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**THE STRUCTURE AND
FORMATION OF SIGNS IN AUSLAN
(AUSTRALIAN SIGN LANGUAGE)**

Adam Schembri

Renwick College Monograph

Number Two

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THE STRUCTURE AND FORMATION OF SIGNS IN AUSLAN (AUSTRALIAN SIGN LANGUAGE)

Adam Schembri

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North Rocks Press

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Schembri, A.C.

The Structure and Formation of Signs in Auslan (Australian Sign Language), Renwick College Monograph No. 2.

ISBN 0 949050 07 5

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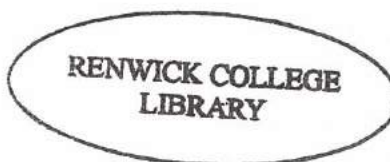
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Published by North Rocks Press, The Royal New South Wales Institute for Deaf and Blind Children, 361-365 North Rocks Road, North Rocks, 2151, Australia.

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FOREWORD

During his six month tenure as a Ratcliffe Fellow at Renwick College, Adam Schembri was involved in research which led to the publication of a specialist sign language dictionary and this monograph. The dictionary (*Technical Signs for Computer Terms: a sign reference book for people in the computing field*, Parker & Schembri, 1996) is the product of community-based research in which Adam Schembri, together with his deaf colleague David Parker, consulted with signing deaf people employed in computing fields or undergoing computing studies, members of the deaf community, teachers of the deaf and Auslan interpreters, in order to collect and record signs being used in computing. Where no signs existed for particular computing terms, suggestions were made for possible new forms to fill the vocabulary gap.

This monograph is the second in a series which is published and distributed by Renwick College to assist professionals in the education of children with sensory disabilities to keep abreast of advances in their field. This publication represents an overview of the theoretical framework that lies at the basis of the type of lexicographical work that resulted in the dictionary of computer terms. In this monograph, Schembri conducts a systematic and rigorous analysis of the status and form of the basic unit in sign languages such as Auslan, the sign. He has drawn on the latest linguistic research into various sign languages around the world and in Australia. Regarding the status of the sign, he clearly analyses and illustrates the differences between signs and words, on the one hand, and signs and gestures, on the other. These distinctions are often misunderstood by teachers, interpreters, and even signing deaf people themselves. Consequently, the everyday practices of all three groups are often coloured by erroneous assumptions about the status of signs vis-à-vis gestures and words. Clarity in this area is vital. As to the form of signs, Schembri's clear account of the literature, together with his own analysis and Auslan examples, finally makes a wealth of information available to the educated non-specialist. This information has, for too long, remained inaccessible in the research literature or in unpublished dissertations. Schembri explains how the spoken language equivalents of phonology and morphology are realised in Auslan and, most importantly, the roles that these play in the grammar of the language and in the creation of new signs.

The information in this monograph is of vital importance to everyone involved in the use of Auslan on a daily basis, especially educators of the deaf. With the introduction of the Australasian Signed English vocabulary into deaf education over a decade ago, the recent explosion in the use of sign language interpreters in educational settings, and the introduction of bilingual/bicultural educational programs for deaf children, enormous pressure has been put on our local sign language to accommodate sign innovations and borrowings (especially from American Sign Language). By understanding what works naturally in the sign medium, at a phonological level, we can all avoid innovations and borrowings which are inappropriate and likely to meet with community resistance. By understanding how the morphology of Auslan works, deaf teachers, students and interpreters, will discover, often with a significant degree of relief, that they, as users of the language, have many more resources at their fingertips to create new signs than they ever thought possible. I strongly recommend this monograph to anyone with a professional obligation to really understand Auslan and how it works.

Trevor Johnston

Renwick College, Sydney.

