and token spaces)

Figure 8.5 Token, surrogate and blended spaces

In the next sections, we identify different ways in which signers' bodies acted as perceptual tools (using real, surrogate and token spaces) and how signers represented information based on their embodied view of the information. Furthermore, we will explore the cognitive approach to form-meaning relations. The fundamental stance of iconicity relevant for the discussion in this chapter is the cognitive iconicity view of sign language which does not consider iconicity as the "relation between the form of a sign and what it refers to in the real world, but as a relation between two conceptual spaces" (Wilcox, 2004, p. 122). The two conceptual spaces refer to the phonological and the semantic poles.

8.3 Cognitive Iconicity

The cognitive definition of iconicity as a distance relation between the phonological and semantic poles of symbolic structures (Wilcox, 2004) implies that iconic mappings are the construals of the form (phonological representation) and the meaning (semantics). Studies in the cognitive approach to sign language phonology have identified that the majority of handshapes have form-meaning mappings (Occhino, 2016). From the background chapters and chapters 5, 6 and 7, it was identified that the visual encoding of information in signed languages has a high potential for iconic representation because of the modality, i.e., the visual-spatial expression of visual-spatial information. The use of space, hands, and the body in the representation of signed structure used in the visual modality affords a high degree of similarity between sign languages in the spatial domain. Similarities in the preferred iconic strategies used by different or unrelated sign languages have been identified in the lexical domain (Padden, et al., 2015; Kimmelman, et al., 2018) and spatial domain (Perniss, 2012). Different or unrelated sign languages conceptualize the construals of scenes with similar phonological parameters. As noted in chapter 3 and in the analysis of chapters 5-7, phonology is not meaningless, and the meaningfulness of phonology contributes to the similarities and differences in mapping form-meaning resemblance relations in sign languages.

"Instead of viewing phonological parameters as meaningless building-blocks which belong to a universal set of formal units, I suggest that handshape (and by extension other phonological parameters) as a formal unit in signed languages is emergent, arising from individual experience and exposure to multiple usage events." (Occhino, 2016, p. 4)

8.3.1 Lexical Iconicity

In this dissertation, we identified that signers of GSL and AdaSL preferred *instrument* and *handling* strategies to name Handheld tools. The iconic depiction of these two strategies relies on signers' conceptualization of the hand or fingers as profiling the object in the real-world or as the hand manipulating the object. The form of sign is a depiction of the meaning associated with the construals of the object in the real-world. Important to note is that signers construed the hands or the fingers to represent specific features of the real-world object. Our depiction of real-world structures in the visual-spatial domain stems from our cognitive experience of the world. In representing objects (chapter 5), we identified that all the phonological parameters of iconic signs contributed to the form-meaning resemblance mappings. In other words, the different ways signers profiled an object relied on the different ways in which the articulatory parameters were profiled. The visual modality of sign language permits signers to use phonological forms that share a resemblance mapping between the construals of form and the construals of meaning. For example, the depiction of SPOON or FORK as an *instrument* or a handled entity depended on the different phonological realisations of the sign. Data from signers compared with gestures used by non-signers presented similarities between the signers and gesturers in the representation of the objects. This implies that the same cognitive processes are used in the visual-spatial domain (i.e., depicting construals of real-world objects with the construals of form).

Analogue-Building Model

Taub's (2001) Analogue-Building Model of linguistic iconicity is depicted in lexical iconicity. The model does not represent "what goes on in a language user's mind each time he or she utters an iconic item" (Taub, 2001, p. 44) but is a model for the emergence of iconic items in sign languages. The model which is summarised as *image selection- schematisation - encoding* shows the stages of iconic signs. These stages are not necessarily followed by each sign language and the "cognitive processes for each aspect could easily occur simultaneously" (Taub, 2001, p. 44). Image selection is concerned with the specific image of the object that is selected from the "plethora of sensory images" (Taub, 2001, p. 45) that are activated. For example, *bed* activate images like a rectangular object, soft mattress, sleep, lie down etc. and these different images are seen in signers' choice of iconic strategies and the variants used by signers of the same sign language. Schematisation of the selected image involves "pulling out the important details" (Taub, 2001, p. 46) that preserves the structure of the target in the depicted linguistic form. Finally, encoding entails the physical form that is chosen to represent the depicted image and "this substitution process preserves the overall structure of the original image" (Taub, 2001, p. 47).

In the data, there were objects that were depicted with different iconic strategies by different signers of the same sign language and other objects were construed with the same iconic strategy but a different phonological depiction (formational parameters). Signers selected the image (sign) that depicted certain aspects of the source (target). The selection of the appropriate articulators to depict the linguistic form of the target object and preserve the form was relevant for an iconic mapping. The selected articulators encoded specific information about the depicted object including how the object is manipulated, the hand as the object (entity), tracing the object etc. For example, signers of both sign languages depicted *broom* and *long broom* with *handling* and *instrument* strategies. In both strategies, the images selected are the hand-as-hand or hand-as-object and these are schematised by pulling out the relevant details which were encoded with *handling* and *instrument* strategies.

Manipulation

Depicting the construals of objects with *handling* and *instrument* strategies was general to most of the semantic categories investigated in chapter 5 (Handheld tools, Clothing & Accessories, Furniture & Household items, and Appliances). These two strategies, called Manipulation by Hwang et al. (2017), involve the signer as the agent and the hand or arm depicting the hand or arm of the agent performing an action. Manipulation as an iconic strategy to name objects in sign languages uses conceptualization of the hand(s) to construe real-world objects. There is specificity in the conceptualised hands as the appropriate part of the hands are used to describe specific properties of the objects (*instrument*). For instance, the opened B-HS depicted objects like *broom* while the index finger depicted smaller objects like *toothbrush*. For the *handling* strategy, the hand performing the handling is profiled according to the size and shape of the object perceptually mapped onto the hands. Therefore, the handling handshape for *long broom* is profiled differently from the handling handshape for *sewing needle* (as exemplified in Figure 8.6).


GSL

AdaSL

LONG BROOM SEWING NEEDLE BROOM TOOTHBRUSH

……………… handling ……………. ……………instrument…………

Figure 8.6 Manipulation (handling and instrument)

Entity depiction

Signers (and gesturers) used *entity depiction* to represent Handheld tools, Clothing & Accessories, Furniture & Household items, and Nature. The conceptualization of the hands as entity specified features of the depicted object. Entity depiction (*entity*, *entity at a body location*, *measure stick*) was either located in space like TREE or on meaningful locations on the body like SPECTACLES. Entity depiction subsumes the *instrument* strategy. However, in this dissertation, we define entity depiction as the handshape that gives structural features of the depicted object without performing actions that are canonical to the object (this is rather defined as *instrument* strategy). Entity depiction conceptualised construals of real-world objects with the handshape that depicted features of the object (and location of use). Signers (and gesturers) depicted stout objects (e.g., bottle) with the arm; *spectacles* with the thumb and index fingers and created a perceptual pair of *spectacles*; *flower* with the palm(s) opened and spread etc. Different handshapes were used to profile the same objects, and same or similar handshapes were used to profile different objects (see Figure 8.7). Signers and gesturers mental images of the target objects were seen in the different entity depictions used to name items within different semantic categories. Conceptual mapping of objects on the hands implies that some bigger objects like *tree* undergo perceptual reduction to be profiled by the arm of signers and gesturers (i.e., a tree is bigger than the arm).

 GSL  AdaSL  gest  gest

FLOWER FLOWER TREE TREE

Figure 8.7 Entity depiction

Virtual depiction

Drawing or tracing the object was another strategy which was used by signers (and gesturers) to present an iconic mapping between the form and the meaning. In virtual depiction (*tracing* 2D & 3D), signers outlined the object in space and that left imaginary traces of the object. This strategy was used to depict objects from all the five semantic categories (Handheld tools, Clothing & Accessories, Furniture and Household items, Appliances and Nature). Virtual depiction conceptualised the signer's hand as a drawing tool and a visible trace of the depicted object was drawn in space. This strategy is transient and demands that the receiver holds the perceptual information of the depicted object in memory (see e.g., in Figure 8.8). Signers mostly depicted the prominent features of the object with a virtual depiction (e.g., flat top for *table*). Some gesturers who used virtual depiction were more elaborate as the image drawn in space outlined two or more features of the depicted object (e.g., flat top and legs for *table*). Signers and gesturers used both 3D and 2D depictions of this strategy. Most objects that were construed with virtual depiction, were drawn in space with the palms or two fingers creating a visual image of the object.

 AdaSL  GSL  GSL

TABLE TABLE BOTTLE

Figure 8.8 Virtual depiction

8.3.2 Spatial iconicity

The affordances of the visual-spatial modality bring about a high degree of similarity between sign languages in the spatial domain. Topographic use of space in sign language uses placement to locate people and objects in sign space (Perniss, 2012) and can be used to iconically locate entities and events in space. The stimulus video (Pear Story) elicited information on location, motion, and action and these were profiled by the construals of the real-world scenes onto the construals of form used by signers. Perniss states that in “the topographic use of space, the referent-location associations in sign space are in themselves meaningful” and it “exploits the iconic properties of the visual-spatial modality, as the spatial relationships between locations in sign space match those between the referents in the real or imagined event space being described” (Perniss, 2012, p. 414). In chapters 6 & 7, we identified several strategies signers used to iconically map construals of real-world scenes onto the construals of the linguistic forms used in spatial relationships.

The use of perspectives (character/observer and blends) presents a surrogate or token that situates the spatial event in life-sized scale or reduced-sized scale. Character perspective depicts the real-world scenes with construals of form that permitted the signer to take the role of an actor moving in a meaningful spatial domain. In character perspective, signers communicate in a real space with a life-sized ‘surrogate’ but in observer perspective, the interaction is with a ‘token’ (see Figure 8.5). Liddell states that both surrogate and tokens are “the invisible conceptual entities” (Liddell, 2000, p. 338). In an iconic depiction of event, surrogates and tokens are depicted with character and observer perspectives in meaningful spatial locations. The choice of a specific iconic strategy depends on the signer’s mental representation of space. In other words, certain strategies align with character and observer perspectives because surrogate and tokens demand specific strategies. For example, handling classifiers align with character perspective because the hand of the signer reflects the handling of the object in real-world. Thus, the different handling handshapes depend on the nature of the invisible conceptual entity being handled. On the other hand, entity classifiers align with observer perspective because the ‘tokens’ or entities depicted are “limited to the space ahead of the signer” (Liddell, 2000, p. 338).

In character perspective, signers play active roles and as Meir and her colleagues noted, “[t]he most direct way in which the body can be used as an iconic representational device is that it may stand for a human body and all its various parts: the mouth eyes, ears, forehead, chest, arms etc.” (Meir, et al., 2013, p. 318). In chapter 2, we identified two major points in iconicity proposed by Meir, et al., (2013): (1) the way in which iconicity is grounded in human experience (embodiment) and (2) the competition between iconicity and grammar. This paragraph will discuss the former, i.e., the way in which iconicity is grounded in human experience. Meir, et al., (2013) categorised three iconic use of the body: (1) the signer's body represents a human body; (2) the signer's body represents the subject of the argument of a verb; (3) the signer's body represents the 1st person in pronouns and agreement verbs. According to this analysis, a signed event can be an embodied human experience where the signer takes on several roles. In chapters 6 & 7, we identified that signers took character-related roles in location, motion, and action event. When the signers' bodies represent themselves (or a human body in action) as in Figure 8.10 (*boy holds bicycle and head*), the signer becomes the subject.

Signers used their hands and the space in front of their body to give iconic, topographic depictions of real-world scenes in sign space. For example, objects were depicted with the hands representing the size and shape of the entities moving or located in space. Signers associated space to non-1st person roles by taking the perspective of an observer to represent reduced-sized event space. This was typically identified in the use of entity classifiers indicating motion and the use of observer's perspective. Using entity classifiers in observer perspective, signers profiled the hands or fingers as entities located or moving in space as exemplified in *boy and girl riding towards each other*. The conceptualised handshapes in this example assume the role of the two animate figures who are in motion towards each other. The linguistic forms (the upright entity classifier or two-legged entity classifier) profiled two animate figures moving towards each other from the opposite direction. Both animate figures are agents in motion and the signing space is conceptually profiled as the field with the vegetation and the trees. Entity classifiers (depicted by iconic handshapes) are perceived as objects that are stationary, moving, or involved in some activities.

8.4 Construal in sign language

The linguistic notion of construal refers to the alternate ways language users interpret a content (Langacker, 2008) and iconic mapping is the construal of the phonological (form) and semantic (meaning) that are represented in the same conceptual domain. Language users perceive linguistic content in relation to their understanding. That is, the relationship between the form and the meaning is depictive of how language users represent conceptual structures with linguistic forms and how the forms resemble the structures they represent.

Important to note is that the conceptual base of a linguistic expression refers to all the domains accessed in a broad construal (Langacker, 2008). There is also a narrow construal that profiles only the "onstage" portion as noted by Langacker. For example, in the narrative tasks, signers mostly presented a narrowly construed expression when retelling the videos. That is, most background information were not considered or were ignored, and specific focus of attention was given to the onstage expression in the retelling. On the other hand, most objects in the lexical elicitation tasks were construed broadly by profiling two or more associated networks of the object (see §8.6).

The cognitive approach to phonology proposed by Occhino (2016, pp. 5-6) "incorporates concepts of embodied cognition and explores the human ability to construe the articulators, and by extension form construals of articulations themselves, which allows for mapping of language internal and language external patterns". Language internal patterns according to Occhino are analogical and language external patterns are iconic. For example, chapter 5 identifies cross-linguistic similarities in the selection of iconic strategies by signers and gesturers in three categories: Handheld tools, Clothing & Accessories and Furniture & Household items. Signers and gesturers mostly construed Handheld tools with *instrument* or *handling* strategies which depict the manipulation of the tools and by extension allow a mapping between the linguistic form (sign) and the meanings assigned. *Handling* and *instrument* strategies relied on perceptual properties of the depicted object, i.e., the handshape for the *handling* or *instrument* depiction was based on the physical properties of the object being depicted. The next subsections will discuss specific classes of construal (Langacker, 2008) and how these were demonstrated in the data.

8.4.1 Specificity

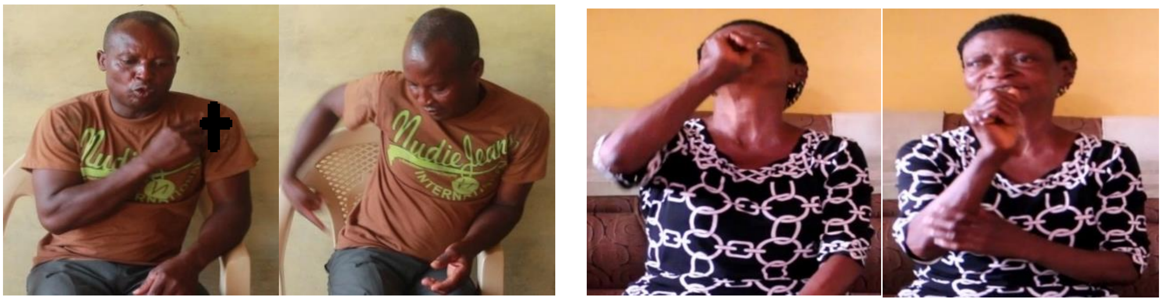
One class of construal relevant for signers' representation of lexical and grammatical iconicity is *specificity*. This label of construal applies to "the level of precision and detail at which a situation is characterised" (Langacker, 2008, p. 55). The implication of this label to the current study concerns the amount of information given by signers through the depiction of lexical and spatial information. In other words, specificity in this section details the characteristics of the specified object given through signers' choice of iconic (and non-iconic) strategies. As noted by Langacker, "[a] highly specific expression describes a situation in fine-grained detail, with high resolution" (p. 55). On the other hand, expressions that have lower specificity reveal only "gross features and global organisation" (p. 55). In the examples below (i-iii) we identify fine-grained details at the tail end of the hierarchy, whereas the initial entities are more schematic representations.

i. *rodent* → *rat* → *large brown rat* → *large brown rat with halitosis* (Langacker, 2008, p. 56)

ii. *tool → handheld tool → handheld hospital tool → handheld hospital tool that is injected on the rump (shoulder/arm)*

iii. *tool →handheld tool →stout handheld tool → stout handheld tool that contains consumable liquid*

The example of a GSL signer's depiction of mirror (§8.6) presents a fine-grained detail of the object. Other examples of specificity seen in this dissertation relied on multipart tokens (signs with two or more parts). These different tokens present specific information about the object. For instance, in Figure 8.9 *syringe* and *bottle* were depicted by signers with specific details of the objects. In these examples, we identify specific ways signers profiled *syringe* and *bottle* based on the individual construals that were activated. The phonological parameters of the sign (i.e., Handshape, Location, Movement and Orientation) assigned different levels of precision in iconic tokens. In Figure 8.9, the handshapes give specific details about the shape of the objects, the locations give specific details about perceived places the object can be situated, the movements depict how the object is used in the real-world and the orientation of the palm specify the way an object is oriented to another object. Other nonmanual features like shifting the torso, raising the head all present detailed information about the *syringe* and *bottle*.



HOSPITAL instrument handling entity

SYRINGE (GSL) BOTTLE (AdaSL)

Figure 8.9 Specificity in construed handheld tools

Signers demonstrated specificity in spatial relations depicting location, motion, and action. The strategies used by signers (lexical and classifier predicates) demonstrated precision of details found in the stimulus videos. For example, simultaneous constructions demonstrated specific information about the referent(s) and the event(s). Some signers of GSL and AdaSL simultaneously depicted the action of the boy holding or touching his hair while riding the bicycle (see Figure 8.10). Some of the specific information given in this example includes: *the boy (CL_E) held the hair*, and *(the boy) holding the bicycle held the hair*.

In this example, we see a blend of information comparable to Langacker's (2008, p. 56) example.

iv. *Something happened.→A person perceived a rodent.→A girl saw a porcupine.→ An alert little girl wearing glasses caught a brief glimpse of a ferocious porcupine with sharp quills.*

Example (iv) above is comparable to the specific information given by signers using simultaneous construction as exemplified below in (v).

v. *Something happened.→A person rode a single-track vehicle. →A boy rode a bicycle.→ A boy whose hat fell from his head and briefly touched his head rode a bicycle.*

AdaSL

RH: CL_H (holds hair) CL_H (hold bicycle)
LH: CL_E (boy) CL_H (hold hair)

Figure 8.10 Specificity in construed action

Through the simultaneous construction (SC), signers took on different roles and viewpoints (perspectives) to give specific information about the action comparable to *A boy whose hat fell from his head and briefly touched his head rode a bicycle*. In this particular example for representing this scene (Figure 8.10), most signers presented specific information as compared to schematic information like *something happened*. Specificity seems to be an inherent feature of simultaneously signed narrations depicting action predominantly, and in motion events and location scenes. Whereas specificity is inherent to both signed and spoken languages, we identify that using SC, signers economise this feature and depict scenes giving information about multiple referents or multiple events. As noted by Dudis (2004), signers can effortlessly produce other visible elements in addition to them being the actor (character). This is depicted in the GSL SC in Figure 8.10; signer is an actor touching the hair and at the same time produces the entity classifier depicting the boy on another hand. On the other hand, signers can effortlessly produce two actions as one actor performing these two at the same time as exemplified in the AdaSL example in Figure 8.10. Whereas the GSL example presents one event with two partitionable viewpoints (signer as an actor and as an observer with blended spaces; real, surrogate and token), the AdaSL example presents two events (holding hair and holding bicycle) with a single viewpoint (signer as an actor; real and surrogate spaces). These two representations are specific depictions of the scenes as shown in the Pear Story.

Specificity is depicted with both manual blends (Dudis, 2004) as exemplified in Figure 8.10 and manual and nonmanual blends (see Figure 7.25 in chapter 7). GSL and AdaSL signers demonstrated a preference for both manual and nonmanual simultaneity, but the visible parts of signers' bodies[138] that formed the blends with the signer as actor (character) differed. GSL signers barely used the lower parts of the signer's body as part of their blends (with few examples of signers holding their leg to depict *boy holding leg*). In contrast, the legs were used by AdaSL signers to depict movements (legs literally move) and holding the leg (depict *boy holding leg*). Here we identify that specificity is hindered by the limitation of the signing space available to GSL signers, whereas AdaSL seem to have a broad signing space that allowed specific details of the events to be recounted using the area below the torso as a signing space.[139]

8.4.2 Focusing

Focusing as a class of construal involves the selection of conceptual content for linguistic presentation, and its arrangement into foreground vs. background (Langacker, 2008). For example, both GSL and AdaSL signers (and the gesturers) demonstrated that LIPSTICK has maximal scope over the lips, i.e., the ground for LIPSTICK is the lips. The major focus for the depiction of the sign LIPSTICK was not the iconic strategy used (*instrument* and *handling*) but the relationship to the lip, i.e., the embodied experience with using the object. Although the *instrument* strategy depicted lipstick with specificity [small elongated object used on the lip], we identify that the lip as the 'location' for applying lipstick is maximally activated in the sign (as compared to depicting the same object with an *instrument* handshape in a neutral location, see Figure 8.11). Another example is the sign FRIDGE that activated COLD and *tracing the shape of a fridge* for most signers. In the FRIDGE example, the conceptual content is the freezing nature of fridge (or at least making things cold). Profiling fridge as *cold* fixes

[138] This refers to other parts of the body that formed the blend together with signer as actor. Classifier and lexical predicates were the second strategy in simultaneous constructions involving character perspective. Whereas classifier predicates were iconic depiction of the events, lexical predicates were either iconic (modified lexical items or directionals) or non-iconic (like plain verbs).