PREFACE

This monograph investigates the various ways for creating new signs that are available to users of Auslan, the sign language of the Australian Deaf community. Much contemporary research in linguistics has concentrated on the role of syntax in language, on the apparently unique ability of human beings to generate a seemingly unlimited number of possible sentences from a comparatively small set of syntactical rules. Recent developments in the field, however, have emphasised that people are "as infinitely creative with words as they are with phrases and sentences" (Pinker, 1994, p. 127). This perspective has renewed an interest in the study of word formation processes (Bauer, 1988). Auslan, like any natural language, has many devices at its disposal for the creation of new words. Individual users of the language are able to coin new signs at any time, but most of these lexical items will remain "one-off usages" (Brennan, 1990, p. 2), while others will move into the "established" Auslan lexicon, becoming accepted and used by the wider community of signers in a standardised way.

How do signers perform this creative task? Aitchison (1994) pointed out that most new words in a language are not new words at all, but are simply modifications of existing words or recombinations of their basic components. Thus, this study will draw on a sign database of both established and productive forms. After a brief comparison of the properties of gesture and visual-gestural language, this account will begin by describing the formational components at work in sign formation in Auslan. Drawing on recent studies of British Sign Language (Brennan, 1990, 1992), particular attention will be given to the links between these formational subcomponents and their meanings in visual-gestural languages. Next, this study will explore those sign formation processes, such as the use of classifier predicate forms, which are highly productive aspects of sign morphology. Other derivational processes that Auslan shares with spoken languages like English, such as affixation, compounding, reduplication, and lexical extension, will also be discussed. In addition, as in a recent account of word formation in New Zealand Sign Language (Collins-Ahlgren, 1990), this study will include a description of lexical borrowing in Auslan. Borrowing from English through fingerspelling, loan translation and mouth patterns plays an important role in the Auslan lexicon. Signers also sometimes use loan signs from other sign languages, such as American Sign Language and British Sign Language.

This monograph seeks to demonstrate that Auslan, like other native sign languages, has "a rich morphology capable of producing new forms in a regular and rule-governed way" (Brennan, 1990, p. 2). A better understanding of word formation processes in Auslan is particularly relevant in the 1990s, as the language has only recently begun to break out of the Deaf community "ghetto" (Branson and Miller, 1991), and is now being used in an ever-widening variety of social, educational, institutional and employment situations. Thus, by providing the reader with an introduction to this fascinating area of research, it is hoped this monograph will stimulate much thought and discussion amongst those professionally interested in the bilingual education of deaf children, the teaching of Auslan as a second language, as well as in other areas, such as sign language lexicography and language planning. It is also hoped that this monograph will be of interest to linguists and psychologists interested in an introduction to aspects of sign language research in the Australian context.

ACKNOWLEDGEMENTS

This publication represents only an outline of the formational structure and processes of sign formation in Auslan. As an introductory sketch of these aspects of the grammar, it has drawn heavily on the work of other researchers, both in Australia and overseas. Most of all, however, this work owes an enormous debt to Trevor Johnston, whose seminal description and dictionary of Auslan has provided much of the data for this research, and Mary Brennan, whose detailed study of the lexicon in British Sign Language served as the basic framework for this monograph.

I am also indebted to Trevor Johnston for his indispensable assistance in the editing and production of the final draft, his encouragement and consistently good advice, his always thought-provoking criticism, and for his permission to reproduce many of the illustrations by Peter Wilkin from the *Auslan Dictionary* (Johnston, 1989a). Thanks to Roz Barker and Robert Adam who also read through earlier drafts of the monograph and provided useful suggestions, criticism and ideas. My sincerest thanks are also due to Greg Leigh of Renwick College. Greg consistently supported this work over its long gestation period, and allowed me the freedom to explore my own, somewhat esoteric, interests in the field. Julianne Hill and Marilyn Sullivan were also of great assistance.

A number of the illustrations in this monograph have been reproduced from other publications. The illustrations on pages four, five and seven in Chapter 1 have been reproduced by permission of the publisher from McNeill, D., *Hand and Mind: What Gestures Reveal about Thought* (1992), Chicago: Chicago University Press, copyright 1992 by Chicago University Press. The illustration entitled NO (p. 20), the handshape from Japanese Sign Language in Figure 2.3 (p. 34), the sign LOOK (p. 53), and Figure 3.2 (p. 78) have been adapted and reprinted from Baker, C. and Cokely, D., *American Sign Language: A Teacher's Resource Text on Grammar and Culture* (1980), Washington, DC: Gallaudet University Press, copyright Gallaudet University Press. The signs WHO, HOW-MUCH, THINK, CHILDREN, and FATHER in Figure 2.10 (p. 45), EXTENT CLASSIFIER (p. 72), SURFACE (p. 74), DEPTH-AND-WIDTH "PIPE" (p. 74), DEPTH-AND-WIDTH "POLE" (p. 74), DEPTH-AND-WIDTH "TREE TRUNK" (p. 74), PERIMETER-SHAPE (p. 74), OPEN-BOOK and BOOK in Figure 4.1 (p. 99), and ASL VEHICLE-PASS-BY (p. 112) have been reprinted with permission of the publisher from Valli, C. and Lucas, C., *Linguistics of American Sign Language: A Resource Text* (1995), Washington, DC: Gallaudet University Press, copyright Gallaudet University Press. The following illustrations, produced by Anne Catherine Dufour, have been reproduced with permission from Moody, B., *Introduction à l'Histoire et à la Grammaire de la Langue des Signes: Entre les Mains des Sourds* (1983), Vincennes: International Visual Theatre: SIGN (p. 20), JUST-RECENTLY (p. 20 & 84), PERSON-PASS-BY (p. 52), VEHICLE-PASS-BY (p. 52), LOOK-AT-ME (p. 54), LOOK-UP-AND-DOWN (p. 54), Figure 3.1 (p. 66), COLLECTIVE CLASSIFIER (p. 72), HANDLE-SMALL-ROUND-OBJECT (p. 73), HANDLE-MEDIUM-SIZED-ROUND-OBJECT (p. 73), HANDLE-LARGE-ROUND-OBJECT (p. 73), VEHICLES-IN-LINE (p. 76), MOVE-CYLINDRICAL-OBJECT (p. 77), CYLINDRICAL-OBJECT-FALL, GIVE-CYLINDRICAL-OBJECT, LONG-CYLINDRICAL-OBJECT (p. 80), VERY-FAT and RECENTLY (p. 84), and the various forms of DOOR in Figure 4.1 (p. 99). The handshapes from Warlpiri Sign Language (p. 34) have been reproduced with permission from Kendon, A., *Sign Languages of Aboriginal Australia: Cultural, Semiotic and Communicative Perspectives* (1988), Cambridge: Cambridge University Press. A number of other illustrations, such as Figure 2.4 (p. 35), Figure 2.5 (p. 36), TOUCH-CLASSIFIER (p. 73), INSTRUMENTAL (p. 73), and PERIMETER-SHAPE (p. 74) have been reproduced with permission from Klima, E. and Bellugi, U., *The Signs of*

Language (1979), Cambridge, MA: Harvard University Press. The signs WAIT-FOR-LONG-TIME (p. 45) and DRIVE-CARELESSLY (p. 83) have been reproduced from Baker, C. and Padden, C., *American Sign Language: A Look at its History, Structure, and Community* (1978), Silver Spring, MD: T.J. Publishers. Finally, the signs SCREEN and MOUSE (p. 95) have been reprinted from Prillwitz, S. and Vollhaber, T. (Eds.), *Sign Language Research and Application: Proceedings of the International Congress Hamburg March 23-25, 1990* (1990), Hamburg: Signum Press. All other illustrations of handshapes have been reproduced with permission from Prillwitz, S. et al., *HamNoSys 2.0: Hamburg Notation System for Sign Language—An Introduction* (1989), Hamburg: Signum Press.