[139] AdaSL seem to have a larger use of signing space as compared to GSL signers, in general. The use of the legs was not constrained to narrative tasks but also lexical tasks to name FOOTBALL and SHOE. There are specific sign names that are signed from the knee in AdaSL.

the focus on what the fridge does as compared to what fridge looks like. On the other hand, profiling fridge by outlining the shape focuses on the conceptual information on the shape of fridge. However, some signers (e.g., Figure 8.11) used both *cold* and *outline shape* to depict fridge and as such assessed a multiple network of associations as the focus (§8.6 gives details).

Manipulation (*handling*/*instrument*), entity depiction (*entity*/*entity at location*/*measure stick*), virtual depiction (*tracing 2D*/*3D*), size depiction (*measuring*), pointing (*indexing*) and embodied gestures (*presentable action*/*body*) all relied on source and target domains to depict the resemblance relationship between the linguistic form and the meaning. The source domain is anchored in our human (bodily) experience and the target domain is the representation that is viewed and understood (Langacker, 2008). For all the iconic strategies, the phonological features activated specific conceptual content as the focus of the lexical items.


AdaSL

GSL

Mouth for LIPSTICK *Cold* and *trace shape* for FRIDGE

Figure 8.11 Focus expressed in LIPSTICK *and* FRIDGE

In the expression of spatial relations, signers of both sign languages depicted mostly the figure as compared to the ground. For instance, both sign languages barely described location scenes as such scenes formed the background/ground in comparison to the figure performing the action or the motion. The general focus in both sign languages was on the dynamic scenes that were action packed and involved signers taking on specific roles in retelling the narratives. This could be an indication of the conceptual depiction of the things that are projected in our daily thinking (dynamic events as opposed to background description). Background details like the colour of a dress, shoes, how a table is positioned in a restaurant seem unimportant as compared to the services we receive at the restaurant. An example is the fact that none of the signers described the colours of the shirts worn by the girl and the boy who were riding the bicycle. Contrastively, none of the signers missed the narration of a girl on a bicycle moving towards another boy on a bicycle. As a further example, the Pear Story opens with a static scene of the location of a man picking the pear:

Pear 1, scene 1- *Scene of sloping hill with tree in foreground, ladder leaning against tree (on right side of tree) and basket on ground to right of tree. Ladder is between basket and tree. Man is standing at top of ladder in tree (this is hard to see). Other trees in background.*

This information was not presented fully by any of the signers. The background "stories" seem to be unimportant as compared to the foreground events. None of the signers mentioned the hill nor the fact that the ladder was between the basket and the tree. Some background information was given by signers from both sign languages including the ladder leaning on the tree and the presence of other trees and the baskets. All the signers who gave background information included the ladder and the pear tree as these two contributed to the subsequent event of picking the pears from the tree. Signers mainly described the static scene from their point of view focusing on what is 'relevant' to them. For the dynamic scenes, all the signers presented the 'major events' including *the man dragging the goat; the man picking the pear; the boy stealing the pear; the boy meeting the girl on the bicycle; the boy's fall; the events of the three boys* etc. Even though signers demonstrated individual and community construals in the depiction of location, motion and action, the conceptual content mostly construed by signers focused on the dynamic scenes. Individual construal refers to preferences for specific strategies and the narrative approach used by individual signers; community (language) construal refers to specific preferences used generally in the signing community. For example, GSL signers had community preference for entity classifiers depicting motion events, whereas AdaSL signers had individual preferences for entity classifiers depicting motion events.

8.4.3 Profiling

It is typical of language users to direct "attention to certain aspects of the scene being linguistically encoded" (Evans & Green, 2006, p. 41). When language users use profiling, there is attentional windowing (Talmy, 2000, cf. Evans & Green, 2006) that highlights particular information over other information. This section considers the conceptual content profiled by signers in the lexical and narrative tasks.

Profiling objects (Lexical tasks)

Signers used several strategies as discussed in chapter 5 to profile Household tools and objects. The discussion in chapter 5 revealed that; (1) Handheld tools used mainly *instrument* for both sign languages (2) Clothing & Accessories used mainly *handling* for both sign languages (3) Furniture & Household items used mainly *tracing* (4) Appliances were represented with different strategies. GSL used mainly *instrument* while AdaSL used both *instrument* and *handling* (5) Nature category used mainly *entity depiction* by both signers and GSL used a good amount of *presentable action* (embodied gesture).

Each of the strategies directed attention to certain aspects of the objects being encoded. For example, whereas the *handling* strategy profiled the way the object is handled in its canonical use, the *instrument* strategy profiled both the object and how it is used. Even though *handling* and *instrument* strategies profiled different information, both strategies projected the signer as an agent performing an action. On the phonological level, specific information about the object was profiled based on the conceptual mappings between the construals of handshape and the construals of real-world object. The same strategy used to profile an object could project certain aspects of the object as compared to others. The phonological parameters (Handshape, Location, Movement or Orientation) highlighted aspects of the source object based on signers' conceptualization of the object, and the projection of this conceptual content depended on the construals of form. For instance, mobile phone and standing fan were mainly profiled as *instrument* and spectacles as *entity at a body location*. However, different handshapes and orientations profiled particular aspects of the objects including variants in terms of the entity depiction or signers' individual conceptual mapping of the object.

Table 8.2 Examples of profiled variants of the same strategy

Iconic strategy	**Construed variants using the same iconic strategy**
Instrument 	 GSL  AdaSL Different handshapes MOBILE PHONE

	 GSL  AdaSL Different orientations & handshape STANDING FAN
Entity at loc. 	 GSL  AdaSL Different handshapes SPECTACLES

Profiling spatial information (Narrative tasks)

According to Langacker, “[a]n expression can profile either a thing or a relationship” (Langacker, 2008, p. 67). The examples in Table 8.2. profile things (objects). There are other expressions (and here signed expressions) that invoke a relationship even though profiling an entity. An example given by Langacker is *aunt* that profiles a “kinship relation between a female and a reference individual” (2008, p. 67). Profiling spatial relationships between two entities in signed languages is done through simultaneity; that is, the use of either bimanual or manual and nonmanual simultaneous constructions. For example, depicting spatial relationships in sign languages with simultaneous constructions such as depicting *the boy and* *girl riding towards each other* with entity classifiers profiled the agents involved in this motion event. This example does not just profile the agents (boy and girl), the spatial relationship between them (moving towards each other) is linguistically encoded.

Signers also used construed variants of the same strategy for motion and action events. Entity classifiers depicting animate (human) referents were profiled as a two-legged entity classifier or as an upright entity classifier. The alternate ways of depicting events with entity classifier for motion profiled particular aspects of the entity. Whereas the upright entity classifier conceptually maps a resemblance relationship with any upright entity (both animate and inanimate), the two-legged entity classifier profiles the legs of an animate entity (specifically, a two-legged animate entity). In the example depicted in Figure 8.12, the two-legged entity classifier profiles the legs of the human agents and the upright entity classifier profiles the full body of the human agents. In other words, both signers use the same strategy (entity classifier depicting motion), but different profiling of the entity. In both examples, the onstage figures (the profiled entities) are the boy and the girl. The bicycle was not profiled when signers used entity classifiers to depict motion. On the other hand, signers profiled the *rider* or the *bicycle* when they used embodied gestures such as holding the handlebars of the bicycle, or manipulative gestures (*instrument*) such as the hands as the wheel of the bicycle.

Depicting a motion event (*boy and girl ride towards each other*) with the embodied action of holding or riding the bicycle profiles an agent (single), but not the spatial relationship between the boy and the girl (see still 4 & 7 of Figure 8.13). As seen in chapter 7, depicting events with simultaneity (Figure 8.12) encoded different aspects of the scene at the same time as compared to sequential depiction (see Figure 8.13). However, when signers use entity classifier predicates, the hands of the cyclists are not visible in the classifier, but one can conceptually infer that the *cyclist is still holding the bicycle*. The examples depicted with sequential depiction used both lexical and classifier predicates. The example in Figure 8.13 uses lexical predicates to show the same events represented in Figure 8.12.

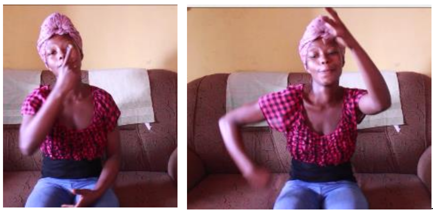

GSL


AdaSL

	GSL	AdaSL
RH:	CL_E (boy)	CL_E (boy)
LH:	CL_E (girl)	CL_E (girl)
	Two-legged CL_E	Upright CL_E

Figure 8.12 Profiling figures and motion event with entity classifiers

RH: BOY FINISH BOY RIDE GIRL
LH: FINISH RIDE



AdaSL

RH: ONE RIDE
LH RIDE

Figure 8.13 Profiling figures and motion event with lexical predicates

8.5 Image schemas and thematic roles

Image schemas are mental patterns that provide an understanding of various experiences (Johnson, 1987). Signers' experiential knowledge is an informative aspect in understanding objects and events. In other words, signers' linguistic experiences rely on how language is used in specific contexts. Image schemas are part of language users' daily experiences and part of their thought patterns. Therefore, the production of language depends on these image schemas that form part of language users' interactions. The schema of shape, performance (action), manipulation etc. are relevant for iconic naming of Household tools and objects. These schemas are related to the object based on signers' selection of specific information represented through the phonological representation of the sign. For example, the shape schema mainly projects the shape of the object using strategies such as *virtual depiction* and *measure*. The manipulation schema as an iconic strategy includes *handling* and *instrument* and the object schema includes *entity depiction*. Langacker notes that image schemas "give rise to more elaborate and more abstract conceptions", as e.g., "the concept ENTER can be analyzed as a combination of the image schemas object, source-path-goal, and container-content" (Langacker, 2008, p. 32).

In both lexical and narrative tasks, signers take different roles as participants. Thematic roles in this section consider the various participant roles taken by signers to depict both the Household tools and objects that were named in the lexical task and to retell the Pear Story in the narrative task. The relationship between thematic roles and image schemas pertains to the selection of specific information depicted by signers. For example, in the data, lexical signs that involved two schemas (two simultaneous iconic strategies) mostly presented different thematic roles as exemplified in Table 8.3. In other words, different schemas provide different semantic information of the referent or of the signer performing the task. §8.5.1 will consider different images schemas and thematic roles used by signers in the lexical task, and §8.5.2 will focus on the different thematic roles used by signers in the narrative task.

8.5.1 Image schemas and thematic roles in lexical tasks

Some of the responses in the lexical elicitation tasks used different image schemas in individual signs. For example, with objects that elicited different tokens for the same item, signers depicted different aspects of the object based on their general understanding. There were also instances in which a single sign depicted two aspects of the object in figure-ground depiction. This section will focus on the latter (figure-ground representation) and refer to the use of more than one image schema at the same time in a single token as *multiple schemas.*[140] For responses considered under the multiple schemas, the two hands profiled different aspects of the object simultaneously. The iconic mappings of these handshapes construed different conceptual contents of the depicted object and thereby illustrated figure and ground information with different image schemas. For example, when signers use *handling* strategy (manipulation) together with an *entity* strategy (object), the handled hand depicts how the object is grasped, handled, or used and the entity hand depicts an object that is being acted on. These different image schemas identified two different roles (thematic roles) of the participants.

In other words, the dominant hand and the non-dominant hand in figure-ground tokens profiled different information in relation to the object. For most of the signers, the dominant hand profiled the figure or the handling of the figure, whereas the non-dominant hand profiled the ground, or the entity being acted on (Figure 8.14). Figure 8.15 shows the relationship between image schemas and thematic roles. In Figure 8.15, the *handling* hand (manipulation) and the *entity* (object) represent the image schemas of KEY exemplified in Figure 8.14, while the Agent and Patient are the thematic roles assigned to KEY. *Handling* confers agentic role to the dominant hand and *entity* (being acted on) confers patient role to the non-dominant hand. In Table 8.3, FORK and KNIFE have manipulation and object schemas

[140] "Multiple schemas" is used in this section to refer to the use of more than one iconic strategy at the same time (i.e., figure-ground). Chapter 5 indicates that figure-ground relationships were popular in Handheld tools as compared to the other semantic categories investigated.

depicted with *instrument* and *entity* strategies; KEY and HAMMER have manipulation and object schemas depicted with *handling* and *entity* strategies.

GSL AdaSL

FORK KEY KNIFE HAMMER

Figure 8.14 Handheld tools with multiple schemas

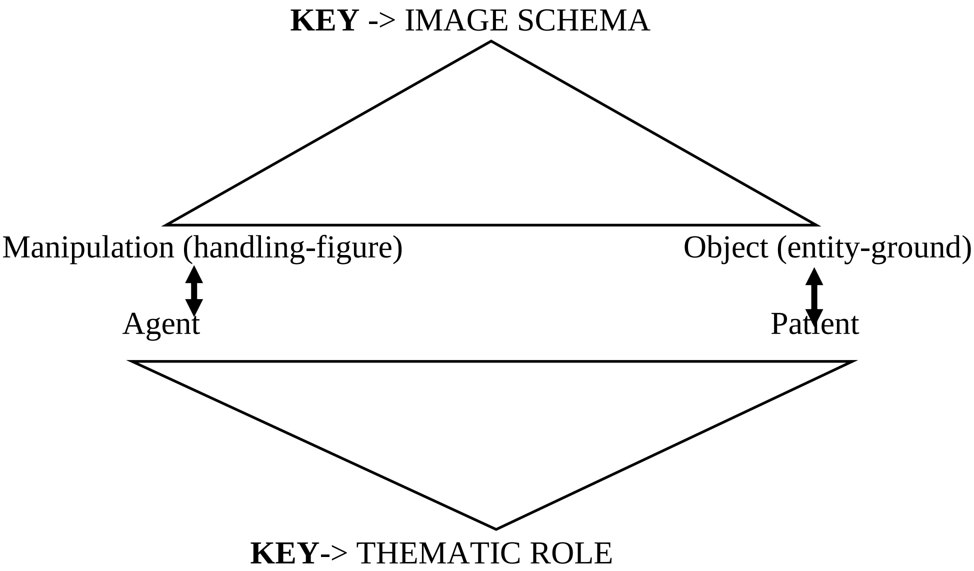


Figure 8.15 Relationship between image schema and thematic roles

Table 8.3 Multiple schemas in individual signs

Articulatory unit	**FORK**	**KEY**	**KNIFE**	**HAMMER**	**Thematic role**
Dominant hand	V	A	B	A	Agent
Non-dominant hand	B	B	B	A	Patient

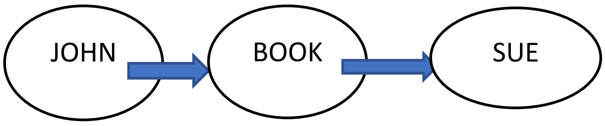
Iconic strategy (dom)	Instrument (manipulation)	Handling (manipulation)	Instrument (manipulation)	Handling (manipulation)	Agent
Iconic strategy (ndom)	Entity (object)	Entity (object)	Entity (object)	Entity (object)	Patient

8.5.2 Thematic roles in narrative tasks

In the narrative tasks, signers used different image schemas that elicited different thematic roles. In the visual modality, a signer can take on the role of the Agent or Patient or both. In narrative tasks, signers conceptually construed the *Place* in space to represent a real-world place or person (where Place is the patient/recipient/benefactor and signer is the agent). The term *Place* refers to meaningful locations that have different semantic and phonological specifications (Wilcox & Occhino, 2016a). When Place is used meaningfully, an invisible surrogate is situated in the signing space. In the grammar of sign language, role assignment can be done through the iconic use of the signer's body or giving meaning to *Place*. In English, a simple sentence like,

vi. John gave the book to Sue

has different semantic roles. John (subject) is the *Agent*, Sue is the *Benefactor/Recipient,* and the book is the *Mover* (or patient) that changes location from John to Sue. This sentence is assigned semantic roles based on the roles that the parts contribute to the general understanding of the sentence. Sign language uses embodied gestures and motion, and action events are represented using constructed action (CA). Alternatively, entity classifiers (or tokens) are used which situate the signer in an observer viewpoint. The movement of one entity or object to another location in sign languages is depicted manually in space through classifier and lexical predicates. The perception of these moving objects visually forms "the basis of role archetypes upon which semantic roles are built" (Wilcox, 2004, p. 126). Wilcox refers to the role archetypes as conceptual archetypes because they "emerge from our visual perceptual and motoric abilities" (p. 126) to reflect our experience of the physical reality. The grammars of sign languages encode these conceptual archetypes in the iconic strategies used by signers. The "agent is an individual who willfully initiates and carries out an action, typically a physical action affecting other entities" and becomes the "energy source and the initial participant in an action chain" (Langacker, 2008, p. 356). In sign languages, the agent's role is cognitively marked within the sign and the inflected form of the sign changes trajectory and assumes the semantic roles. In, *John gave the book to Sue*, John is the agent and the initial participant in the action chain.



John (Agent) gave the book (Patient) to Sue (Recipient)- Action chain

Figure 8.16 Action chain in language

In a sign conversation where the participants are interacting face to face (real space), the role of the Agent is marked from the person performing the action of *giving* and the (visible) Recipient or Benefactor is the person in the sign event *receiving* the book. However, in retelling or narrations, the signer in character perspective is the Agent but the Recipient is not in the signing event but is conceptualised and placed in the signing space as a surrogate or a token. For example, Figure 8.17 exemplify two instances where the recipient is in the event (still image from Pear Story) and where the recipient is placed in the signing space as an invisible surrogate (still image from AdaSL signer). The signer as the *Agent* moves the hand through a *path* towards the conceptualised *Recipient* who is located in space.

AdaSL

RH: SASS (hat) loc.$_{signer}$ to loc.$_2$ (recipient in space)
LH: SASS (hat) loc.$_{signer}$ to loc.$_2$ (recipient in space)

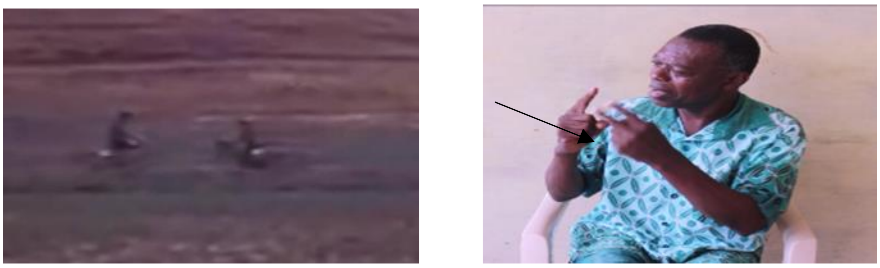
Real space
Surrogate space

Figure 8.17 Boy$_1$ (Agent) gives the hat (Patient) to Boy$_2$ (Recipient)

Whereas the *Patient* that changes location from John to Sue in example vi. (or Boy$_1$ to Boy$_2$ as in the Pear story) in face-to-face conversation is a real entity that moves from one person to another (book or hat); in narrations or retellings, the Theme or Patient (surrogate/token) is construed with iconic handshapes and moves from loc.$_1$ to loc.$_2$ in the signing space. In the AdaSL example in Figure 8.17, both the Patient and the Recipient are conceptualised and located in the signing space using an iconic handshape (SASS) and a meaningful place conceptualised as the location of the recipient or the surrogate. As identified in chapters 6 & 7, signers used multiple blends of perspectives in the narrative tasks and took on more than one role in simultaneous descriptions. In narrative tasks, language users (signers and speakers) are modulated by the specifics of the language domain. For example, whereas a speaker can retell an event without committing himself to the details of the event using reported speech, signers have the modality '*freedom*' to represent the event using reported narrations (entity classifiers and lexical predicates) or as partakers of the event with embodied gestures portraying the different actions and taking on different roles as and when possible.

Importantly, we identify that space is meaningful in sign languages and signers "extensively employ spatial locations to convey meaning" (Wilcox & Occhino, 2016a, p. 378). The meaningfulness of space and Place in sign language cannot be overlooked in assigning role archetypes in sign languages. In the same way, certain linguistic attributes of sign languages permeate the presence of role archetypes. For example, "agreement verbs are morphologically marked for both syntactic and thematic agreement" and this is done "by utilizing two different phonological elements available in the language: the direction of the path movement, and the facing (as distinct from orientation) of the hands" (Meir, 1998, p. 3). The direction of the path movement in the verb GIVE presents the roles of an Agent and a Recipient. The Agent is the signer, and the recipient is the 'invisible' surrogate located in the meaningful Place where GIVE is directed. In the GSL example in Figure 8.18, the entity classifier is located in a meaningful location in space. The change in "phonological location may be used to represent a change in conceptual location; this change may either be actual or metaphorical" (Wilcox, 2004, p. 125). For example, *boy and girl riding towards each other* identifies two entity classifiers moving in space and a change in location of the entity classifiers represents an actual change depicted with movement through space.

Narrative tasks were conceptually depicted with different strategies that included the signer taking on different thematic roles. The narrative tasks presented different conceptual archetypes (roles) based on visual and motoric abilities of signers. Classifier predicates and embodied gestures (constructed action) permitted signers to cognitively take on both Agentive and Experiencer roles at the same time. This is comparable to lexical tokens with multiple schemas that generated different thematic roles. For example, in Figure 8.18 *(boy watches girl),* the boy is the *Experiencer* and the girl is the *Recipient* (or *experiencer*) of the action of the boy. Important to note is that in this scene, the girl is an *Agent* riding a bicycle and moving along in a *Path*. The signer uses the object schema for the entity classifier depicting the girl on the bicycle; constructed action depicting the boy looking at the girl and a modified lexical verb [WATCH] depicting the action of the boy. The multiple events and referents depicted in this example reveal the cognitive complexity of this single simultaneous construction. In other words, the signer activated both image schema (an object schema here) and thematic roles (Agent, Experiencer, Recipient, Path) in profiling the event *boy watches girl*.



RH: CL_E (girl) – agent (riding a bicycle)
recipient (of the boy's gaze)
LH: SEE
Embodied gesture (CA): experiencer (boy performing the action of seeing)
Trace path: path (the trajectory of movement)

Figure 8.18 Role archetypes in simultaneous constructions

8.6 Network of association and conceptual integration networks

Other sequential depictions profiled lexical and grammatical segments with a network of association and conceptual integration networks. The subsections under §8.6 will discuss how signers depicted networks of associations in the lexical tasks and conceptual integration networks in the narrative tasks.

8.6.1 Network of association in lexical tasks

A network of association in this regard represents all the conceptual mappings associated to the symbolic unit.[141] For example, the networks of association of FRIDGE[142] present the conceptual mappings of cold, shape, door, storage etc. These networks can be depicted with different iconic strategies by signers depending on the construals of the real-world *fridge* that are encoded in the signed representation. Whereas single token iconic signs made use of just one of the associated networks (i.e., only one construal of the item is encoded in the sign), signs with multiple tokens used more than one schematic representation of the object. In the lexical elicitation tasks, a network of association was used by both GSL and AdaSL signers.

[141] Symbolic unit here refers to the linguistic unit.
[142] Shown in Figure 3.6 in chapter 3.

For example, bed was depicted with the schema of *shape* and the gesture of *sleep*; bowl and plate were depicted with the schema of *shape* and the action of *eat*, sofa was depicted with the schema of *shape* and the action of *sit* etc. The shape schema (*virtual depiction*) was used by signers across all the semantic categories. Signers varied in their preference for network of association, whereas some signers profiled a single associated network of an object, others profiled up to four associations of an object in the lexical elicitation tasks.

Signers had individual preferences (or differences) in the selection of networks for objects profiled with multiple networks of association. These differences in the profiled networks were prompted by the different schemas that were activated based on signers' experiential knowledge of objects. One other reason signers' profiled different networks to represent an object is associated to the different form-meaning mappings of the linguistic form of the sign. For instance, whereas 9 out of the 10 AdaSL signers profiled MIRROR with a single schema (object schema), GSL signers profiled mirror with multiple schemas and associations. GSL signers profiled *Mirror* with several networks of associations construed by signers. GSL signers depicted several construed associations for *mirror* including GLASS[143] (no form-meaning mapping), shape schema, object schema and SEE (lexical Verb).

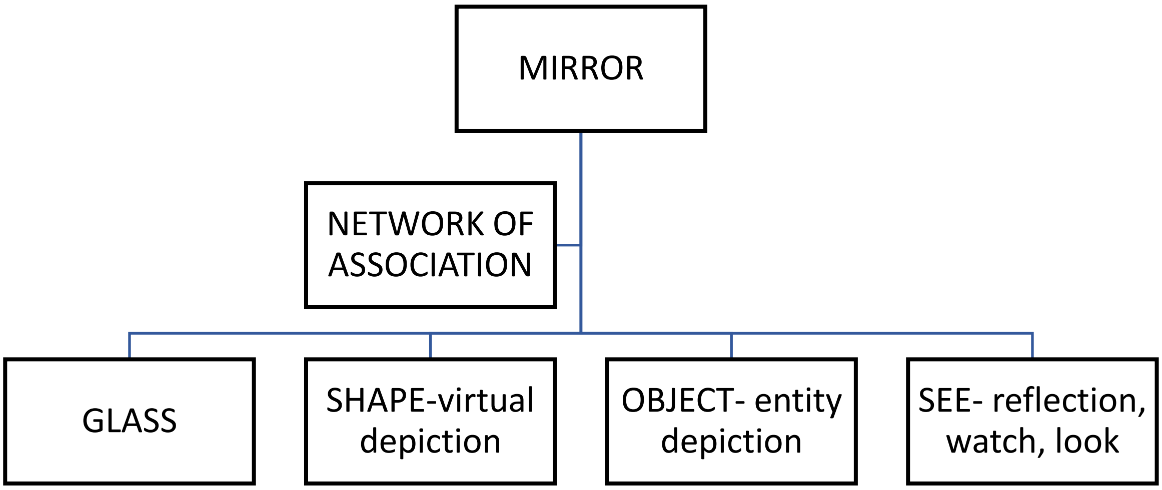


Figure 8.19 Network of associations for mirror

[143] GLASS in GSL was coded as non-iconic does not have form-meaning mappings as the construal of form and the construals of the real-world object do not have resemblance mapping. There seem to be no correlation between the phonological parameters (middle finger touching the teeth) and the meaning of glass (or mirror). However, some correlation can be made between the teeth and the shininess of *glass*.

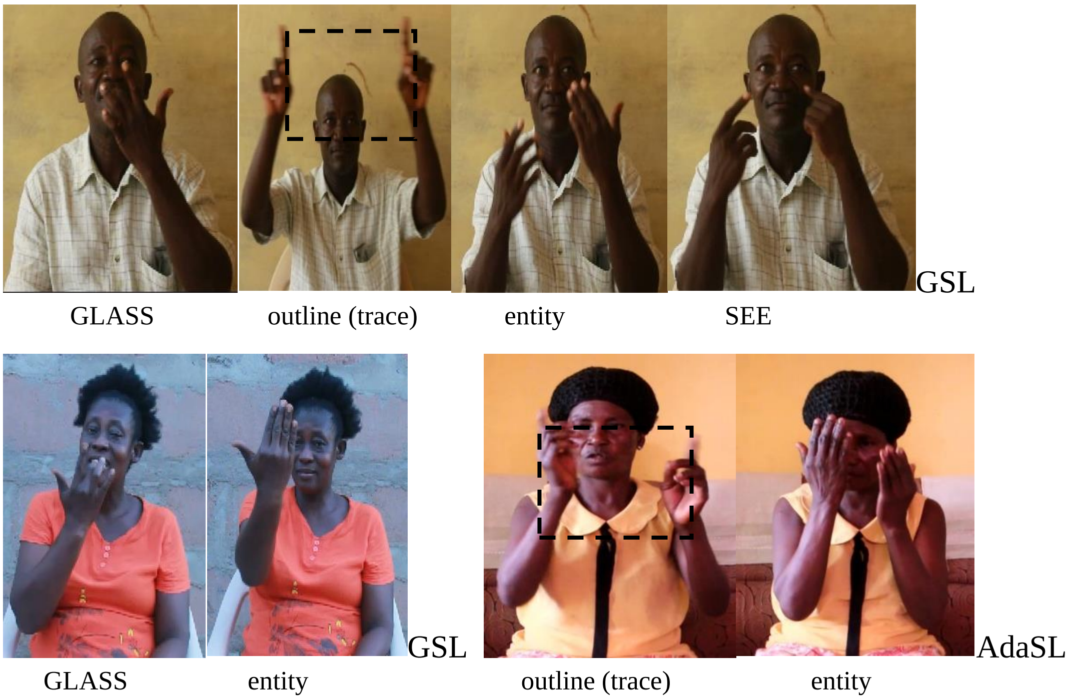


Figure 8.20 Examples of Network of Association of mirror

The examples in Figure 8.20 support the view that grammar is an individual experience and the sociolinguistics of the language user seem to influence the conceptualization of linguistic events represented here by both individual and community construals[144] of *mirror*. The different conceptualizations of the lexical item could also be an indication of the presence of linguistic variants in the language communities. The phonology of the sign is extracted from signer's experiences and sociocultural or sociolinguistic differences. In a rural setting like Adamorobe, there seems to be a condensation of these different individual experiences as we identify more consistency and agreement of the use of strategies across most of the semantic categories as compared to GSL. As noted by (Occhino, 2016, p. 109) "[i]f individual experience can somehow be condensed into 'group' experiences, we will likely find patterns of agreement across different groups".

8.6.2 Conceptual integration networks in narrative tasks

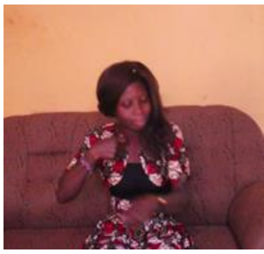
Related to the conceptual mappings associated to symbolic units in the lexical tasks are the conceptual integration networks in the narrative tasks. Signers used conceptual integration networks to depict 'partitionable zones' (Dudis, 2004) in single blended signs as depicted in Figure 8.21. In the examples in Figure 8.21, the signers depict both the man and the animal

---

[144] *Mirror* in GSL is GLASS^entity and in AdaSL is entity depiction. The different iconic strategies used by signers that differ from the general community depiction reflect their individual profiles of *mirror*.

being dragged in a single sign. The GSL signer pulls her own hand, depicting a conceptual integration of both the man and the animal in this blended sign [DRAG *man*, *animal*]. These blends were depicted using both manual and nonmanual features. The example in Figure 8.21 uses manual blends. In each case, we identify a conceptual blend from the partitionable zones within the body. The GSL and AdaSL blends in Figure 8.21 depict the action of dragging; the entity performing the action (Agent) and the entity being dragged (Patient). These two referents and events are blended into a single action mapped on the signers' body. That is, the examples in Figure 8.21 need *unpacking* before all the depicted events and referents can be identified. Unpacking is done by conceptually mapping the role archetypes to the hands, the body and the other nonmanual features involved in the blend. In other words, the full meaning of the depiction by signers is construed from the depicted scene.

GSL



AdaSL

	GSL	AdaSL
RH:	CL_E (goat)	CL_H (drag)
LH:	CL_H (drag)	
Signer:	both man and goat	both man and goat

Figure 8.21 Conceptual integration networks

Table 8.4 Partitionable zones in single blends

Man drags goat away	Man	Goat	Blended network
GSL	Depicted by signer's body (torso shift), facial expression and left hand (Agent)	Signer drags right hand as the goat (Patient)	DRAG, man, goat
AdaSL	Invisible but signer's right hand depicts the hand of the man (Agent)	Signer pulls own neck as the goat (Patient)	DRAG, man, goat

8.7 Summary

This chapter discussed the data in chapters 5,6 & 7 using a cognitive approach to language. The cognitive approach assumes a functional approach to language as a mental event. A usage-based framework, which is a cognitive approach, "considers linguistic structure to be emergent from how human languages are used, and shaped by domain-general cognitive processes" (Lepic, 2019, p. 1). From the discussions in the chapter, we identify that the cognitive approach to linguistic iconicity is suited for the discussion on form-meaning mappings between the linguistic form and the depicted image. The discussions in the chapter identify that the relationship between the linguistic form (phonology) and the meaning (semantics) has to do with a series of associations that are mapped from the phonological parameters and the meanings. The preference for a particular handshape over the other is the result of the image schemas that are activated when the object is seen. Thus, the preference for one handshape over the other is caused by what signers' profile and the construals of the object. Signers use embodiment when they perceive the linguistic content with grounded experience and their bodies interact with the linguistic form using embodied gestures. The different ways in which signers conceptualised the scenes in the narratives tasks include character, observer, narrator, and blends of these perspectives depicted with different iconic strategies.

The phonological and semantic parameters of iconic structures share perceptual form-meaning mappings. This chapter discussed the form-meaning mapping between the linguistic form (lexical and syntactical) and supported the view that (iconic) phonological parameters are meaningful. The meaningfulness of iconic phonological parameters arises from signers' experiences and possible exposure to "multiple usage events" (Occhino, 2016, p. 4). This exposure brings about both similarities and differences between handshapes and other phonological segments. The alternate ways of portraying linguistic information (construal) were seen in different labels that were applied to the data from GSL and AdaSL. We identified that signers used specificity, focusing and profiling, and these classes of construal mapped signers' perception of the linguistic content to reflect the real-world experience. The phonological articulators were conceptualised to have meaningful relations to the depicted object and scenes. The chapter discussed the different associations of a network and identified that signers used both individual and community construal associated with objects.

Finally, this chapter has discussed the cognitive linguistic approach to iconicity based on cross-linguistic data of different domains (lexical and grammatical). Iconicity defined within the cognitive iconicity approach (Wilcox, 2004) is the relation between the phonological and semantic parameters (poles). Examining the data from GSL and AdaSL, we identify that iconic structures are instantiated by the meaningfulness of the phonological parameters. In other words, the forms of iconic signs are meaningful, and the meaningfulness is influenced by signers' experiential knowledge. As Wilcox (2004) explains, the distance relation between the phonological and semantic poles of symbolic structures in an iconic relationship are close. This closeness is instantiated by the meaningful phonological parameters that have a resemblance relationship to the real-world objects and events. The resemblance relationship as noted in this chapter could be imagic (iconic lexical strategies) or diagrammatic (grammatical iconicity in narrative tasks). We identify that different strategies profile different construals of the real-world structures.

As has been observed in this chapter, phonological parameters have meaning, and the meaningfulness of the phonological parameters constitutes the "cognitive organization of one's experience with language" (Bybee, 2006, p. 711). Knowledge of language is experiential, and the individual and community experiences contribute to the differences and similarities within linguistic units. To close this chapter, let us consider the cognitive iconicity view that suggests that iconic structures are *symptomatic* of our cognitive abilities (Wilcox, 2004). That is, iconicity fundamentally unites the linguistic form and meaning, and this unity is a symptom of our cognitive abilities to represent linguistic forms with meaningful phonological forms. In order words, iconicity and arbitrariness are not mutually exclusive because we cannot always predict an iconic form from its meaning (Wilcox, 2004). As noted by Janzen (2006, p. 365) "iconicity in signed language does not mean that the relation between form and meaning is transparent". For example, iconicity in simultaneous structures in sign languages depict complex structures that represent complex events, but understanding these events relies on ones' experience with the language.

PART 5

CONCLUSION

Chapter 9

Conclusion

9.0 Introduction

The aim of this dissertation has been to give both comparative and descriptive analysis of iconicity through three main empirical analyses comparing GSL and AdaSL. The comparative analysis focused on lexical iconicity, spatial iconicity, and simultaneous constructions. The descriptive analysis of the data considered iconicity within the cognitive linguistics perspective. More specifically, the comparative and empirical analysis investigated the use of iconic strategies (lexical iconicity and iconicity in the grammatical constructions), signing perspectives and simultaneous use of strategies and perspectives across GSL and AdaSL. Chapters 5-7 presented the results of the comparative study and chapter 8 presented the results of the descriptive study. As identified in the chapters 5-8, iconicity demonstrated in the visual-spatial domain involves different form-meaning resemblance mappings that could be based on language-specific patterns, individual construal or other cognitive processes that map construals of real-world scenes to the construals of form.

Besides providing data on strategies that signers of GSL and AdaSL use in lexical iconicity and iconicity in the grammatical constructions, this dissertation has also given an in-depth analysis of the similarities and differences between GSL and AdaSL based on the data from the 20 signers. The different research questions that were raised at the beginning of the dissertation were explored in the different data chapters. The earlier chapters (1-4) presented the introduction to the dissertation (1); review of the linguistics of sign languages and literature on iconicity in spoken and signed languages (2); a review on the cognitive view of iconicity (3); and the research methodology (4). Chapter 1 discussed background factors including sociolinguistic information on GSL and AdaSL, and research on GSL and AdaSL. Chapter 2 presented background information to sign language linguistics and iconicity from the perspectives of signed and spoken languages considering examples from other signed and spoken languages. Chapter 3 focused on the enterprise of cognitive linguistics and discussed relevant themes like form-meaning mappings in the cognitive framework, construal and labels of construal that are relevant for discussions in chapter 8. Chapter 4 presented the methodological issues that were considered for the dissertation.

This chapter is arranged as follows; §9.1 presents the summary of the main findings from the three empirical studies and the cognitive analysis of iconicity. §9.2 considers the possible language contact and its effect on iconicity. §9.3 discusses diachronic change and borrowing as productive means to introduce new iconic forms to the repertoire of the language (AdaSL). §9.4 considers the research methodology used and its effect on iconicity in GSL and AdaSL. §9.5 discusses the theoretical implications and the contributions of the three empirical studies. The same section further discusses the theoretical implications of the cognitive linguistics analysis. Finally, §9.6 gives the general conclusions of the dissertation.

9.1 Summary of the main findings

Iconicity in language in general is not a recent debate but earlier discussions on the role of iconicity in sign language regarded it as a symptom of the modality and most possibly fading in time (Frishberg, 1975). Although much intriguing research in sign language linguistics has been done since the 1960's, most of the research done by sign linguists focused on general descriptions such as phonology, morphology, syntax and other sociolinguistic features. In recent times, there have been several works on iconicity in sign languages and these have investigated mainly lexical and spatial iconicity in Western and Asian sign languages with only few investigations of African sign languages. To be specific, iconicity in GSL had not been explored prior to this research. On the other hand, investigation on some aspects of lexical and spatial iconicity have been done on AdaSL (Nyst, 2007a; Nyst, 2016a; Edward, 2015a) but these did not sufficiently explore iconicity in the lexical and grammatical domains

Thus, this dissertation has filled the research gap by providing a comprehensive account of iconicity in GSL and AdaSL focusing on lexical iconicity, spatial iconicity and simultaneous constructions using both object naming and narrative tasks. The lexical tasks used Household tools and objects that were classified into 5 semantic domains and the narrative tasks were based on retelling the Pear Story. The primary aims of the dissertation have been to identify *if there are systematic differences and similarities in the representation of iconicity in the lexical and spatial (grammatical) domains in GSL and AdaSL* (considering the typologies and the language contact between GSL and AdaSL) and *to identify cognitivist*[145] *representation of iconicity revealed in the cross-linguistic data of different linguistic domains*. To identify the similarities and differences, lexical and narrative tasks were designed to elicit data from signers representing their use of iconic structures. The data from the lexical and narrative tasks were later analysed to identify how the results could be

[145] Themes/approaches from the cognitive linguistics perspective that have been discussed in previous literature on both signed and spoken languages.

described in cognitive linguistic approaches to iconicity considering the different linguistic domains. Important to the dissertation is the use of iconic strategies, signing perspectives, simultaneous use of strategies and signing perspectives, and signers' depiction of iconicity based on (individual/shared) experiential knowledge.

9.1.1 Lexical iconicity

The discussion on lexical iconicity in chapter 5 gave an overview of the preferred strategies used by signers of GSL and AdaSL to name Household tools and objects. Based on the results, it was identified that for the semantic category of Handheld tools, GSL and AdaSL signers used similar strategies to a larger extent preferring *handling* and *instrument* strategies over the other strategies. AdaSL signers however, used more *instrument* as compared to GSL signers. Furthermore, GSL and AdaSL signers demonstrated a preference for *handling* strategy for the semantic category of Clothing & Accessories. However, AdaSL signers demonstrated a greater preference as compared to GSL signers. Important to note is that in the semantic category of Clothing & Accessories, GSL signers used more forms without an iconic mapping and these forms were mostly lexicalised fingerspelling and initialised signs showing the influence of English on the structure of GSL.

For the semantic category of Furniture & Household items, GSL and AdaSL similarly preferred the *tracing* strategy over all the other strategies. More importantly, AdaSL signers had a high use of the *body* strategy and the *presentable action* strategy for Furniture & Household items as compared to GSL. The semantic category of Appliances had diversity in terms of signers' preference of specific iconic strategies. GSL signers used mainly *instrument*, *handling* and *presentable action*. On the other hand, AdaSL signers used *instrument*, *handling*, and *tracing 3D*. Finally, the category of Nature, which had the least objects represented, exhibited *entity* as the preferred strategy for both GSL and AdaSL. Clearly, AdaSL showed a greater preference for *entity* with respect to the other iconic strategies used and GSL, on the other hand, used other strategies like *presentable action*, *tracing 3D*, and *measuring*. Across all the semantic categories, GSL signers exhibited more responses coded as *non-iconic,* i.e., forms without form-meaning resemblance (e.g., lexicalised fingerspelling). More specifically, in the categories of Clothing & Accessories, 45% of GSL signs were coded as *non-iconic*. Finally, across all categories, GSL demonstrated a high use of signs coded as *not clear* (especially in the category of Furniture & Household items).