The research for this monograph was made possible primarily by the generous financial support made available under the terms of the Ratcliffe Trust through The Royal New South Wales Institute for Deaf and Blind Children. Support from the Victorian School for Deaf Children through the Deafness Projects Fund also provided the means for additional collection of data by my research assistant, Meg Stewart.

I owe special gratitude to the members of the Australian Deaf community, particularly to my many teachers over the years: Marcia Girke, Steve Ripley, Helen Anglicas, Toni der Sarkissian, Mike Canfield, David Healy, Malcolm Shannon, Chris Dunn, Colin Allen, Brett Casey, Caroline Conlon, and Darlene Thornton. Brian Bernal, Jennifer Toms, Linda Warby, and Ian Rogers have also provided useful criticism and feedback. Thanks to David Parker for assisting in the collection of the computer terminology data. Thanks are also due to Maree Madden, Peter Bonser, Judy Bonser, Della Bampton, and Della Goswell who have answered my many questions. Particular thanks go to Pam Spicer and Rebecca Ladd who were both instrumental in securing funding for this project.

Last but not least, I thank Joe Sabolcec for his support at the end of some very long working days. Needless to say, any errors or omissions that remain are mine alone.

Adam Schembri
Renwick College
June, 1996

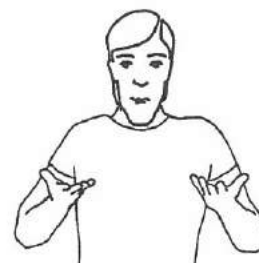
SIGN AND GESTURE

1.1 Speech, gesture and sign

As the British sign linguist Mary Brennan (1992) observed, most people are quite familiar with the communicative use of gesture. Non-signers are perhaps likely to be most aware of three kinds of gestural behaviour: the gestures that appear spontaneously during speech (known as *gesticulation*), the conventional gestures or *emblems* which vary from one community to another (such as the 'shoulder shrug', the 'thumbs up' and the 'okay' signs), and the formal sign languages used in deaf communities. Although aware of the various types of gesture, many people may never have considered the very different function each plays in the human communicative repertoire. In particular, the contrast between the use of gesture as a primary means of communication and other communicative uses of gesture is not widely understood. This confusion has led to the widely-held misconception that the sign languages of deaf communities are merely elaborated forms of spontaneous and imitative gesture, or that they are gestural surrogates for spoken language.

Intensive linguistic research since the 1960s, however, has clearly demonstrated that the natural sign languages of deaf people in fact display the same linguistic properties as spoken languages (Petitto, 1994). Like spoken languages, sign languages have developed naturally, and have arisen wherever deaf people have come together to form communities. Sign languages are not universal, but instead differ from one part of the world to the next. They are passed down from one generation of language users to the next, and are learnt as a native language by children in the same way as spoken languages (Newport & Meier, 1985; Petitto, 1994). People who use particular sign languages form distinctive social and cultural groups (Brennan, 1992; Padden & Humphries, 1988). Unlike other types of gestural communication, research has demonstrated conclusively that natural sign languages have the same expressive power and complex grammatical organisation as do spoken languages (Brennan, 1992; Johnston, 1989b; Klima & Bellugi, 1979).

Thus it seems clear that sign languages, like spoken languages, qualify as fully linguistic systems. But what of the other uses of gestural communication? Gesture is clearly distinct from language, but it nevertheless forms an important part of face-to-face communication. What is the relationship, then, between gesture and speech (with which it so often co-occurs), and between gesture and sign (which share the same visual-gestural channel)? A number of researchers have begun to explore the link between speech and gesture (Armstrong, Stokoe & Wilcox, 1995; Burling, 1993; Kendon, 1980; McNeill, 1992). A number of these researchers, such as McNeill (1992), have argued that the gesticulation and speech form an integrated communication system. Although they play a secondary role, gestures, he argued, "...are an integral part of language as much as are words, phrases and sentences" (1992, p.2). The spontaneous gesturing that accompanies speech is symbolic and organised, and works in various



The shoulder shrug



The thumbs up gesture



The okay gesture

ways to complement what is being said. Other types of gestural communication, such as conventional gestures and mime, can be understood as partly independent from speech, and able to function in language-like ways. Sign languages, however, are primary systems of communication autonomous from speech.