Comparing all the 5 categories, we identify a systematic preference for manipulation (*handling* & *instrument*), virtual depiction (*tracing 2D &3D*) and entity depiction (*entity*, *entity at body location*, *measure stick*). Signers mostly used these strategies for all the categories investigated in chapter 5. However, there were category specific preferences as seen in the paragraphs above. The other strategies were specific to each sign languages; for instance, *body* and *indexing* strategies were mostly used by AdaSL signers. GSL signers, on the other hand, used forms that were coded as *non-iconic* and *not clear* across most of the semantic categories.

Other features considered in the analysis include signers' consistency (>70% used same strategy) and full agreement (100% use same strategy) towards the use of the iconic strategies. GSL and AdaSL signers demonstrated 100% consistency and agreement in the Nature category. For the category of Handheld tools, AdaSL had more consistency and more agreement than GSL; for Clothing & Accessories, AdaSL had more consistency and more agreement than GSL; for Furniture & Household items, GSL and AdaSL had same consistency but GSL had more agreement; for Appliances, GSL exhibited more consistency and more agreement than AdaSL. The discussions on consistency and agreement revealed specific domains in which signers in both sign languages had similar strategies to name the same items. One argument supporting the differences and similarities among signers in their choice of strategies, consistency and full agreement is the age of the sign languages. AdaSL as the older sign language demonstrated consistency and full agreement in most categories except Appliances (and minimally in Furniture & Household items). However, GSL as the younger sign language had lower consistency and agreement across some categories indicating the various strategies used by signers. GSL had higher consistency for Appliances demonstrating the connection with science and technology as compared to the intra-community use of AdaSL.

The data from the signers were compared to the gestures of non-signers recruited from Adamorobe and Ketan-Sekondi. Findings were discussed with respect to patterns of iconicity across semantic categories and similarities and differences between sign and gesture. Overall, we identified more similarities between signers (GSL/AdaSL) and between gesturers (rural/urban). Of particular note is that gesturers use similar strategies (different proportions) and were more similar to AdaSL. Specifically, gesturers from Adamorobe (rural) showed a higher similarity with AdaSL in comparison to their urban counterparts in the preference for *instrument* strategy in Handheld tools. The similarities between the AdaSL signers and the non-signing gesturers from Adamorobe contradicts with earlier research with

Bedouin signers and non-signing gesturers (Padden , et al., 2013), and the other research on the preferred iconic strategies for Handheld tools by gesturers (Brentari, et al., 2015). Non-signing gesturers from Adamorobe showed an equal proportion of *handling* and *instrument* strategies for Handheld tools rather than the dominant *handling* strategy which has been documented for other gesturers. Chapter 5 mentions language contact as the main argument for the similarities between AdaSL signers and non-signing gesturers from Adamorobe.

Results from the lexical data demonstrates that varied iconic patterns for different semantic domains emerge with sign languages and provides valuable insight into the typology of sign languages and into the community-mediated interplay between sign and gesture in their shared access to the iconic affordances of the visual modality. For example, the generic preference for manipulation (*handling* & *instruments*) for Handheld tools in GSL and AdaSL and in previous research (Padden , et al., 2013; Kimmelman, et al., 2018; Hou, 2018; Hwang, et al., 2017) depicts manipulation (*handling* & *instrument*) as the preferred strategy among signers. On the other hand, gesturers (except for Adamorobe gesturers) have demonstrated preference for *handling* strategy for Handheld tools indicating the shared access of iconic strategies in the visual modality.

9.1.2 Space and iconicity

Chapter 6 provided an analysis of the encoding of spatial information focusing on perspectives used by signers and iconic strategies[146] for mapping location, motion, and action. This dissertation provided specific details on the perspectives used by both sign languages. Six different perspectives were identified: character, observer, narrator, character-narrator, character-observer, and observer-narrator. One similarity demonstrated in the data is GSL and AdaSL signers' preference for character, narrator, and character-narrator perspectives. On the other hand, observer related perspectives were dispreferred by signers of both sign languages to encode location, motion, and action. Notwithstanding the lower preference for observer perspective (token space), there were some interesting findings with respect to the use of observer perspective. Although AdaSL signers preferred character related perspectives (as stated in previous research), on few occasions, some AdaSL signers used observer perspective for motion events. This finding is interesting in the light of previous findings by Nyst (2007a) that suggested the absence of the observer perspective in

[146] These strategies combined the iconic strategies for chapter 5 and specific strategies relevant for iconicity in the grammatical constructions (e.g., constructed action, directionals/directional verbs, classifier, and lexical predicates)

AdaSL. For example, in Nyst's research, it was identified that "none of the different types of expressions of motion in AdaSL make use of a reduced-size projection" (Nyst, 2007a, p. 204). Of interest is the fact that the scene that triggered most of the instances of observer perspective use in AdaSL is the scene depicting the boy and girl riding towards each other (*Boy rides from right to left, girl rides from left to right*). Six AdaSL signers used entity classifiers to depict this scene and the observer perspective was less reduced-size in nature than a "typical" observer perspective use might be.

Furthermore, the presence of observer perspective in AdaSL seems to influence other areas such as the iconic strategies signers used to encode motion events in observer perspective. For GSL, it was highly expected that entity classifiers for motion events will be present considering the relationship with ASL and the presence of entity classifiers for motion events in ASL. On the other hand, AdaSL signers were not expected to use entity classifiers for motion event as previous works on AdaSL indicated their absence (Nyst, 2007a; Nyst & Perniss, 2004). All 10 GSL signers used entity classifiers in the narrative task, and 6 out of the 10 AdaSL signers used entity classifiers to express motion in space. The presence of entity classifiers depicting motion in AdaSL could be because of language contact with GSL or the research methodology used for the data elicitation. The effect of language contact and research methodology on iconicity will be discussed in §9.2 and §9.4.

9.1.3 Simultaneous Constructions

Chapter 7 presented the analysis of simultaneous constructions (SC) used to depict location, motion, and action by signers. The chapter focused on the different strategies signers of both sign languages used to depict SC. Both GSL and AdaSL depicted bimanual SC and manual/nonmanual SC. Overall, the chapter identified that numerically, GSL signers used more SC as compared to AdaSL signers. However, there was not much difference with respect to the intra-language use of SCs across sign languages.

AdaSL did not present any bimanual or manual/nonmanual simultaneity to depict location and GSL had only a single signer depicted bimanual simultaneity for location (and not a single use of manual/nonmanual SC for location). Contrastively, signers used a fair amount of bimanual simultaneity for motion and action events. Signers did not show many differences in their preference for bimanual SC and the few differences identified were the result of the different iconic strategies used to depict those scenes. For example, whereas GSL signers mostly used SC of entity and handling classifiers to depict the *boy on the bicycle moved to a location*, AdaSL signers depicted the same scene with handling classifier and a directional. Signers used similar iconic depictions for motion and action events, except that AdaSL signers did not use simultaneous blends of entity classifiers with nonmanual or lexical items. GSL signers had more SCs with multiple blends of both bimanual and nonmanual constructions compared to AdaSL signers. Although previous research on SC in AdaSL found that the sign language has SC limited in specific features (Nyst, 2007b), in chapter 7, various strategies were identified to be used by AdaSL signers to depict simultaneity. This finding reiterates the argument about language contact with GSL and the differences in research methodology. As seen in the examples in chapters 6 and 7, AdaSL signers (in the current data) demonstrated examples of SCs involving classifier predicates expressing motion in space, SCs involving pointing and SCs that contrast two concepts.

9.1.4 Cognitive iconicity

Chapter 8 situated the results of the lexical and narrative tasks within cognitive linguistics focusing on iconicity in cross-linguistic data with different domains. The chapter's topical discussions conveyed that the cognitive approach to linguistic iconicity is suited for the discussions on form-meaning resemblance mappings between the linguistic form and the depicted image. Further, topics discussed in the chapter attested to the fact that the relationship between the linguistic form and the meaning conveyed depends on construals of form and construals of meaning. That is, signers' choice of a specific profile of an object largely depends on the image schemas that activate in the minds of signers. Again, objects are profiled differently because signers construe different images of the object. For example, construing a *pen* as an object demands a profile of the entity (hand-as-object). On the other hand, construing a *pen* as a writing tool can activate a profile of a handled hand (or a hand holding a pen).

The notions of profiling and construing are relevant for both lexical iconicity and iconicity in the grammatical constructions. In the same chapter, we identified instances of signers profiling their bodies as Agents performing actions in character-related perspectives in real and surrogate spaces, or as an observer giving information in a reduced-size representation with token space. When signers use character-related perspectives, the action is performed with embodied gestures. Finally, the chapter discussed associative meanings of the iconic constructions. These were considered in relation to individual and community networks of association and conceptual integration networks. The fundamental assumption presented in chapter 8 is that iconicity emerges when the distance relation between the phonological and semantic parameters of linguistic units are closer together (Wilcox, 2004).

Iconic structures in sign languages have meaningful phonological segments and this links our conceptual abilities as language users to our perceptual abilities.

9.2 Language contact and iconicity

The phenomenon of language contact refers to “the use of more than one language in the same place at the same time” (Thomason, 2001, p. 1). In chapter 1, the language contact between GSL and AdaSL was given exposition and the conclusion drawn was that the language contact situation between GSL and AdaSL is asymmetrical, with AdaSL users more likely to use GSL signs in their conversation. The outcome of language contact has been identified as one of the major sociolinguistic effect in deaf community (Lucas & Valli, 1989). Whereas bimodal contact between sign and speech leads to contact signing (Lucas & Valli, 1989), contact between two or more sign languages leads to borrowing and incorporating signs from one language into another (Lucas & Valli, 1989; Edward, 2015b). AdaSL signers in previous studies (and in this current study, see chapter 5) were noted to borrow GSL lexical signs in spontaneous signing (Nyst, 2007a; Edward, 2015b). This section will explore the possible effect of language contact on the representation of iconic structures in GSL and AdaSL.

9.2.1 Effect of language contact on lexical iconicity (Imagic iconicity)

This subsection discusses the possible effect of language contact on lexical iconicity. More specifically, this section will consider imagic iconicity, which deals with visual resemblance between the sign and what is being referred to. Generally, we shall consider the iconic strategies used to name the lexical items as imagic. In chapter 5, we identified that *non-iconic* structures in AdaSL were mostly borrowed from GSL. From chapter 1, we identified that AdaSL has been in contact with GSL for some years. The effect of this contact on lexical signs in AdaSL includes the loss of imagic iconic forms in AdaSL or the addition of an extra *non-iconic* token to a highly iconic AdaSL sign.[147] For example, we identified that the GSL sign SHOE which was coded as *non-iconic* was used by 80% of the AdaSL signers.[148] Another example is the sign WATER in GSL which was also coded as *not clear* but was found to be used by some AdaSL signers as complementing tokens to other iconic strategies used in AdaSL to depict FRIDGE and CUP. There is the possibility for a sign language to lose its

[147] In most instances of lexical borrowing from GSL to AdaSL, iconic forms in AdaSL were replaced with non-iconic forms in GSL.

[148] The AdaSL sign for *shoe* was coded as iconic.

iconic signs in language contact situations when the borrowed form that replaces an iconic form is does not have resemblance mapping relationship.

Another form of language contact identified in the data existed between GSL and the written form of English. For example, the use of lexicalised fingerspelling to name objects in GSL is influenced by written forms of the objects and possibly GSL's relationship with ASL. Television popularly referred to as TV was signed as #TV by GSL signers. Objects like *bed*, *bag*, *saw* etc. were represented with the English orthography depicted with fingerspelling. The use of fingerspelling reduced iconicity as no form-meaning resemblance mapping (imagic iconicity) was associated with the fingerspelling and the object. #TV does not look like the real-world television, although the alphabet represents the object by name.

On the other hand, GSL seems to be getting rid of some forms with lexicalised fingerspelling. For example, the oldest dictionary of GSL produced in 2001 had signs that were based on initialisation and lexicalised fingerspelling. Most of these signs have lost their arbitrariness and have become more iconic in the new dictionaries. For example, #BED and #BG are currently depicted as an iconic sign in the recent dictionaries. In this work, we identify GSL signer's use of forms with iconic relations in place of lexicalised fingerspelling or iconic forms together with lexicalised fingerspelling (e.g., *handling* strategy for BAG or *handling* strategy and #BG for BAG, see GSL examples in Table 5.4 in chapter 5). Although, the reason for the loss of arbitrary forms in GSL was not systematically investigated during the fieldwork, it seems the earlier version of GSL probably from Andrew Foster's lessons (believed to have been a direct transfer from ASL) used initialised and lexicalised fingerspelling for many concrete and abstract concepts.[149] However, as the language developed, initialisation and lexicalised fingerspelling of certain concrete items have been replaced with forms with resemblance mappings.[150]

9.2.2 Effect of language contact on iconicity in grammatical constructions (Diagrammatic iconicity)

Whereas imagic iconicity considers the visual resemblance between the sign and the referent, diagrammatic iconicity is concerned with structural (or relational) similarities between the

[149] Some signers also attribute the loss of arbitrariness to the desire to depart from the system of lexicalised fingerspelling to conventional forms with structural relations with the meaning.
[150] This is not necessarily a general or widespread trend, however. There are many examples, including abstract concepts, that are signed with initialised handshapes. Often in these forms, the initialised handshape differentiates them from similar concepts with same location such as [CONCEPT, IDEA, OPINION, REASON] which are signed from the head.

sign and the referent. Both imagic and diagrammatic iconicities existed in the narrative task. Imagic iconicity was evident in the iconic strategies used for the individual lexical items and diagrammatic iconicity existed in the structural similarities between the depiction of the target scenes in signing the videos. Diagrammatic iconicity is expressed through the grammatical structures in sign languages. This subsection will consider the effect of language contact on the diagrammatic iconicity in grammatical constructions in AdaSL.

In chapters 6 and 7, it was identified that GSL and AdaSL signers retold the videos using different strategies. Galvin & Taub (2004, p. 191) stated that there are "conceptual elements that a language might choose to express, the linguistic surface forms" as depicted in the preference for different perspectives and strategies used by signers to express iconicity in grammatical constructions. The choice of these perspectives and strategies identifies the conceptual elements that are encoded by the signers. Through the narrative tasks, we identify that AdaSL signers use linguistic structures that were previously not accounted for in AdaSL. In chapter 2, we identified typological exceptions in AdaSL based on the previous literature: lack of observer perspective, lack of entity classifiers for motion events and limited types of simultaneous constructions (Nyst, 2007a; Nyst, 2007b; Nyst & Perniss, 2004). Previous literature identified AdaSL to use "real-size projections" as opposed to a "reduced-size observer perspective", "directionals rather than classifier predicates" for motion events, "restricted use of simultaneity" and "simultaneous constructions involving entity classifier predicates were not found" either (Nyst, 2007a, p. 204ff). According to Nyst, "the restricted use of highly iconic structures, together with the restricted use of simultaneity and space is a result of the large proportion of L2 users of AdaSL, as their first language is more sequential in nature and as highly iconic structures, notably entity classifier predication, are hard to acquire in general" (Nyst, 2007a, p. 217).

From the data in the preceding chapters, we identify that AdaSL signers exhibited use of different types of simultaneous constructions, use of observer perspective and entity classifiers for motion events. One possibility to account for the presence of these *novel structures* in AdaSL is the language contact with GSL. Possibly, one effect of language contact on iconicity in grammatical constructions in AdaSL is the emergence of entity classifiers for motion events and observer perspective. AdaSL's contact with GSL is caused by various factors (Edward, 2015b; Nyst, 2007a; Kusters, 2014a; Kusters, 2019) that has led to the exposure of AdaSL signers to the grammatical structures in GSL.[151] Edward (2015b) argues that the social pressures to adopt a more widely used sign language (in this case GSL) are strong and equally critical for the survival of AdaSL.[152] The increased desire for the use of GSL within Adamorobe is linked to the wider communication networks which makes GSL preferred in certain contexts over AdaSL. That is, the imperatives of formal discourse[153] within the wider Deaf community in Ghana demands a shift into GSL and thus the borrowing of GSL forms (Edward, 2015b).

Classifier predicates have been documented for most studied sign languages of the world. However, Nyst confirmed the non-existence of entity classifiers expressing motion events (Nyst, 2007a; Nyst, 2004)[154] in AdaSL. In place of entity classifiers, Nyst (2007a, p. 196) identified that signers employ “sequences of semantically light units, including generic directionals to express motion” and the use of “little simultaneous packaging in motion signs”. According to Nyst, AdaSL was more comparable to “young sign languages such as home sign and young Nicaraguan Sign Language” (Nyst, 2007a, p. 196). In other words, irrespective of the long history of AdaSL, Nyst found structures that pattern with young sign languages.[155] The “absence of entity classifiers” (Nyst, 2007a, p. 168) expressing motion in AdaSL in retellings and spontaneous data meant the absence of observer perspective.[156] As Nyst put it, “spatial projections in AdaSL appear to be restricted to real-size proportions, allowing both real space and surrogate space projections” (Nyst, 2007a, p. 196). However, as identified in chapter 6, out of the 10 AdaSL signers, 6 used entity classifiers depicting motion events. Important to note is the fact that AdaSL signers mostly used entity classifiers for motion seen from a distance (e.g., *boy and girl riding bicycle across field*). That is signers showed an interaction of the perceived distance between the *boy* and the *girl* and the

[151] Although there were no previous descriptions of the grammatical structures of GSL, the relationship between ASL and GSL, the author’s knowledge of GSL (entity classifiers for motion events, observer perspective, different types of SCs) led to the conclusion that *these structures* exist in the grammar of GSL.
[152] Lexical borrowing and code-switching from GSL to AdaSL ensure that AdaSL signers can use their language and at the same time migrate to GSL as and when needed without fully shifting to GSL. Although the long-term effect of language contact is language death (for the minority language), in AdaSL, this is a gradual process and might take a while before signers fully commit to GSL and “abandon” AdaSL.
[153] Formal discourse here refers to scientific discourses such as information and communication technology.
[154] Some of the AdaSL signers who took part in the data collection for this dissertation also took part in the earlier research by Nyst (2007a).
[155] However, this dissertation identified more consistency and more agreement for AdaSL compared to GSL in the lexical elicitation tasks and this seem to indicate the longer history of AdaSL. Maybe entity classifiers and simultaneous constructions are not necessary indication of the age of a sign language as other factors can contribute to their usage.
[156] Nyst (2007, p. 195) also confirms that the absence of entity classifiers for motion events “was not systematically investigated” but “no examples are found of the establishment of loci on a limited plane in front of the signer”.

perceived direction of the motion with two entity classifiers that move towards each other. Other motion events were expressed with different strategies including constructed action and directionals. The preference for entity classifiers for motion events by AdaSL signers (as used by 6 of the 10 signers) could be caused by language contact. Interestingly, the two signers from Adamorobe who have gone through formal education (with GSL as the language of instruction) did not use entity classifiers for motion events at all, potentially indicating their awareness of the difference between GSL and AdaSL.

9.3 Diachronic change or borrowing?

Diessel (2007, p. 117) argues that "[s]mall biases in language production can lead to diachronic change" and "these biases are on-line variants of more elaborate forms" which become conventionalised "if the variants occur over an extended period of time" and end up "separated from their (historical) source". The emergence of entity classifiers for motion events in AdaSL can be conventionalised in the language if these "new" variants occur over a period of time. The argument for diachronic change holds that languages evolve to accommodate new features as has been documented in many languages (signed and spoken). Wilcox & Occhino (2016b) shows evidence of diachronic change in ASL and argues against iconicity being submerged through historical changes as proposed by Frishberg (1975). Diachronic change is also relevant in languages as productive means for languages to create new forms to name new concepts and objects.

One effect of language contact is borrowing. Lexical borrowing occurs when one language borrows a sign from another language and incorporates it into its system (Lucas & Valli, 1989) and code-switching (sentential or syntactic borrowing) occurs when signers switch to another language for part of a sentence or whole sentence within a larger stretch of discourse. AdaSL signers did both lexical and syntactic borrowing of GSL forms. For example, AdaSL signers used GSL lexical signs to name household tools and objects. Some of these lexical signs (SHOE, WATER) seem incorporated into AdaSL such that signers considered it as part of the lexicon of AdaSL. Borrowing is a productive means of increasing the repertoire of another language. For instance, the use of entity classifiers for motion event by AdaSL signers could be a productive means to introduce new iconic forms to the repertoire of the language through borrowing structures of GSL.

To consider either diachronic change or borrowing as a productive means used by AdaSL signers depends on the different arguments raised in this dissertation. Whereas diachronic change proposes variants evolving to replace more elaborate forms, borrowing considers taking structures from one sign language and incorporating it into another. The change in the lexical and grammatical structures in AdaSL as exemplified in the preceding data chapters could possibly be the result of the long-term contact with GSL and the systematic exposure of younger AdaSL signers to GSL (through education). I consider borrowing as the fundamental reason for the emergence of some specific structures in AdaSL (including entity classifiers for motion events and observer perspective).

9.4 Research methodology and iconicity

This comparative and descriptive research used elicitation tasks to gather data from signers (and gesturers). As elaborated in chapter 4, specific stimulus materials were used for the data elicitation tasks based on previous research and signers' ability to connect with both the objects (for the lexical task) and the video (for the narrative task). For example, using pictures for the lexical tasks enabled all the signers (and gesturers) to name the target objects. Although signers did not only use iconic forms, but the images may also have prompted more iconic form-meaning mappings to be derived especially from the GSL signers. For instance, GSL signers who used lexicalised fingerspelling for the signs for *bed* and *television* had additional iconic forms (#BED ^ outline shape; #TV ^ outline shape). Furthermore, using pictures enabled all AdaSL signers to identify the objects for the elicitation tasks as not all signers were literate.

Although other researchers have used cartoon animation stimuli for retelling tasks, for this dissertation, a different genre of stimulus was preferred to get new data with stimuli portraying human referents. For example, Nyst (2007a) and Edward (2015a) both used cartoon stimulus materials for data elicitation in AdaSL. The use of the Pear Story with human characters in a natural landscape, with actions familiar to both GSL and AdaSL signers as compared to spontaneous narrations and cartoon retellings (Canary rows) used in previous research (Nyst, 2007a; Edward, 2015a) elicited forms that were not identified in previous research. For example, while previous research identified that AdaSL signers do not use entity classifiers for motion events, this dissertation identified the use of entity classifiers in AdaSL for depicting motion of referents, especially for motion seen from a distance. The choice of video with human characters for the elicitation task, offered signers the opportunity to use different iconic strategies. Although the argument for the possible language contact as the major reason for the presence of entity classifiers for motion events in the AdaSL data holds, the effect of using the Pear Story video with real human activities may also have contributed to the use of entity classifiers for motion events and the different types of simultaneous constructions (SC).

The multifaceted nature of the videos, with human actors performing different actions at the same time (e.g., *lifting basket and looking up; eating pear, and hitting the ball on the paddle; riding bicycle and turning to look at girl on another bicycle* etc.) prompted different SC depictions. Signers also took on different referents performing different actions at the same time (e.g., *boy/girl riding bicycles, man looking at boys who are moving in front of him* etc.) and depicted these with different types of SCs. Further, the scene with *boy and girl riding towards each other* described below, prompted the use of entity classifiers expressing motion in both sign languages.

Boy and girl ride towards each other, hills in the background, vegetation in the background. Boy rides from right to left, girl rides from left to right. Boy rides pass girl. (Pear Story video scene 53, 54a, 54b)

In the depiction of this scene, signers of both GSL and AdaSL used entity classifiers although the nature of the scene (camera zoom out) made the depiction less of a reduced-sized event space representation. This seems to support Nyst's view that "[t]he absence of a conventional system of entity classifiers can be explained in terms of a restriction to real-size spatial projections, in terms of a general avoidance of heavy simultaneous packaging, or a conspiracy of the two features" (Nyst, 2007a, p. 206). However, AdaSL signers also demonstrated considerable use of simultaneous constructions and of a wide variety of different types in the data, similar to use of SCs in GSL and this is attributed to the different types of data analysed, and different nature of stimulus videos (Edward & Perniss, 2019).

9.5 Theoretical implications and iconicity

This dissertation has allowed me to expand some of the typological considerations explained in chapter 1. To recapitulate from chapter 1, we introduced the fact that sign languages have been shown to exhibit typological differences at distinct levels of linguistic analysis (De Vos & Pfau, 2015; Zeshan, 2006b; Zeshan & Perniss, 2008; Perniss, et al., 2007). The typological differences and similarities enable linguists to classify the different sign languages according to their properties and structure. As noted earlier, typological studies are aimed at documentation of individual sign languages and the cross-linguistic studies of sign languages (Zeshan, 2006b). In chapter 1, we identified that typological differences discussed in sign languages include phonological features, manual and nonmanual markers, colour terms, phonological features; number (counting); manual and nonmanual makers; kinship system; signing space; classifiers, simultaneity, and iconicity. Specifically, my dissertation considered iconicity in lexical items and iconicity in grammatical construction with specific contribution to the discussion on lexical iconicity, phonological features, signing space, classifiers, simultaneity (manual and nonmanual). The nature of iconicity as seen in these typological differences and similarities were further addressed with cognitive linguistics approaches that compared the data from GSL and AdaSL with theory. The subsections in §9.5 will discuss the theoretical contributions of the different domains investigated in relation to iconicity.

9.5.1 Lexical iconicity

This dissertation has provided a cross-linguistic analysis of the iconic strategies used by signers and gesturers to name Household tools and objects. Specifically, lexical iconicity compared GSL and AdaSL signers' use of iconic strategies to name Household tools and objects. The data from signers was compared with gestures by non-signers and specific iconic strategies were identified to be used by both signers and gesturers for iconic depiction of different semantic categories. The results and analysis from signers and non-signers are important to the understanding of lexical iconicity in African sign languages and gesturers as previous research on lexical iconicity has focused mainly on Western and Asian signers and gesturers. Furthermore, the apparent contact between GSL and AdaSL, on the one hand, and AdaSL and Adamorobe gesturers, on the other hand, reveals the subtle but permeating effect of languages in contact. The structural preserving feature of the iconic forms used by signers and gesturers to represent tools and objects reiterates the fact that the affordance of the visual-spatial modality brings about similarities.

One of the contributions of this dissertation is the analysis of patterned iconicity in two African sign languages and its comparison with gesturers used by non-signers in surrounding communities. The discussion on lexical iconicity has provided further insights on the nature of the iconic mappings revealed in different semantic categories. This dissertation extended the previous research on patterned iconicity to the nature of the iconic mapping depicted in the ground object (in figure-ground relationships). The extended classifications of iconic strategies to include *presentable action* and *body* strategies are important for further discussion in different sign languages.

This dissertation provided both structural and cognitive principles governing signers' choice for specific iconic strategies over others. For example, the choice of *handling* strategy or *instrument* strategy presents specific details of the object signers' profile. In other words, the different ways of construing an object depends on both the construal of form and the construal of meaning. Thus, whereas, Handheld tools were construed in GSL and AdaSL with a high proportion depicted with figure-ground relationships (where one hand is the figure and the other hand is the ground), Clothing & Accessories were mostly profiled on signers' body (the body as the ground object). The choice of simultaneous strategies (figure-ground) as compared to sequential depiction of different iconic and arbitrary forms indicates the different networks associated to the depicted image.

The similarities between signers and gesturers for specific iconic strategies points to our cognitive abilities to portray particular items using specific iconic strategies. For example, as seen in chapter 5, GSL and AdaSL used both *handling* and *instrument*, with more *instrument* in both sign languages in the category of Handheld tools. The urban gesturers used predominantly *handling*, as has been found consistently for other gesturer groups. On the other hand, the rural gestures used *handling* and *instrument* relatively equally, with no predominance of *handling*. The use of more *instrument* in the rural gesture group may come from close contact with AdaSL in the community. The structural properties of the items coded as Handheld tools motivated the predominant use of *instrument* by signers (and rural gesturers) and *handling* by urban gesturers. This significant finding does not conform to what has been found in other places where gesturers systematically preferred *handling* strategy for Handheld tools. The effect of language contact between the AdaSL signers and the hearing non-signers of Adamorobe indicates the subtle but permeating effects of community-mediated language contact.

The differences between signers and gesturers indicate the varied iconic strategies available in the visual-spatial modality. We could make inferences such as the effect of language exposure on specific domains and the ability to name items within such domains. Among signers, we identified that GSL signers used more *non-iconic* forms because of the relationship of GSL to ASL forms and written forms of the language (English alphabets). AdaSL signers who have little exposure to ASL, and the written form of the English alphabets barely used *non-iconic* signs except for signs borrowed from GSL. On the other hand, gesturers mainly used different iconic forms to name items within different semantic categories. Comparing signers and gesturers use of varied iconic strategies to name specific lexical items, we identify that different scales of profiling (e.g., profiling fork with the tines, or with *handling* strategy etc.) depend on what signers and gesturers construe.

Finally, in chapter 5, we have identified that there are certain signs with resemblance mappings (coded as *not clear*) but could not be categorised under any of the iconic strategies listed in chapter 5. This indicates that iconicity is not a monolithic phenomenon and signers rely on different construals of the depicted image even if the profile of the form is not clearly defined unless in a network of association. For example, the cross **[+]** used by GSL signers to depict HOSPITAL as part of the responses for SYRINGE is iconic in the sense of it being a mental depiction of the *geographical sign* for hospital. This metonymic relationship broadly construes the syringe as a tool used in a hospital setting. In other words, there are different forms of resemblance mappings beside what have been discussed in this dissertation and size and shape depictions (Nyst, 2016a) which demands broadly profiling other objects related to the item in question.

9.5.2 Space and iconicity

The visual spatial modality of signed language has been argued to be more iconic as compared to the oral modality. Investigating signers' representation of location, motion and action and the different iconic strategies and perspectives used is fundamental to understand language-specific features. In this dissertation, we have seen that lexical and classifier predicates are used with specific aligned and non-aligned perspectives that are specific to sign languages. More importantly, we have identified language-specific features of GSL and AdaSL and the greater preference for character-related perspectives in both sign languages. Whereas location was least expressed in both sign languages, motion and action were dominant and signers used both lexical and classifier predicates to depict iconic scenes. From the discussions in chapter 6, we identify that the need to express the form as iconic and economical motivates signers' use of entity classifiers for motion events.

One contribution of this dissertation is the analysis of spatial projections in two African sign languages, focusing on the different types of perspectives and strategies that signers use to depict location, motion, and action. The discussions in chapter 6 outlined the different alignments between perspectives and iconic strategies used to depict location, motion, and action. This dissertation argued that signers of both GSL and AdaSL extensively relied on character-related perspectives as compared to observer perspectives. Although this finding supports previous research done with narrative tasks, it also identifies that AdaSL signers minimally make use of reduced-size representation in narrative. The *discovery* of entity classifiers for motion events in AdaSL provides insights into the possible effect of the language contact situation in Adamorobe and its effect on the grammar of AdaSL.

Chapter 6 proposed 5 *patterns* for locative scenes in GSL and AdaSL: (1) referents are named or identified with noun phrases before other information is given, (2) placement of lexical signs in spatial locations, (3) referents are placed in space by indexing, (4) signer as a figure describing the scene in character (or character-narrator) perspective, and (5) use of entity classifiers to encode spatial information about referent in observer perspective (specific to GSL). The 5 patterns identified in this dissertation cannot appear in a single description because some of the patterns refer to the same thing. However, there were some patterns that could co-occur, and the highest co-occurrence found in the data was three patterns used at the same time. For example, pattern 1, pattern 3 and pattern 4 where the constituent order is presented in pattern 1, the localization strategy in pattern 3 and the perspective in pattern 4. The absence of entity classifiers for locative scenes in AdaSL further highlights the possibility that entity classifiers are emergent in AdaSL.

9.5.3 Simultaneous constructions (SC)

The ability to simultaneously represent two referents or two events motivates signers' use of SC. The sign modality is not constrained in the ability to represent two pieces of information at the same time. This possibility is exploited quite often by signers of sign languages to represent information. Therefore location, motion and action are adequately represented with bimanual SC or manual and nonmanual SC or even both. Signers have the choice to be both internal and external to the event by using strategies that allow them to be Agent and observer or both at the same time. Manoeuvring between two referents or two events is made possible using predicates and perspectives that allow signers to choose different aspects of the event to be represented at the same time. I identified a high degree of similarity in the strategies used by GSL and AdaSL signers to represent SCs (SC of entity classifiers with CA or lexical items were specific to GSL). This is important for future studies on other African sign languages.

This dissertation has contributed to the research on SCs by outlining the different types used in GSL and AdaSL. Specifically, AdaSL signers were found to use different types of SC not previously found in AdaSL. I have argued in preceding sections that the different types of SC in AdaSL could be result of the possible language contact between GSL and AdaSL or result of the type of stimuli used to collect data for this dissertation. Both GSL and AdaSL signers simultaneously used two perspectives to encode both motion and action events. Thus, both aligned and non-aligned perspectives were simultaneously used by signers to express motion and action events. SCs depicted diagrammatic information using both iconic and non-iconic strategies to economise information.

9.5.4 Cognitive linguistics analysis

The cognitive iconicity framework defines iconic mappings as construals of the form (phonological representation) and the meaning (semantics). In this dissertation, we identified similarities and differences between GSL and AdaSL on the lexical and grammatical domains. One major argument of the cognitive viewpoint is that phonology is not meaningless, and the meaningfulness of phonology contributes to both the similarities and differences in mapping form-meaning resemblance relations in sign languages. From the cognitive linguistics analysis, we identify that signers construe objects and events based on the experiential knowledge and the images that are associated to the objects and events. Therefore, signers have both individual and community preferences of iconic strategies. The individual construal refers to the specific iconic strategies' signers prefer over others such as using a network of associations (lexical task) and multiple blends (narrative task). On the other hand, community construal prescribes conventions shared by all members of the language community such as the use of lexicalised fingerspelling to name objects (GSL) and the preference for more character related perspectives for narrative tasks (GSL/AdaSL). As identified in chapter 5, signers demonstrated consistency and full agreement in the lexical task. This reiterates the idea that there are specific strategies that are available to a particular signing community. I also argued that the inconsistencies in specific semantic categories could be a result of the novelty of the item in a particular sign language (Appliances in AdaSL) or the different construals of the lexical item (using initialised or iconic forms in GSL).

From the cognitive perspective, we identify that iconicity is not monolithic and the diverse types of strategies used by signers are embedded in cognitive processes that allows mapping between the referent and the form. These processes follow general linguistic rules such as an acceptable Handshape, Orientation, Movement, and Location. Again, representing the target object or event with manual articulators demands a comprehensive approach to align real-world scenes to construals of form and construals of meaning. The handshapes in reality do not represent the objects or the events, but the handshapes take on certain properties of the depicted objects or events such as showing the size and shape, showing the movement or indicating the distance between two entities by profiling the hands as entities.

In chapter 2 (see Figure 2.17), we stated that CL allows one to consider the tripartite resemblance mapping between the sensory image- form- meaning. Thus, a contribution of this dissertation is extending the discussion of iconicity as a relationship between the sensory image and the form (Nyst, 2016a) to a broader discussion of sensory image-form-meaning mapping. As seen in chapter 8, the notion of construal within the CL framework helped with understanding this relationship. The different classes of construal considered in chapter 8 identified the varied ways in which the resemblance relationship is expressed with linguistic forms.

This dissertation makes original contributions to the field of CL by discussing iconicity in GSL and AdaSL in relation to specific elements in CL mainly discussed for spoken languages and few Western sign languages. For example, chapter 8 discussed the data in relation to the different classes of construal proposed by Langacker (2008). Considering iconicity in GSL and AdaSL in terms of profiling, focusing and specificity presents an original contribution to sign language linguistics and to cognitive linguistic discussions in Ghanaian sign languages. Furthermore, other discussions on embodiment and use of space; cognitive iconicity; image schemas and thematic roles; network of association and conceptual integration networks contribute to the literature in CL and in sign language linguistics in general. More importantly, these discussions make my research the first to discuss iconicity in African sign languages using these CL terms which have been mostly used in relation to ASL.

Finally, the cognitive reality of iconicity which implies one's mental capability to link construals of form and meaning through the conceptualization of the articulators has been thoroughly discussed in chapter 3 and 8. This research extends the notion of cognitive iconicity (as proposed by Wilcox, 2004) to African sign languages and from the discussions in chapter 8, we identify a visual mapping and transfer of actions of the hands onto real-world events (i.e., phonological and semantic poles). In other words, this dissertation has further added to the discussion that iconicity is not mere transparent form-meaning mapping, but the cognitive reality of iconicity implies our mental capabilities to link construals of form and meaning through the conceptualization of the articulators.

9.5.5 Implications for language and cognitive development

The data in this dissertation has demonstrated the pervasiveness of iconicity in language and more precisely in sign languages. There is also evidence that iconicity has an important role to play in language, contributing to both language acquisition and processing (Vogt & Kauschke, 2017; Imai & Kita, 2014; Perniss & Vigliocco, 2014; Lockwood & Dingemanse, 2015; Vinson, et al., 2008). For example, Vogt & Kauschke (2017) argue that observing iconic gestures prompts richer encoding and makes word learning more efficient in typically developing and language impaired children. Research on iconicity in sign languages does not only serve as a material for academic work but, it can enable language researchers to develop tools for language learning for both children and adults. For example, in the lexical tasks, comparing the signers and gesturers, we identify similarities and differences in their preferences for different iconic strategies. In the category of Handheld tools, both signers and gesturers preferred *handling* and *instrument* strategies for naming. However, the signers demonstrated a greater preference for *instrument* and gesturers demonstrated a greater preference for *handling* (rural gesturers from Adamorobe demonstrate equal preference for *instrument* and *handling* in the category of Handheld tools). Both *handling* and *instrument* are manipulative in nature and the signers and gesturers are Agents using the object. We can hypothesise that our knowledge of tools is mainly based on what the tools are used for or how we manipulate such tools. In practice, children learn names of objects by initially being shown what the object does. For instance, the sound of objects, the shape of object and the movement etc. are all relevant information for acquiring information about the object. This can influence acquisition of a first language and teaching of second language in both the visual and oral modality. On the other hand, people with specific language disorders can acquire language using iconic cues and gestures that give specific information about the target. That is, beyond the general language use, there are specific cognitive functions that allow language users to store language information based on experiential knowledge.

9.5.6 Typology and iconicity

As identified in chapter 1, sign languages exhibit many typological features at different levels of linguistic analysis (De Vos & Pfau, 2015; Zeshan, 2006b; Zeshan & Perniss, 2008; Perniss, et al., 2007; Zeshan & Palfreyman, 2017). The features discussed in this dissertation include phonological features (formational parameters in lexical items), sign space, classifiers, simultaneous constructions, and perspectives. The discussion in the whole dissertation was driven by iconicity and as such these typological features were considered from the perspective of iconicity (see § 9.5.1-5). The discussion of iconicity focused on empirical discussions on the differences and similarities in GSL and AdaSL in relation to lexical and grammatical categories (§ 9.5.1-4). Furthermore, chapter 8 presented a theoretical description of iconicity using cognitive linguistic approaches (§ 9.5.5). This section will consider iconicity and typology based on the empirical discussions in chapters 5-7, i.e., iconicity in relation to form-meaning resemblance relationship between a sign and its meaning. The purpose of this subsection is to highlight the typological differences and similarities identified in the data, i.e., whether the iconic strategies were expressed in the same way, differently, or whether the differences and similarities were by chance or as a matter of degree.

Throughout the empirical chapters, we identify similarities and differences between GSL and AdaSL on the phonological level (see chapter 5 & § 9.5.1). We identify that signers of both sign languages were very similar in their choice of iconic strategies for Handheld tools, Clothing & Accessories, Furniture, Nature and minimally in Appliances. The similarities were based on the fact that signers used similar iconic strategies and not by chance. We also identified that similar iconic strategies had different formational parameters. For example, using the strategy of *virtual depiction* to sign TABLE could be expressed the flat palm or the index finger. In such examples, we identify same strategies but different formational parameters. As the dissertation was more concerned with the strategies than the formational parameters, we shall not go into details about this. However, specific phonological differences identified include the *measure stick* strategy (used by AdaSL signers) and *body* strategy (mostly used by AdaSL signers and the gesturers). These strategies show the specific typological difference between the two sign languages (e.g., in depicting Furniture, AdaSL was closer to the gestures used by non-signers). Further, the foot as a location and an active articulator for lexical items was only identified in the AdaSL data and among the gesturers. Other phonological features like mouth gestures which augmented the meaning of signs were used mostly by AdaSL signers. Lexical fingerspelling and initialisation were specific to GSL and the few examples of initialised signs used by AdaSL signers were borrowed from GSL.

Research has identified the distinct use of the signing space by rural and urban sign languages (de Vos &Pfau, 2015; Zeshan, 2006b). Rural sign languages have been found to use much larger sign space as compared to urban sign languages. This is true of GSL and AdaSL as the data analysed in this dissertation and from previous research on AdaSL have demonstrated that AdaSL uses a larger signing space as compared to GSL. For instance, the signing space in AdaSL is not concentrated to the space above the torso only, but everywhere around the signer is a potential signing space (including the space around the legs). In other words, AdaSL signers systematically demonstrated a wider spatial use as compared to GSL and this was expected (see Nyst, 2008). For instance, in both the lexical and grammatical data, we identified signs made below the torso. However, for GSL, the examples of signs made below the torso included SYRINGE signed at the rump by one signer and constructed action depicting *boy holding his leg/boy hitting his leg by a stone*.

Furthermore, prior studies in AdaSL identified the preference for real and surrogate space (Nyst, 2007a) as compared to token space. Real and surrogate spaces depicted in character perspective had been identified as the preferred for AdaSL (Nyst, 2007a), i.e., for the choice of perspective, AdaSL according to previous research was mainly *character-only* and *narrator*. Although we did not have prior investigation of perspective use in GSL, we assumed (per inferences from ASL) that different signing perspectives existed in GSL including blends (e.g., character, observer, narrator, character-observer, character-narrator, and observer-narrator). Results from this work show the use of token space by AdaSL signers. Thus, AdaSL seem to be gradually shifting from *character-only* and *narrator* (including blends of character-narrator) perspectives to include observer and character-observer in story retellings. Specifically, token space expressed in observer perspective was identified to be used by six signers of AdaSL and character-observer was used by one signer. In other words, AdaSL may be gradually closing this typological gap because of language contact with GSL.