The relationship between gesture and speech has thus received considerable theoretical and empirical attention. The relationship between gesture and sign, however, has only recently become the focus of research (Marschark, 1994; Singleton, Goldin-Meadow & McNeill, 1995). Although it is widely accepted that sign languages exhibit complex linguistic organisation which other types of gestural communication lack, some researchers have suggested that there may be close connections between the formational features of sign languages and those of gesture. Brennan (1992), for example, suggested that much can be learnt about visual-gestural language from the many types of symbolic gesture used by non-signers. In particular, she suggests that there appear to be strong links between the iconic and metaphorical properties of sign languages and the symbolic patterning found in gesticulation. There is also evidence that sign languages have, in some sense, evolved from other types of manual communication. Kendon (1988) and McNeill (1992) have shown that various types of gesture exhibit different degrees of language-like organisation. Their research has demonstrated that gesture is often consciously used by non-signers in a sign-like way. In informal conversation, for example, gestures are sometimes used in place of words, and may often replace words completely when speech communication is difficult. Other researchers, too, have attempted to explore these links that appear to exist between gesture as an accompaniment to spoken language, and the use of a gesture as a primary linguistic system, independent of speech. When gesture is used by non-signers as the sole means of communication, as in the traditional art of mime, during times of mourning in traditional Aboriginal communities, or in particular experimental situations (Eastman, Noretsky & Censoplano, 1989; Kendon, 1988; Singleton, Goldin-Meadow & McNeill, 1995), many other properties in common with the sign languages of the deaf appear to emerge.

Although it seems natural to perceive links between sign and gesture, McNeill (1992) stressed that it is important to distinguish between the various classes of gestural communication. The types of gesture are distinct from one another, and from the use of sign as a primary means of communication. Recent research evidence supports his claim that there is a dramatic difference in both form and function between socially-regulated, standardised sign languages and the informal, idiosyncratic gestures that appear spontaneously during speech (Singleton, Goldin-Meadow & McNeill, 1995). On the other hand, McNeill and other researchers appear to agree that other types of gesture used by non-signers, such as the 'thumbs up' and other conventional gestures, have some features in common with the signs found in visual-gestural languages (Brennan, 1993; Kendon, 1988). A recent study by Webb (1996) argues persuasively that many gestures used by non-signers are highly conventionalised in the same way as words and signs, and have a very specific form linked to a specific meaning. Although they are

distinct from the complex and highly-structured use of the hands, face and body in sign languages, these uses of gesture appear to share at least some of the same principles of organisation (Brennan, 1992).

In our study of sign structure and sign formation in Auslan, a better understanding of language in the visual-gestural modality may come from exploring some of the underlying features which Auslan share with other uses of gesture, as well as those features which distinguish the linguistic use of gesture from other types of gestural communication. A comparison of signs in a sign language with the use of gesture in non-signers offers a unique opportunity to more fully understand the meaning-making potential of the gestural channel, as well as the properties of linguistic systems which emerge from the use of gesture as a primary means of communication (McNeill, 1992).

1.2 Gestural communication

In his discussion of the various types of gestural behaviour, McNeill (1992) used a classification scheme first discussed by Adam Kendon (1980), which he referred to as Kendon's continuum (see Figure 1.1). The relationship between the various uses of gesture is represented as a continuum because, as we move from left to right, there is a gradual change in a number of characteristics: (a) the use of speech becomes less obligatory; (b) systematic linguistic structure and organisation increases; (c) the gestures used in each category become less idiosyncratic and more socially regulated.