Review of previous literature in both chapters 1 and 2 identified that classifiers have been documented and used in sign languages including GSL and AdaSL. Furthermore, from chapter 1 and 2, we identified that classifiers have been identified to be used in both sequential and simultaneous constructions in many sign languages. However, for AdaSL, earlier research identified the absence of entity classifiers for motion and location and the absence of entity classifiers in simultaneous construction (Nyst, 2007a, 2007b). That is, for motion, location and in simultaneous constructions (SC) AdaSL was typologically classified as *no-entity-classifiers*. Numerical data from the dissertation showed a greater preference for GSL signers to use entity classifiers in motion events and simultaneous constructions. However, this typological gap "*no-entity-classifier"* for motion events may be closing due to the influence of the language contact between GSL. As identified in chapters 6 and 7, six out of the ten AdaSL signer used entity classifiers to express motion in space. Furthermore, we also identify entity classifiers in simultaneous constructions in AdaSL. Thus, there seem to be gradual bridge between GSL and AdaSL in relation to the preference for entity classifiers for motion events and in simultaneous construction. This progression is considered as a matter of degree because not all AdaSL signers recruited for this work use entity classifiers for motion events and in simultaneous constructions.

9.6 General conclusions

The main findings from this dissertation have shown specific iconic strategies used by signers (and gesturers) in lexical and grammatical tasks. The results from the study are relevant contribution to the literature on visual-spatial language (sign and gesture) and cross-linguistic comparison of signers and gesturers. More importantly, the dissertation has demonstrated that sign languages demonstrate similarities and differences because the iconic strategies used by signers of different sign languages are influenced by cognitive processes of profiling meaningful forms. Signers have the same linguistic apparatus: Handshape, Orientation, Location, and Movement, but the expression of these linguistic forms differs between sign languages. For example, handshape inventory, specific locations, movement, and orientation in one sign language differs from those in another sign language. With these tools, signers construe objects and events based on specific features of the object. The similarities of the signing apparatus contribute to the similarities in the iconic strategies used even though the strategies may be expressed with a different hand configuration, for example. Contrastively, differences in sign languages are caused by language-specific constraints. For instance, although the hands are a basic articulatory parameter for sign languages, the handshapes are not the same. There are language-specific handshapes, movement, orientation, and location that can influence the iconic strategies signers use. For example, the location parameter in GSL was found to be limited in place and space, whereas AdaSL had flexibility in the location parameter both on the body and in space allowing signs to be made from as low as the foot and as back as the rump for both lexical and grammatical tasks.

In conclusion, this dissertation has contributed to our understanding of iconicity in the visual-spatial modality through a cross-linguistic analysis of lexical iconicity and iconicity in the grammatical domain. These cross-linguistic analyses have shown the similarities and differences between GSL and AdaSL considering the typological differences and similarities highlighted in chapter 1 (phonological features, signing space, classifiers, simultaneous constructions, perspectives etc.) and the *possible* contact between GSL and AdaSL. Furthermore, comparing the lexical results from signers with gestures produced by non-signers, we have identified modality specific (visual-spatial) iconic strategies. The similarity between AdaSL signers and gesturers from Adamorobe further confirms the possible effect of language contact in Adamorobe. Although this dissertation has provided an in-depth discussion on lexical iconicity and iconicity in the grammatical domain in GSL and AdaSL, further research on iconicity in other domains in these sign languages will contribute to knowledge of iconic form-meaning mappings in the visual-spatial modality.

Appendix 1a: Informed Consent Form for Participants

Title of project:
Iconicity as a pervasive force in language: Evidence from Ghanaian Sign Language and Adamorobe Sign Language

Name of researcher:
Mary Edward (m.edward@brighton.ac.uk)
School of Humanities, Checkland Building D419, Falmer BN1 9PH

Participant's Statement

I ……………………………………….................................... agree that

- the information on the information sheet and the project has been explained to me;
- I have had the opportunity to ask questions and discuss the research;
- I have received satisfactory answers to all my questions;
- I understand that I am free to withdraw from the study without penalty if I so wish;
- I consent to the processing of my personal information for the purposes of this study only and that it will not be used for any other purpose;
- I understand that such information will be treated as strictly confidential and handled in accordance with the provisions of the Data Protection Act 1998.

Signed: Date:

Investigator's/Interpreter's Statement

I/We ……………………………………………………………………..
confirm that the purpose of the research has been carefully explained to the participant and any reasonably foreseeable risks or benefits (where applicable) have been outlined.

Signed: Date:

Signed: Date:

Apppendix 1b: Video Consent Form for Participants

Title of project:
Iconicity as a pervasive force in language: Evidence from Ghanaian Sign Language and Adamorobe Sign Language

Name of researcher:
Mary Edward (m.edward@brighton.ac.uk)
School of Humanities, Checkland Building D419, Falmer BN1 9PH

This research project involves obtaining video recordings of you signing. The video data will not be associated with your name, however because signed language cannot be recorded without inclusion of the face, it is not possible to fully conceal your identity. We therefore seek your specific consent for different possible uses of still images or video clips in which you may appear. We will only use still or video images in those circumstances for which you have explicitly given consent.

Please mark "YES" if you give permission for us to use images or brief clips from your video data for a particular purpose, "NO" if you do not give permission.

		Do you give permission for this use?	
1. Presentation to other researchers invovled in the project		YES	NO
2. Presentation at academic research conferences		YES	NO
4. Academic publications reporting the results of the research, including journal articles, book chapters, technical reports, reports to funding bodies		YES	NO
5. Educational uses in classroom settings		YES	NO
6. Academic Web pages		YES	NO
7. Media reports of the research:	a. Print	YES	NO
	b. Television	YES	NO
	c. Internet	YES	NO
8. Presentation to community groups/organisations		YES	NO

Name ……………………………………………………………………………….……………..

Signed ………………………………………………………………… Date ……………

Appendix 1c: Information Sheet for Participants

Title of project:
Iconicity as a pervasive force in language: Evidence from Ghanaian Sign Language and Adamorobe Sign Language

Name of researcher:
Mary Edward (m.edward@brighton.ac.uk)
School of Humanities, Checkland Building D419, Falmer BN1 9PH

We would like to invite you to participate in this research project. You should only participate if you want to; choosing not to take part will not disadvantage you in any way. Before you decide whether you want to take part, we will explain the following information carefully and you may ask any questions and discuss anything with the researcher. Ask if there is anything that is not clear or you would like more information.

In our research we want to learn more about and document the special structures of two sign languages used in Ghana, GSL and AdaSL. To do this, we will ask you to sign for us in various contexts and we will video record your signing in order to look at and analyse the language data in detail at a later date. Some of the data collection will consist of interviews as well as natural conversations between yourself and another signer from the community. For more detailed investigation of certain structures, we will use elicitation methods: You will be asked to watch short video clips and retell what you have seen; you will be asked to provide the signs for pictures that we will show you.

There are no known risks associated with participation in this research. It is up to you to decide whether or not to take part. If you do decide to take part, you may keep this information sheet and you will be asked to sign a consent form. **Even after agreeing to take part, you can still withdraw at any time and without giving a reason.**

All data will be collected and stored in accordance with the Data Protection Act 1998.

The video data will be stored securely on a hard drive and will not be shared with anyone.

Appendix 1d: Participant Demographic Information

Title of project: Iconicity as a pervasive force in language: Evidence from Ghanaian Sign Language and Adamorobe Sign Language

Age ______
(approx. if not know)

Male **Female**
(circle as appropriate)

1. Is sign language your main form of communication?

2. Are there other members of your family who are Deaf?

    If yes, what is your family relation to them?

3. Where did you learn to sign?

    How old were you when you started signing?

4. Of the people you regularly communicate with in sign language:

    How many of them are Deaf?

    How many of them are hearing?

5. Do you use other forms of communcation?

    What are they?

    With whom?

Appendix 2: Relevant scenic representation of the Pear Story (Lexical, Spatial and Event representations)

Nr	Description	Type	Lexical signs (signs of interest)
1	Scene of sloping hill with tree in foreground, ladder leaning against tree (on right side of tree) and basket on ground to right of tree. Ladder is between basket and tree. Man is standing at top of ladder in tree (this is hard to see). Other trees in background.	Spatial (static/location)	Tree, basket, ladder
2	Close up of pear fruit hanging on tree.	Spatial (static/location)	Pear, leaf
3	Hands clasp pear	Event (transitive)	
4	Hands pick pear	Event (transitive)	Pick
5	One hand holds picked pear	Event (transitive)	
6	Hands move to other pear on tree (close up) and clasp other pear	Event (transitive)	
7	Pick other pear	Event (transitive)	
8	Close up of leaves	Spatial (static/location)	
9	Zoomed out more to view of tree trunk, branches, leaves and man standing behind branches (hard to see)	Spatial (static/location)	
10	Man picks pear	Event (transitive)	
11	Man drops pear	Event (causative)	
12	Pear falls to ground	Event (intransitive)	
13	Close up of pear next to ladder on ground (straw on ground)	Spatial (static/location)	
14	Zoom out, view of tree and man on ladder, see back of man, baskets and pears in foreground	Spatial (static/location)	
15	Man wearing hat, bandana, apron, long sleeves, trousers	Personal description	Hat, bandanna, apron, long sleeve, trousers
16	Man climbs down ladder	Event (transitive)	Climb, descend
17a	Man walks to basket	Event (intransitive)	Walk
17b	Man walks toward camera	Spatial (dynamic/motion)	
18	Man kneels in front of basket	Event (intransitive)	
19	Man empties pears from apron into basket	Event (transitive)	
20	Man turns to pick pear from the ground	Event (transitive)	
21	Man remove kerchief/ bandanna from the neck	Event (transitive)	
22	Man cleans pear	Event (transitive)	Clean
23	Man ties kerchief around the neck	Event (transitive)	

24	Zoom out, hill and trees in the background, another man approaches with a goat, left of man with pears in the basket	Spatial (dynamic motion)	Hills, goat
25a	Man rises and cleans legs	Event (transitive)	
25b	Other man with goat moves closer	Spatial (motion)	
26	Man moves to the ladder	Spatial (dynamic/motion)	
26b	Man with goat moves closer to the pear tree	Spatial (motion)	
27a	Man climbs ladder	Event (intransitive)	
27b	Basket of pear behind man	Spatial	
27c	Other man with goat moves closer to pear tree	Spatial (dynamic/motion)	
28a	Man with goat moves between pear tree and basket,	Spatial (dynamic/motion)	
28b	Goat hesitate to move	Event (transitive)	
29	Close up, man drags goat between baskets and the ladder and moves towards the hills	Spatial (dynamic/motion)	
30	Man drags unwilling goat towards the hills	Spatial (motion)	
31	Close up, man on ladder picking pear	Event (transitive)	
32a	Man picks another pear	Event (transitive)	
32b	Man put pear inside apron	Event (transitive)	
33	Close up, face of man picking pear	Event (transitive)	
34	Zoom out, trees and a boy on a bicycle	Spatial (static)	Bicycle
35	Close up, man picking pear	Event (transitive)	
36a	Zoom out, boy riding towards ladder and pear tree	Spatial (motion)	Ride
36b	Boy rides closer to ladder and pear tree	Spatial (dynamic/motion)	
37	Boy rides between baskets of pear and ladder	Spatial	
38	Boy stops between basket of pear and ladder leaning against the tree	Spatial	
39	Boy dismount from bicycle	Event (intransitive)	Dismount
40a	Boy put bicycle down	Event (causative)	
40b	Bicycle is placed beside pear basket and in front of ladder	Spatial	
41a	Boy looks up		Look
41b	Boy moves towards baskets of pear	Spatial	
41c	Boy is between baskets of pear and ladder (against pear tree)	Spatial	
42a	Boy holds a pear and looks up	Event (transitive)	
42b	Ladder in front of boy	Spatial	

43a	Boy turns his back towards ladder	Spatial	
43b	Boy holds handle of basket	Event (transitive)	
44	Boy looks up, ladder in front of him	Spatial	
45a	Boy carries basket of pear	Event (transitive)	Carry
45b	Boy moves towards bicycle	Spatial	
46	Boy set basket down	Event (causative)	
47	Boy lift bicycle from ground	Event (causative)	Lift
48a	Boy lift leg over bicycle	Event (causative)	
48b	Boy lift basket over bicycle	Event (causative)	
48c	Back of man on ladder in the background	Spatial (static)	
48d	Boy set basket on bicycle	Event (causative)	
49	Boy rides away	Event (intransitive)	Away
50	Close up of man on ladder picking pears	Event (transitive)	
51a	Boy rides away with basket of pear on bicycle	Event (intransitive)	
51b	Zoom out, basket of pear, road with pebbles	Spatial (static)	
51c	Boy rides with fence behind him	Spatial (dynamic)	Fence
52	Girl on bicycle appear from the woods, trees in the background	Spatial (motion)	Girl
53	Zoom out, Boy and girl ride towards each other, hills in the background, vegetation in the background	Spatial (motion)	
54a	Boy rides from right to left, girl rides from left to right	Spatial (motion)	
54b	Boy rides pass girl	Spatial (motion)	
55a	Boy turns around	Event (intransitive)	
55b	Boy’s hat fall	Event (intransitive)	
56	Boy touches hair/head	Event (transitive)	
57a	Boy bumped onto a big stone	Event (transitive)	Bump/crush
57b	Bicycle falls, pears scatter, boy on the ground	Event (causative)	scatter
58	Boy tries to stand (bicycle down and basket of pear scattered on the floor)	Event (intransitive)	
59a	Boy sits and cleans leg	Event (transitive)	
59b	Boy pulls trouser up and socks down	Event (causative)	Socks
59c	Boy holds leg (as if in pain)	Event (transitive)	Pain
60	Boy looks up and face three other boys standing under a tree	Spatial (static)	Three, stand
61	Three boys moves towards the boy, the bicycle and the scattered pears	Spatial (motion)	
62a	Three boys start to help	Event (transitive)	Help
62b	One boy lift the basket and start packing in the pear	Event (transitive)	Pack

62c	Another boy helps the boy (who fell) back on his feet	Event (causative)	
62d	The boy (who helps the fallen boy back on his feet) cleans the dust on the fallen boy	Event (transitive)	Dust
63a	Another boy holds a tennis bat and turns it around	Event (transitive)	Tennis bat
63b	He puts the tennis bat in his pocket	Event (Causative)	
63c	He bends down	Event (intransitive)	
63d	He picks the pear on the floor (the other boys performing the actions simultaneously)	Event (transitive)	
64	The fallen boy lift bicycle (other boys continue packing scattered pear into the basket)	Event (causative)	
65	Close up, boys continue picking pear into basket	Event (transitive)	
66a	Zoom out, boy with tennis bat picks it up and start bouncing	Event (transitive)	Bounce
66b	Two boys continue picking pear	Event (transitive)	
66c	Boy (fallen) hold up the bicycle (hills and grass in the background)	Event (transitive)	
67a	Two boys lift basket of pear	Event (causative)	
67b	Two boys place basket on the bicycle (other boy continue bouncing his tennis ball)	Event (transitive)	
68	Boy turns around still bouncing his ball	Event (transitive)	
69a	One boy bends down (the shortest)	Event (intransitive)	
69b	He lifts the stone that caused the accident	Event (causative)	
70a	Three boys turn round	Event*	
70b	Fallen boy turns his bicycle	Event (transitive)	
70c	Fallen boy moves	Spatial (motion)	
71	Three boys move forward	Spatial (motion)	
72a	Fallen boy walks behind his bicycle (towards the woods)	Spatial	
72b	Boy limps as he walks behind his bicycle	Event (transitive)	
73	Close up, three boys walk ahead (hat on the floor, hills in front of them, boy in red shirt ahead, followed by boy in yellow shirt and then the boy in blue shirt)	Spatial (dynamic/motion)	
74a	The third boy (in the roll) sees the hat	Event (intransitive)	
74b	The boy is bouncing his tennis ball	Event (transitive)	

75a	He put his tennis bat into his back pocket	Event (transitive)	
75b	He bends down	Event (intransitive)	
75c	He picks the hat (two other boys turn around in the background)	Event (transitive)	
76	He turns around (towards the direction of the boy with the bicycle)	Spatial	
77a	The boy with the bicycle drags his bicycle along	Event (transitive)	
77b	He signals the boy with the bicycle	Event (transitive)	Signals
78	The boy with the bicycle turns around	Event (intransitive)	Turn
79a	The boy with the hat walks towards the boy on the bicycle	Spatial (motion)	
79b	The two other boys stand behind	Spatial	
80	The boy with the hat moves closer to the boy with the bicycle	Spatial	
81	The boy with the bicycle picks three pears	Event (transitive)	
82a	The boy with the hat stands at the left of the bicycle	Spatial	
82b	The boy with the bicycle stands at the right	Spatial	
83	The boy with the hat gives it to the boy	Event (transitive)	
84	The boy with the bicycle gives the boy three pieces of pear	Event (transitive)	
85	The boy with the bicycle wears his hat	Event (transitive)	
86	The other boy turns (he held the bicycle while the fallen boy puts on the hat)	Spatial	
87a	The boy with the bicycle moves towards the woods	Spatial	
87b	The other boy looks on (the boy with the three pieces of pear)	Event (intransitive)	
88	The boy turns towards his friends	Spatial	
89	The boy runs towards his waiting friends	Spatial	
90	The boy gets close to his friends	Spatial	
91	Close up, the boy distributes the pear among his friends	Event (transitive)	Distribute
92	The boy cleans the pear with his shirt	Event (transitive)	
93a	The three boys turn around (towards the hills)	Spatial (motion)	
93b	The middle boy has tennis bat in his back pocket	Event (transitive)	Pocket
94	The middle boy start eating the pear	Event (transitive)	

95	He picks his tennis from his pocket	Event (transitive)	
96a	He bounces his tennis ball	Event (causative)	
96b	He eats his pear	Event (transitive)	
97	The boys walk on	Spatial (dynamic/motion)	
98	Close up, two baskets stand side by side. A ladder leaning against the tree. One basket is filled with pear. Trees in the background	Spatial (locative)	
99	Man descends from the ladder	Spatial (dynamic/motion)	
100	He turns and faces the two baskets	Spatial	
101	He kneels before the empty basket	Spatial (locative)	Kneel
102	He looks at the baskets curiously	Event (intransitive)	
103a	He stands	Event (intransitive)	
103b	He counts the baskets with his hands	Event (transitive)	
104	He stares at the baskets	Event (intransitive)	
105a	He moves towards the basket filled with pear	Spatial (motion)	
105b	He touches his hat	Event (transitive)	
106a	The three boys walk towards the man	Spatial (motion)	
106b	Two of the boys are eating pear	Event (transitive)	
107	Man looks at them curiously	Event (intransitive)	
108	The boys walk in front of the man and the baskets	Spatial	
109	Man tilts his hat (to look at them)	Event (transitive)	
110	Three boys walk on (man still stands under tree)	Spatial (motion)	
111	One boy bouncing his tennis ball	Event (causative)	
112	Boys walk towards the hills	Spatial (motion)	

Appendix 3: Coding scheme and controlled vocabularies for lexical signs

Tier name	***Parent tier***	***Linguistic type***	***Stereotype***	***Controlled Vocabulary***
Gloss	None	Gloss	None	None
#Sign parts	Gloss	Parts	Symb Assoc	Parts
Descr. Sign parts	Gloss	Descr. Parts	Included in	None
Type	Descr. Sign parts	HS	Symb Assoc	Type
Handshape (dom/both- A1-E)	Descr. Sign parts	HS	Symb. Assoc	None
Handshape (ndom/both B6-C)	Descr. Sign parts	HS	Symb. Assoc	None
MovPath (dom/ndom-A1-C)	Descr. Sign parts	Mov-Path	Symb. Assoc	Mov-Path
MovInt	Sign parts	Movement	Symb. Assoc	None
Icon type Mov	Sign parts	Iconicity type	Symb. Assoc	Iconicity type
Comments	None	Comments	None	None

Controlled vocabulary	**Entry values**
Iconicity type	handling, instrument, tracing 2D, tracing 3D, measure, indexing, entity, presentable action, body
Initialization	Yes, No
Figure/Ground relations	Yes, No

Movement internal	Open, spread, close, bent, hook, pivoting, nodding, twisting, flattening, squeezing, wiggling, rubbing
Movement path	Up, down, up and down, forward, towards, backwards, sideways, side-by-side, horizontal circular, vertical circular, pattern, towards and away
Location	All locations in the sign space
Sign parts	1, 2, 3, 4, 5

Appendix 4: Coding scheme and controlled vocabularies for narrative tasks

Tier name	***Parent tier***	***Linguistic type***	***Stereotype***
Gloss	None	Gloss	None
Scenes	Gloss	Scenes	None
Scene type	scenes	Scene type	Symb. Assoc
Predicate type	Gloss	Predicate type	Symb. Assoc
Event type	Gloss	Event type	Symb. Assoc
Constructed Action	Gloss	Constructed Action	Included in
Constructed Action type	Constructed Action	Constructed Action type	Symb Assoc
Perspective	Gloss	Perspective	Symb. Assoc
Spatial Modification	Gloss	Spatial Modification	Symb. Assoc
Simultaneity	Gloss	Simultaneity	Symb. Assoc
Iconic strategy	Gloss	Iconic strategy	Symb. Assoc

Controlled vocabulary	Entry values
Iconicity type	handling, instrument, tracing 2D, tracing 3D, measure, indexing, entity, presentable action, body
Sign type	Classifier, plain verbs, intensified verbs, directional verbs, Size and shape specifiers (SASS), lexical agent, lexical patient, lexical ground
Scene type	Spatial (static/location); spatial (dynamic/motion), event (transitive), event

	(causative), event (intransitive), personal description[157]
Perspectives	Character, observer, narrator, character-observer (fused 1), character-narrator (fused 2), observer-narrator (fused 3)
Event Component	Entity, ground, path, manner, entity-manner, entity-path, entity-path-manner, manner-path

[157] Personal description refers to the extra information given by signers, e.g., descripting the clothing of the participants in the video, or making inferences like *THE MAN ON THE TREE IS DEAF* etc.

References

Aarons, D., 1994. *Aspects of the syntax of American Sign Language.* Johannesburg: Doctoral dissertation, University of the Witwatersrand.

Aarons, D., & Morgan, R. 2003. Classifier predicates and the creation of multiple perspectives in South African Sign Language. *Sign language studies,* pp. 125-156.

Admasu, Y. F., & Raimond, K. 2010. Ethiopian sign language recognition using Artificial Neural Network. In 2010 1*0th International Conference on Intelligent Systems Design and Applications* (pp. 995-1000). IEEE.

Agyekum, K., 2008. The language of Akan ideophones. *Journal of West African languages ,* 1-2(35), pp. 101-129.

Aikhenvald, A., 2019. Expressing'possession': motivations, meanings, and forms'. In: L. Johanson, L. F. Mazzitelli & I. Nevskay, eds. *Possession in Languages of Europe and North and Central Asia.* Amsterdam: John Benjamins, pp. 7-25.

Akach, P. A. O. 2010. *Application of South African sign Language (SASL) in a bilingual-Bicultural approach in education of the deaf*. PhD thesis, University of Free State, Bloemfontein.

Akanlig-Pare, G. & Edward, M. (2020). Societal Perception of Hearing Impairment in Ghana: A Report on Adamorobe. *Lancaster University Ghana Journal on Disability (LUGJD)* Volume. 2, pp. 62-84. Lancaster University Ghana.

Aldersson, R. R. & McEntee-Atalianis, L. J., 2008. A lexical comparison of signs from Icelandic and Danish sign languages. *Sign Language Studies,* 9(1), pp. 45-87.

Al-Fityani, K. & Padden, C., 2008. A lexical comparison of sign languages in the Arab world. *Trabalho apresentado ao TISLR, 9.*

Amedofu, G. K., Ocansey, G. & Antwi, B. B., 2006. Characteristics of hearing-impairment among patients in Ghana. *African journal of health sciences,* 12(3), pp. 87-93.

Ameka, F. K., 2001. Ideophones and the nature of the adjective word class in Ewe. In: *Typological Studies in Language, 44,* pp. 25-48.

Angouri, J., 2018. Quantitative, Qualitative or Both?. In: L. Litosseliti, ed. *Research methods in linguistics.* Bloomsbury Publishing., pp. 29-45.

Aronoff, M., Meir, I. & Sandler, W., 2005. The paradox of sign language morphology. *Language,* 81(2), pp. 301-344.

Asonye, E., Edward., M & Asonye, E.E. 2020. Linguistic genocide against development of signed languages in Africa. In *African Languages in Time and Space: A Festschrift in Honour of Professor Akinbiyi Akinlabi @ 60!* (pp. 337-359)

Asonye, E. & Edward, M., Forthcoming. Deaf Education and signed language situation in Ghana and Nigeria: Six Decades after Andrew Foster. In: Y. Nyadu Offei. & E. Marooney, ed. *Signed languages, interpreting, and the Deaf Community in Ghana. Oregon: Open Oregon Educational Resources*

Battison, R., 1978. *Lexical Borrowing in American Sign Language.* Silver Spring MD: Linstok Press.

Bellugi, U. & Klima, E. S., 1979. The signs of language. *Psychological Science,* Volume 1, pp. 6-9.

Blench, R. & Warren, A. 2006. *An unreported African sign language for the deaf among the Bura in Northeast Nigeria*. In Unpublished conference handout.

Bodomo, A., 2006. The structure of ideophones in African and Asian languages: the case of Dagaare and Cantonese. In: John Mugane, ed. *Selected Proceedings of the 35th Annual conference on African languages: African Languages and Linguistics in Broad perspective.* Somerville, MA: Cascadilla proceedings project.

Bohnemeyer, J. & Pederson, E., 2010. *Event representation in language and cognition.* Volume 11. Cambridge: Cambridge University Press.

Branchini, C. & Donati, C., 2009. Relatively diflerent Italian Sign Language relative clauses. *Correlatives cross-linguistically,* Volume 1, pp. 157.

Brentari, D., 2002. Modality differences in sign language phonology and morphophonemics. In: *Modality and structure in signed and spoken languages.* pp. 35-64.

Brentari, D., Renzo , A. D., Keane, J. & Voltera, V., 2015. Cognitive, cultural, and linguistic sources of a handshape distinction expressing agentivity. *Topics in cognitive science,* 7(1), pp. 95-123.

Bybee, J., 1985. Diagrammatic iconicity in stem-inflection relations. In: *Iconicity in syntax.* pp. 11-48.

Bybee, J., 2006. From usage to grammar: The mind's response to repetition. *Language,* pp. 711-733.

Bybee, J. 2011. Usage-based theory and grammaticalization. In: Heiko, Narrog, Bernd, Heine (Eds.), The Oxford Handbook of Grammaticalization. Oxford University Press, Oxford, pp. 69–78.

Chafe, W. ed., 1980. *The pear stories: Cognitive, cultural, and linguistic aspects of narrative production.* Volume 3. Praeger Pub Text.

Chatterjee, A., 2001. Language and space: Some interactions. *Trends in cognitive sciences,* 5(2), pp. 55-61.

Coppola, M. & Newport, E. L., 2005. Grammatical subjects in home sign: Abstract linguistic structure in adult primary gesture systems without linguistic input. *Proceedings of the National Academy of Sciences of the United States of America*, 102(52), pp. 192.

Cormier, K., Smith, S. & Sevcikova, Z., 2013. Predicate structures, gesture, and simultaneity in the representation of action in British Sign Language: Evidence from deaf children and adults. *Journal of deaf studies and deaf education*, 18(3), pp. 370-390.

Cormier, K., Fenlon, J. & Schembri, A., 2015. Indicating verbs in British Sign Language favour motivated use of space. *Open Linguistics,* 1(open issue), pp. 684-707.

Cormier, K., Smith, S. & Sevcikova-Sehyr, Z., 2015. Rethinking constructed action. *Sign Language & Linguistics,* 18(2), pp. 167-204.

Croft, W. & Cruse, D. A., 2004. *Cognitive linguistics.* Cambridge: Cambridge University Press.

Dakubu, M. E. K., 2015. *The languages of Ghana.* Routledge.

De Saussure, F., 2011. *Course in general linguistics.* New York: Columbia University Press.

De Vos, C., 2012. *Sign spatiality in Kata Kolok: How a village sign language of Bali inscribes its signing space.* Doctoral dissertation. Nijmegen: Radboud University.

De Vos , C. & Pfau, R., 2015. Sign language typology: the contribution of rural sign languages. *Annual Review Linguist,* 1(1), pp. 265-288.

DeMatteo, A., 1977. Visual imagery and visual analogues in American Sign Language. In: *On the other hand: New perspectives on American Sign Language.* pp. 109-136.

Diessel, H., 2007. Frequency effects in language acquisition, language use, and diachronic change. *New ideas in psychology,* 25(2), pp. 108-127.

Diessel, H., 2017. Usage-based linguistics. In: M. Aronoff (Ed.) *Oxford Research Encyclopedia of Linguistics*.

Dingemanse, M., 2011. *The meaning and use of ideophones in Siwu.* Nijmegen: Doctoral dissertation, Radboud University Nijmegen.

Dingemanse, M., 2012. Advances in the Cross-Linguistic Study of Ideophones. *Language and Linguistics Compass,* 6(10), pp. 654-672.

Dingemanse, M. et al., 2015. Arbitrariness, iconicity, and systematicity in language. *Trends in cognitive sciences,* 19(10), pp. 603-615.

Dingemanse, M., Perlman, M. & Perniss, P., 2020. Construals of iconicity: Experimental approaches to form–meaning resemblances in language. Language and Cognition, 12(1), pp.1-14. doi:10.1017/langcog.2019.48

Doke, C. M., 1935. *Bantu linguistic terminology.* Longmans, Green and Company.

Dressler, W. U., 2005. Word-formation in natural morphology. In: *Handbook of word-formation.* Netherlands: Springer, pp. 267-284.

Duarte, K. 2010. The Mechanics of Fingerspelling: Analyzing Ethiopian Sign Language. *Sign Language Studies*, 11(1), pp. 5-21.

Du Castel, B., 2015. Pattern activation/recognition theory of mind. *Frontiers in computational neuroscience,* 9(90).

Dudis, P. G., 2004. Body partitioning and real-space blends. *Cognitive Linguistics,* 15(2), pp. 223-238.

Eberle, S. E., 2013. *Locative expressions in signed languages: A cross linguistic comparison.* MA Thesis. Grand Forks, North Dakota: Graduate School, University of North Dakota.

Ebling, S., Konrad, R., Braem , P. B. & Langer, G., 2015. Factors to Consider When Making Lexical Comparisons of Sign Languages: Notes from an Ongoing Comparison of German Sign Language and Swiss German Sign Language. *Sign Language Studies,* 16(1), pp. 30-56.

Edward, M., 2014. The Phonology and the Morphology of the Ghanaian Sign language. Paper presented at the *ATELIER International Conference*. Abidjan, Cote d'lvoire, 24 July 2014.

Edward, M., 2015a. *We speak with our hands and voices: Iconicity in Adamorobe Sign Language and Akuapem Twi (ideophones).* Bergen: Upublished MPhil thesis, University of Bergen, Norway.

Edward, M., 2015b. Signing out: Linguistic contact and possible endangerment of the Adamorobe Sign Language. Paper presented at the *BAAL language in Africa SIG annual meeting on 22nd May 2015 at Aston University, Birmingham.*

Edward, M., & Perniss, P. 2018. Lexical Comparison of Ghanaian Sign Language and Adamorobe Sign Language. Oral presentation at the *Annual Conference of the Linguistics Association of Great Britain (LAGB)*, University of Sheffield (UK), 13 September 2018.

Edward, M. 2018a. Behind the veil: The impact of deafness on rural livelihoods in Ghana (Case study of a Deaf couple in Adamorobe). *Lancaster University Ghana Journal on Disability (LUGJD)* Volume 1. pp. 126-148. Lancaster University Ghana.

Edward, M., 2018b. Our Signs Matter: Protecting sign language in Adamorobe (Ghana). In *Literature and Communication in Human Societies, Papers in Honour of Late Dr (Mrs) Elisabeth Amagah De Campos*. Pan African University Institute. pp. 277-288. Chapter 16.

Edward, M. 2018c. Patterned Iconicity in Ghanaian Sign Language and Adamorobe Sign Language. Oral presentation at the *Colloquium on African Languages and Linguistics* (CALL 2018) University of Leiden, Netherlands, 1 September 2018.

Edward, M. & Perniss, P., 2019. Encoding spatial information in two sign languages: A comparison of Ghanaian Sign Language (GSL) and Adamorobe Sign Language (AdaSL). Paper presented at the *Theoretical Issues in Sign Language Research (TISLR 13). Hamburg, Germany*, 27 September 2019.

Edward, M. 2019a. Language of the hands: Comparing signers and gesturers representation of lexical items. Poster presentation at the *Multimodality Conference,* University of Cologne, Germany, 6 June 2019.

Edward, M. 2019b. Patterned iconicity for different semantic categories: Evidence from sign languages and gestures. Paper presented at the I*nternational Symposium on Iconicity in Language and Literature (ILL-12)*, Lund University, Sweden, 3 May 2019.

Edward, M. (2020). Lexical Iconicity in Ghanaian Sign language and Adamorobe Sign Language. In Nina Pawlak and Izabela Will, eds. *Languages of West Africa. Linguistic Theory and Communication*, pp. 230-251. Warsaw: Wydawnictwa Uniwersytetu Warszawskiego.

Edward, M & Perniss, P. 2020. Simultaneous constructions in Ghanaian Sign Language and Adamorobe Sign Language. Paper presented at the 50th Colloquium on African Language and Linguistics (CALL, Virtual Conference), Leiden University, The Netherlands, 31 August 2020.

Edward, M. & Akanlig-Pare, G., forthcoming. Education and Language: A case study of deaf persons in Adamorobe. In: E. Maroney & Y. Offei, eds. *Signed language, Interpreting and Deaf communities in Ghana*. Oregon: Open Oregon Educational Resources

Emmorey, K., 2003. *Perspectives on classifier constructions in sign languages.* Mahwah, Lawrence, New Jersey.

Engberg-Pedersen, E., 1993. *Space in Danish Sign Language: The Semantics and Morphosyntax of the Use of Space in a Visual Language.* Hamburg: Signum-Verlag.

Evans, V. & Green, M., 2006. *An introduction to cognitive linguistics.* Routledge.

Firth, J., 1955. Structural linguistics. *Transactions of the Philological Society,* 54(1), pp. 83-103.

Fischer, O., 1997. Iconicity in language and literature: language innovation and language change. *Neuphilologische Mitteilungen,* pp. 63-87.

Fischer, A., 1999. What, if anything, is phonological iconicity? In: *Form miming meaning 703.* pp. 123-134.

Friedman, L., 1975. Space, time, and person reference in American Sign Language. *Language,* 51(4), pp. 940-961.

Frishberg, N., 1975. Arbitrariness and iconicity: historical change in American Sign Language. *Language,* pp. 696-719.

Frishberg, N., 1987. Ghanaian sign language. *Gallaudet encyclopedia of deaf people and deafness,* Volume 3, pp. 778-79.

Galvan, D. & Taub, S., 2004. The encoding of motion information in American Sign Language. *Relating Events in Narrative,* Volume 2, pp. 191-217.

Gibbs Jr, R. W. & Colston, H. L., 2006. Image schema. In: D. Geeraerts, D. Rene´ & J. R. Taylor, eds. *Cognitive Linguistics: Basic Readings.* Berlin: Mouton De Gruytor, pp. 239-268.

Givón, T., 1985. Iconicity, isomorphism and non-arbitrary coding in syntax. In: J. Haiman, ed. *Iconicity in syntax.* Amterdam; Philadelphia: John Benjamin Publishing Company, pp. 187-219.

Haiman, J, 1985. *Iconicity in syntax: Proceedings of a Symposium on iconicity in syntax, Stanford, June 24-6, 1983.* Volume 6 Amsterdam; Philadelphia: John Benjamins Publishing Company.

Halliday, M., 1973. *Explorations in the functions of language.* London: Edward Arnold.

Heine, B., 1997. *Cognitive foundations of grammar.* Oxford: Oxford University Press.

Hendriks, B., 2007. Simultaneous use of the two hands in Jordanian Sign Language. In: M. Vermeerbergen, L. Leeson & O. Crasborn, eds. *Amsterdam Studies in the theory and history of linguistics science.* Amsterdam: John Benjamins, pp. 237-256.

Herskovits, A., 1985. Semantics and pragmatics of locative expressions. *Cognitive Science,* 9(3), pp. 341-378.

Hockett, C. F., 1960. The Origin of Speech. *Scientific American,* Volume 203, pp. 88-96.

Hou, L., 2018. Iconic Patterns in San Juan Quiahije Chatino Sign Language. In: *Sign Language Studies.* s.l.:Gallaudet University Press. Retrieved October 2, 2018, from Project MUSE database, 18(4), pp. 570-611.

Hwang, S. O. et al., 2017. Of the body and the hands: patterned iconicity for semantic categories. *Language and Cognition,* 9(4), pp. 573-602.

Imai, M. & Kita, S., 2014. The sound symbolism bootstrapping hypothesis for language acquisition and language evolution. *Philosophical Transactions of the Royal Society B: Biological Sciences,* 369(20130298), pp. 1-13.

Janzen, T., 2006. Visual communication: Signed language and cognition. In: G. Kristiansen, M. Archard, R. Dirven & F. Mendoza Ibanez, eds. *Cognitive linguistics: Current applications and future perspectives.* Berlin: Mouton de Gruyter, pp. 359-378.

Johnson, M., 1987. *The body in the mind: The bodily basis of meaning, imagination, and reason.* Chicago: University of Chicago Press.

Johnston, T., 2005. Sign Language: Morphology. In: K. Brown, ed. *Encyclopedia of Language & Linguistics. Second ed. Vol. 11.* Cambridge, UK: University of Cambridge, pp. 324-328.

Johnston, T. & Schembri, A., 2007. *Australian Sign Language (Auslan): An introduction to sign language linguistics.* Cambridge: Cambridge University Press.

Kimmelman, V., Klezovich, A. & Moroz, G., 2018. IPSL: A database of iconicity patterns in sign languages. Creation and use. *Proceedings of the Eleventh International Conference on Language Resources and Evaluation (LREC-2018).*

Kiyaga, N. B. & Moores, D. F., 2003. Deafness in Sub-Saharan Africa. *American annals of the deaf,* 148(1), pp. 18-24.

Klima, E. S. & Bellugi, U., 1979. Bellugi, U., & Klima, E. S. (1979). The signs of language. Psychological Science, 1, 6-9. *Psychological Science, 1, 6-9.,* Volume 1, pp. 6-9.

Kocab, A., Pyers, J. & Senghas, A., 2015. Referential shift in Nicaraguan Sign Language: a transition from lexical to spatial devices. *Frontiers in psychology,* Volume 5, p. 1540.

König, S., Konrad, R. & Langer, G., 2004. What's in a sign? Theoretical lessons from practical sign language lexicography.. In: *Signs of the time. Selected papers from TISLR.* pp. 379-404.

Kubuş, O., 2008. *An analysis of Turkish Sign Language (TİD) phonology and morphology.* Ankara: METU: MA Thesis.

Kubuş, O., 2016. *Relative clause constructions in Turkish Sign Language.* Doctoral Dissertation. Hamburg: University of Hamburg.

Kusters, A., 2012a. "The Gong Gong Was Beaten"—Adamorobe: A "Deaf Village" in Ghana and Its Marriage Prohibition for Deaf Partners. *Sustainability,* 4(10), pp. 2765-2784.

Kusters, A., 2012b. Adamorobe: A demographic, sociolinguistic and sociocultural profile. *Sign languages in village communities: Anthropological and linguistic insights,* pp. 347-352.

Kusters, A. 2012c. *Since Time Immemorial until the End of Days: An Ethnographic Study of the Production of Deaf Space in Adamorobe.* PhD diss., University of Bristol, UK.

Kusters, A., 2014a. Deaf Sociality and the Deaf Lutheran Church in Adamorobe, Ghana. *Sign Language Studies*, 14(4), pp. 466-487.

Kusters, A., 2014b. Language ideologies in the shared signing community of Adamorobe. *Language in Society,* 43(2), pp. 139-158.

Kusters, A. 2015. *Deaf space in Adamorobe: An ethnographic study of a village in Ghana*.

Gallaudet University Press.

Kusters, A., 2019. One Village, Two Sign Languages: Qualia, Intergenerational Relationships and the Language Ideological Assemblage in Adamorobe, Ghana. *Journal of Linguistic Anthropology*, pp. 1-20.

Kuwornu-Adjaottor, J. E. T., 2011. *Spirituality and the Changing Face of Evangelicalism in Ghana..* Kumasi, Ghana: Kwame Nkrumah University of Science and Technology, Department of Religious Studies.

Langacker, R., 1991. *Concept, Image, and Symbol-The Cognitive Basis of Grammar.* Berlin: Mouton de Gruyter.

Langacker, R., 2008. *Cognitive grammar: A basic introduction.* Oxford University Press.

Langacker, R. W., 1987. *Foundations of cognitive grammar: Theoretical prerequisites.* Volume 1. Stanford University press.

Langacker, R. W., 2016. Baseline and elaboration. *Cognitive Linguistics*, 27(3), pp. 405-439.

Leeson, L. & Saeed, J. I., 2004. Windowing of attention in simultaneous constructions in Irish Sign Language (ISL). In: *Proceedings of the Fifth Meeting of the High Desert Linguistics Society.* Albuquerque. pp. 1-18.

Leeson, L. & Saeed, J. I., 2012. *Irish Sign Language: A cognitive linguistic account.* Edinburgh University Press.

Lepic R., Occhino C. 2018. A Construction Morphology Approach to Sign Language Analysis. In: Booij G. (eds) The Construction of Words. *Studies in Morphology,* vol 4. Springer, Cham. pp. 141-172.

Lepic, R., Börstell, C., Belsitzman, G. and Sandler, W., 2016. Taking meaning in hand: iconic motivations in two-handed signs. *Sign Language & Linguistics*, 19(1), pp.37-81.

Lepic, R., 2019. A usage-based alternative to "lexicalization" in sign language linguistics. *Glossa: A Journal of General Linguistics,* 4(1), p. Art. 23.

Levinson, S., 1996. Frames of reference and Molyneux's question: Crosslinguistic evidence. In: P. Bloom , M. A. Peterson, L. Nadel & M. F. Garrett, eds. *Language and space.* Massachusetts: MIT Press, pp. 109-169.

Liddell, S., 1995. Real, surrogate, and token space: Grammatical consequences in ASL. In: K. Emmorey & J. Reilly, eds. *Language, gesture, and space.* Hillsdale: Lawrence Erlbaum Associates Inc, pp. 19-41.

Liddell, S., 2000. Blended spaces and deixis in sign language. In: D. McNeill, ed. *Language and gesture (2).* Cambridge: Cambridge University Press, pp. 331-357.

Liddell, S., 2003. *Grammar, gesture, and meaning in American Sign Language.* Cambridge: Cambridge University Press.

Litosseliti, L., 2018. *Research methods in linguistics.* Bloomsbury Publishing.

Lockwood, G. & Dingemanse, M., 2015. Iconicity in the lab: A review of behavioral, developmental, and neuroimaging research into sound-symbolism. *Frontiers in psychology,* Volume 6.

Lucas, C. & Valli, C., 1989. Language contact in the American deaf community. In: C. Lucas, ed. *The sociolinguistics of the Deaf community.* Academic Press, pp. 11-40.

Lutalo Kiingi, S. 2014. *A descriptive grammar of morphosyntactic constructions in Ugandan Sign Language (UgSL).* (Doctoral dissertation, University of Central Lancashire).

MacHadjah, T., 2016. *Number marking in Ghanaian Sign Language.* Legon: Unpublished MPhil Thesis, University of Ghana.

Mandel, M., 1977. Iconic devices in American sign language. *On the other hand: New perspectives on American Sign Language*, pp. 57-107.

Masuda, K., 2007. The physical basis for phonological iconicity. In: *Insistent Image.* Amsterdam/Philadelphia. pp. 57-71.

McGuire, c. & Deutsch, C., 2015. *Ghanaian Sign Language Dictionary.* Second ed. Our Talking Hands, Inc.

McKee, D. & Kennedy, G., 2000. Lexical comparison of signs from American, Australian, British and New Zealand sign languages. *The signs of language revisited: An anthology to honor Ursula Bellugi and Edward Klima,* pp. 49-76.

Meir, I., 1998. Syntactic-semantic interaction in Israeli Sign Language verbs: The case of backwards verbs.. *Sign Language & Linguistics,*, 1(1), pp. 3-37.

Meir, I., Sandler, W., Padden, C. & Aronoff, M., 2010. Emerging sign languages. In: *Oxford handbook of deaf studies, language, and education.* pp. 267-280.

Meir, I., 2010. Iconicity and metaphor: Constraints on metaphorical extension of iconic forms. *Language,*, 86(4), pp. 865-896.

Meir, I., Padden, C., Aronoff, M. & Sandler, W., 2013. Competing iconicities in the structure of languages. *Cognitive Linguistics*, 24(2), pp. 309-343.

Milanese, R., Gil Milanese, S. & Pun, T., 1995. Attentive mechanisms for dynamic and static scene analysis. *Optical engineering,* 34(8), pp. 2428-2434.

Miles, M., 2004. Locating deaf people, gesture and sign in African histories, 1450s–1950s. *Disability & Society* , 19(5), pp. 531-545.

Miles, M., 2005. Deaf People Living and Communicating in African Histories, c. 960s - 1960s. *Independent Living Institute.*

Miller, C., 1994. Simultaneous constructions in Quebec Sign Language. In: M. Brennan & G. H. Turner, eds. *Word-order issues in sign language.* Durham: International Sign Linguistics Association, pp. 89-112.

Morgan, G., Barrière, I. & Woll, B., 2006. The influence of typology and modality on the acquisition of verb agreement morphology in British Sign Language. *First Language,* 26(1), pp. 19-43.

Morgan, G. & Woll, B., 2007. Understanding sign language classifiers through a polycomponential approach. *Lingua*, 117(7), pp. 1159-1168.

Morgan, H.E., 2015. When does a word emerge? Lexical and phonological variation in a young sign language. *San Diego Linguistic Papers* 5 (2015) 2-17

Morgan, H. E. 2017. The phonology of Kenyan Sign Language (southwestern dialect). University of California, San Diego.

Müller, G., 2005. Syncretism and iconicity in Icelandic noun declensions: A distributed morphology approach. In: *Yearbook of Morphology 2004.* Netherlands: Springer , pp. 229-271.

Nijen Twilhaar, J., 2009. Lexicon van de gebarentaalwetenschap. j. *Deventer: Van Tricht uitgeveri.*

Nyst, V., 2004. Verbs of motion in Adamorobe Sign Language. *Poster presented at TISLR 8 Barcelona, September 30-October 2. Programme and Abstracts (International Conference on Theoretical Issues in Sign Language Research),* Volume 8, pp. 127-129.

Nyst, V. & Perniss, P., 2004. Classifiers or verb series: motion in German Sign LAnguage and Adamorobe Sign Language. Barcelona: Paper presented at ESF workshop on "*Modality Effects on Theory of Grammar: A cross-linguistic view from sign languages of Europe.*

Nyst, V., 2007a. *A descriptive analysis of Adamorobe sign language (Ghana).* Doctoral Dissertation ed. Amsterdam: University of Amsterdam, Faculty of Humanities.

Nyst, V., 2007b. Simultaneous constructions in Adamorobe. In: M. Vermeerbergen, L. Leeson & O. Crasborn, eds. *Simultaneity in signed languages: Form and function.* Amsterdam: John Benjamins Publishing, pp. 127-125.

Nyst, V., 2008. Pointing out possession and existence in Adamorobe Sign Language. In U. Zeshan & P. Perniss (Eds.), *Possessive and existential constructions in sign languages* (pp. 235–252). Nijmegen, Netherlands: Ishara Press.

Nyst, V., 2010. Sign language varieties in West Africa. In: D. Brentari, ed. *Sign languages: A Cambridge language survey.* Cambridge: Cambridge University, pp. 405-432.

Nyst, V., Sylla, K., & Magassouba, M. 2012. Deaf signers in Douentza, a rural area in Mali. *Sign languages in village communities: Anthropological and linguistic insights*, pp. 251-276.

Nyst, V., 2015. The sign language situation in Mali. *Sign Language Studies*, 15(2), pp.126-150.

Nyst, V. 2016a. Size and shape depictions in the manual modality: A taxonomy of iconic devices in Adamorobe Sign Language. *Semiotica,* 2016(210), pp. 75-104.

Nyst, V., 2016b. The depiction of size and shape in gestures accompanying object descriptions in Anyi (Côte d'Ivoire) and in Dutch (The Netherlands). *Gesture*, 15(2), pp. 156-191.

Occhino, C., 2016. *A cognitive approach to phonology: Evidence from signed languages.* Albuqurque: Doctoral dissertation, The University of New Mexico, USA.

Occhino, C., Anible, B., Wilkinson, E. & Morford, J. P., 2017. Iconicity is in the eye of the beholder. *Gesture*, 16(1), pp. 100-126.

Okyere , A. D. & Addo , M., 1994. Deaf Culture in Ghana. In: Johnson, R.C., Snider, B.N. and Smith, D.L., 1994. *The Deaf Way: Perspectives from the international conference on Deaf culture*. Washington DC: Gallaudet University Press.

Okyere, A. D. & Boison, F. K., 2001. *Ghanaian Sign Language.* 1st ed. Accra-North, Ghana: Ghana National Association of the Deaf.

Oppong, A., 2007. *Fundamentals of Sign Language.* Volume 1. Winneba:Department of Special Education, University of Education Winneba.

Ortega, G. & Özyürek, A., 2016. Generalisable patterns of gesture distinguish semantic categories in communication without language: Evidence from pantomime. Talk presented at the *7th Conference of the International Society for Gesture Studies (ISGS7)*.

Özyürek, A., Zwitserlood, I. & Perniss, P., 2010. Locative expressions in signed languages: A view from Turkish Sign Language (TID). *Linguistic,* 48(5), pp. 1111-1145.

Padden, C., Meir, I., Hwang, S.O., Lepic, R., Seegers, S. and Sampson, T., 2013. Patterned iconicity in sign language lexicons. *Gesture,* 13(3), pp.287-308.

Padden, C., Hwang, S. O., Lepic, R. & Seegers, S., 2015. Tools for language: Patterned iconicity in sign language nouns and verbs. *Topics in cognitive science,* 7(1), pp. 81-94.

Palmer, B., 2002. Linguistic frame of reference reconsidered. *In Proceedings of the 2002 Conference of the Australian Linguistics Society.*

Parkhurst, S. & Parkhurst, D., 2003. Lexical comparisons of signed languages and the effects of iconicity. *Work Papers of the Summer Institute of LinguisticsUniversity of North Dakota Session,* p. 47.

Penn, C., & Reagan, T. 1994. The properties of South African Sign Language: Lexical diversity & syntactic unity. *Sign Language Studies*, 85(1), pp. 319-327.

Perniss, P., Pfau, R. & Steinbach, M., 2007. *Visible variation: Comparative studies on sign language structure.* Vol. 188. Walter de Gruyter.

Perniss, P., Pfau, R. & Steinbach, M., 2007. Can't you see the difference? Sources of variation in sign language structure. In: P. Perniss, R. Pfau & M. Steinbach, eds. *Trends in Linguistics Studies and Monographs.* Berlin: Mouton de Gruyter, pp. 1-34.

Perniss, P. M., 2007a. *Space and iconicity in German sign language (DGS).* Nijmegen: Doctoral dissertation, Radboud University Nijmegen.

Perniss, P., 2007b. Locative functions of simultaneous perspective constructions in German Sign Language narratives. In: M. Vermeeberben, L. Leeson & O. Crasborn, eds. *Amsterdam Studies in the Theory and Historyof Linguistic Science Series.* Amsterdam: John Benjamins Publishing, pp. 27-54.

Perniss, P. M., 2007c. Achieving spatial coherence in German Sign Language narratives: The use of classifiers and perspective. *Lingua, 117(7), pp.,* 117(7), pp. 1315-1338.

Perniss, P. M. & Özyürek, A., 2008. Representations of action, motion and location in sign space: A comparison of German (DGS) and Turkish (TID) Sign Language narratives. In: *Signs of the time: Selected papers from TISLR 8.* Signum Press., pp. 353-376.

Perniss, M., Thompson, R. & Vigliocco, G., 2010. Iconicity as a general property of language: evidence from spoken and signed languages. *Frontiers in psychology,* Volume 1, Article 227.

Perniss, P. M., Zwitserlood, I. & Ozyurek, A., 2011. Does space structure spatial language? Linguistic encoding of space in sign languages. *The 33rd Annual Meeting of the Cognitive Science Society [CogSci 2011] Cognitive Science Soci,* pp. 1595-1600.

Perniss, P. M., 2012. Use of sign space. In: *Sign language: An international handbook.* Mouton de Gruyter, pp. 412-431.

Perniss, P. & Vigliocco, G., 2014. The bridge of iconicity: from a world of experience to the experience of language. *Philiosophical Transactions of the Royal Society B,* 369(20130300).

Perniss, P., Zwitserlood, I. & Özyürek, A., 2015. Does space structure spatial language?: A comparison of spatial expression across sign languages. *Language,* 91(3), pp. 611-641.

Pfau, R. & Steinbach, M., 2005. Relative clauses in German sign language: extraposition and reconstruction. *PROCEEDINGS-NELS,* 35(2), pp. 507-521.

Pfau, R., Steinbach, M. and Woll, B. eds., 2012. Sign language: An international handbook (Vol. 37). Walter de Gruyter.

Pietrandrea, P., 2002. Iconicity and arbitrariness in Italian sign language. In: *Sign Language Studies.* pp. 296-321.

Pietrandrea, P. & Russo , T., 2007. Diagrammatic and imagic hypoicons in signed and verbal languages. In: E. Pizzuto, P. Pietrandrea & R. Simone, eds. *Verbal and Signed languages. Comparing Structures, Constructs and Methodologies.* New York; Berlin: Mouton de Gruyter, pp. 35-56.

Radden, G. & Dirven, R., 2007. *Cognitive English Grammar.* Vol. 2 ed. Amsterdam: John Benjamins Publishing.

Ramat, A. G., 1995. Iconicity in Grammaticalization Processes. In: R. Simone, ed. *Iconicity in language. Current Issues in Linguistics Theory (Vol. 110).* John Benjamins Publishing.

Sackey, B. M., 1999. Women and health seeking behaviour in Religious Contexts: Reproductive and antenatal care in Ghanaian religious movements. A Case Study of the Twelve Apostles Church. *Research Review,* 15(2), pp. 65-69.

Sandler, W. & Lillo-Martin, D., 2006. *Sign language and linguistic universals.* Cambridge University Press.

Sandler, W., 2010. Prosody and syntax in sign languages. *Transactions of the philological society,* 108(3), pp. 298-328.

Schmaling, C. 1997. *Maganar Hannu: Language of the hands. A descriptive analysis of Hausa Sign Language* (Doctoral dissertation, Universität Hamburg).

Schmaling, C. 2003. A for Apple: the impact of Western education and ASL on the deaf community in Kano, Northern Nigeria. In Monaghan, L. F. et al (Eds.). *Many ways to be deaf: International variation in deaf communities*. Washington, DC:Gallaudet University Press.

Schmidtke, D., Conrad, M. & Jacobs, A. M., 2014. Phonological iconicity. *Frontiers in psychology,* 5(Article 80).

Simone, R., 1995. *Current Issues in Linguistics Theory.* Vol. 110. John Benjamins Publishing.

Slobin, D. I. et al., 2003. A cognitive/functional perspective on the acquisition of “classifiers”. In: K. Emmorey, ed. *Perspectives on classifier constructions in sign language.* Mahwah, NJ: Lawrence Erlbaum Associates, pp. 271-296.

Stokoe, W. J., 1960. Sign language structure: An outline of the visual communication system of the American deaf. . In: *Studies in linguistics.* Washington, D.C.: Gallaudet College Press.

Su, S. F. & Tai , J. H., 2009. Lexical comparison of signs from Taiwan, Chinese, Japanese, and American Sign Languages: Taking iconicity into account. *Taiwan sign language and beyond,* pp. 149-176.

Supalla, T. and Webb, R., 1995. The grammar of International Sign: A new look at pidgin languages. *Language, gesture, and space,* pp. 333-352.

Sutton-Spence, R. & Woll, B., 1999. *The linguistics of British Sign Language: an introduction.* Cambridge: Cambridge University Press.

Swadesh, M., 1955. Towards Greater Accuracy in Lexicostatistic Dating. *International Journal of American Linguistics,* 21(2), pp. 121–137.

Tai, J. H., 1993. Iconicity: motivations in Chinese grammar. *Principles and prediction: The analysis of natural language: Papers in honor of Gerald Sanders.* John Benjamins Publishing, pp. 153-173.

Talmy, L., 1985. Lexicalization patterns: Semantic structure in lexical forms. 3(99), 36-149. *Language typology and syntactic description*, 3(99), pp. 59-149.

Talmy, L., 2000. *Toward a cognitive semantics. Concept structuring systems.* Volume 1 ed. Cambridge, MA: MIT Press.

Tamene, E. H. 2016. Language Use in Ethiopian Sign Language. *Sign Language Studies*, 16(3), pp. 307-329.

Tamene, E. H. 2017. *The sociolinguistics of Ethiopian Sign Language: A study of language use and attitudes*. Gallaudet University Press.

Tang, G. & Yang, G., 2007. Events of motion and causation in Hong Kong Sign Language. *Lingua,* 117(7), pp. 1216-1257.

Tano, A. 2016. *Etude d'une langue des signes émergente de Côte d'Ivoire: l'example de la langue des signes de Bouakako (LaSiBo).* Utrecht: LOT.

Tano, A. & Nyst, V., 2018. Comparing body-part size and shape constructions in village sign languages with co-speech gesture. *Sign Language Studies,* 18(4), pp. 517-545.

Tashakkori, A. & Creswell, J., 2007. The new era of mixed methods. *Journal of Mixed Methods,* pp. 3-7.

Taub, S. F., 2001. *Language from the body: Iconicity and metaphor in American Sign Language.* Cambridge: Cambridge University Press.

Thomason, S. G., 2001. *Language contact.* Edinburgh: Edinburgh University Press.

Torigoe, T. & Takei, W., 2002. A descriptive analysis of pointing and oral movements in a home sign system. *Sign Language Studies,*, pp. 281-295.

Tuggy, D., 2007. Schematicity. In: *The Oxford handbook of cognitive linguistics.* pp. 82-116.

Valli, C., Lucas, C., Mulrooney, K. & Villanueva, M., 2011. *Linguistics of American sign language: An introduction.* 5th Edition ed. Washington DC: Gallaudet University Press.

Verhagen, A., 2007. *Construal and perspectivization.* Oxford handbook.

Vermeerbergen, M., Leeson, L. & Crasborn, O., 2007. *Simultaneity in signed languages: A string of sequentially organised issues.* Series 4. Amsterdam: John Benjamin.

Vinson, D. P. et al., 2008. The British Sign Language (BSL) norms for age of acquisition, familiarity, and iconicity. *Behavior Research Methods,* 40(4), pp. 1079-1087.

Vogt, S. & Kauschke, C., 2017. Vogt, S.Observing iconic gestures enhances word learning in typically developing children and children with specific language impairment. *Journal of child language,* 44(6), pp. 1458-1484.

Waugh, L., 1994. Degrees of iconicity in the lexicon. *Journal of pragmatics,* 22(1), pp. 55-70.

Wheeler, M. W., 1993. On the hierarchy of naturalness principles in inflectional morphology. *Journal of Linguistics,* 29(1), pp. 95-111.

Wilcox, S. & Wilcox, P. P., 1995. The gestural expression of modality in ASL. In: *Modality in grammar and discourse.* pp. 135-162.

Wilcox, P. P., 2000. *Metaphor in American sign language.* Gallaudet University Press.

Wilcox, S., 2002. The iconic mapping of space and time in signed languages. In: L. Albertazzi, ed. *Advances in consciousness research.* Amterdam: Philadelphia, PA : John Benjamins Pub, pp. 255-282.

Wilcox, S., Wilcox, P. P. & Jarque, M. J., 2003. Mappings in conceptual space: Metonymy, metaphor, and iconicity in two signed languages. *Jezikoslovlje,* 4(1), pp. 139-156.

Wilcox, S., 2004. Cognitive iconicity: Conceptual spaces, meaning, and gesture in signed language. *Cognitive Linguistics,* 15(2), pp. 119-148.

Wilcox, S., 2015. Signed languages. In: *Handbook of cognitive linguistics (pp. 668-689). Berlin:* . Berlin: Mouton de Gruyter., pp. 668-689.

Wilcox, S. & Occhino, C., 2016a. Constructing signs: Place as a symbolic structure in signed languages. *Cognitive Linguistics,* 27(3), pp. 371-404.

Wilcox, S. & Occhino, C., 2016b. Historical Change in Signed Languages. *Oxford Handbooks Online,* Volume Retrieved 27 Jan. 2020.

Wilcox, S., 2017. *Ten Lectures on Cognitive Linguistics and the Unification of Spoken and Signed Languages.* Keynote lectures series given at the China International Forum on Cognitive Linguistics. Koninklijke Brill NV, Leiden, The Netherlands.

Wittenburg, P. et al., 2006. ELAN: a professional framework for multimodality research. *Proceedings of the 5th International Conference on Language Resources and Evaluation (LREC 2006),* pp. 1556-1559.

Woll, B., 1984. The Comparative Study of Different Sign Languages. In F. Loncke, P. Boyes-Braem, and Y. Lebrun, eds. *Recent Research on European Sign Languages: Preliminary Analyses.* Lisse Swets and Zeitlinger.

Zeshan, U., 2006a. *Interrogative and negative constructions in sign language.* Nijmegen: Ishara Press.

Zeshan, U., 2006b. Roots, leaves and branches–The typology of sign languages.. In: R. M. d. Quadros, ed. *Sign Languages: spinning and unraveling the past, present and future (TISLR9).* Petrópolis/RJ. Brazil: Editora Arara Azul, pp. 671-695.

Zeshan, U. & Perniss, P., 2008. Possessive and existential constructions in sign languages. In: U. Zeshan & P. Perniss, eds. *Possessive and existential constructions in sign languages.* Nijmegen: Ishara Press, pp. 1-31.

Zeshan, Ulrike and Nick Palfreyman (2017). Typology of sign languages. In A.Y. Aikhenvald and R.M.W. Dixon (eds.) *The Cambridge Handbook of Linguistic Typology*. Cambridge:Cambridge University Press.

Zwitserlood, I., 2012. Classifiers. In: *Sign language: An international handbook.* Mouton de Gruyter, pp. 158-186.

Özyürek, A. & Perniss, P., 2010. Event Representation in sign languages. In: J. Bohnemeyer & E. Pederson, eds. *Event representation in language and cognition (Vol. 11). Cambridge University Press.* Cambridge: Cambridge University Press, pp. 84-107.