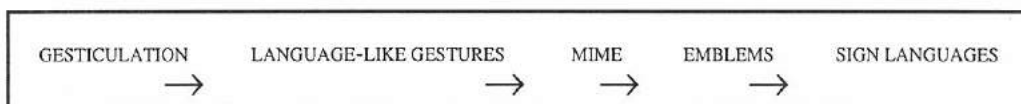


Figure 1.1 Kendon's Continuum of Gestural Communication

We shall now examine examples of each stage in the continuum in turn, relating the communicative use of speech-related hand movements, mime and emblems by non-signers to the linguistic use of gesture in the sign languages of deaf communities. In addition, we shall also consider the types of gesture that are used in situations where hearing people must rely on the gestural mode as a primary means of communication, examining the shared properties of sign languages and the communicative use of gesture.

1.3 Gesticulation

Gesticulation refers to the type of spontaneous gesturing that occurs as people speak. When people are engaged in a spoken conversation, observers will almost always notice the use of particular types of movement of the hands and arms, as well as facial expression and sometimes movement of the head, shoulders and body (Brennan, 1992). Although such use of gesture may convey particular meanings in particular contexts, this does not necessarily mean that such gestures could be considered as equivalent to words in a spoken language, nor to signs in a sign language. Gesticulation lacks most of the main properties of language. Unlike signed

and spoken language, gesticulation is not highly socially regulated and, thus, appears to have little grammatical organisation and few standards of well-formedness (McNeill & Pedelty, 1995). Instead, these gestures appear to be closely synchronised with the rhythm of speech, and to serve to complement spoken language in particular ways (McNeill, 1992). McNeill (1992) based his claims about the form and function of gesticulation on intensive empirical research carried out over a number of years. Although some of his research is based on the study of television broadcasts, videotaped conversations and academic presentations, much of McNeill's work draws on examples from experimental studies. In these studies, a speaker watches a film or animated cartoon, and then later recounts the story to a second person. Neither the speaker nor the listener knows that the gestures they use during the conversation form the focus of the research. On the basis of these studies, McNeill developed a classification scheme which identifies a number of different uses of gesticulation. He claimed these gestures fall into four categories: *iconics*, *metaphorics*, *beats*, and *deictics*. Each of these gestures has a different symbolic function: the hands and arms in each type stand for something other than themselves and are closely related to the meaning that the speech conveys, but each type achieves this in a different way (Studdert-Kennedy, 1994). I have grouped these categories under headings which refer to their function as either *representational*, *rhythmic* or *pointing* gestures.

1.3.1 Representational (iconic and metaphoric) gestures

As the name of this category suggests, these gestures present some kind of picture or illustration of the object being discussed, presenting "more or less transparent images of their referents" (Studdert-Kennedy, 1994, p.205). The hands may be used to describe, for example, the shape of the object being referred to in speech. An example of this imagery may be an upward spiralling movement of the finger while the speaker is describing a spiral staircase. These gestures may also represent the spatial location and orientation of the referent, or its spatial relationship to other objects. A person giving directions, for example, may place one hand opposite another while explaining the location of a building opposite a famous landmark. Iconic gestures may also depict some action of the referent, as in a downward gesture accompanying the description of an object falling. In many cases, such uses of gesture may be redundant, working only to present the same message as the speech.

Iconics also include what other writers refer to as *pantomimic* gestures (Rimé and Schiavatura, 1991). Here the hands represent not another object but themselves, interacting and manipulating the object. McNeill (1985) illustrated this nicely with an example from his own research. While explaining how a character in a cartoon picks up a crate, the author mentions that his informants would spontaneously hold their hands apart in front of their chest, as if holding onto an imaginary square object. The example shown here is a gesture produced by an informant recounting how one character pursues another and attempts to hit the unfortunate individual with an umbrella. This example illustrates how the iconic gesture can complement



"...and she chased him out again"
(McNeill, 1992, p. 9).

the spoken utterance, conveying information that the speech leaves out, since the informant did not describe the particular weapon used by the cartoon character in spoken words, only in the gesture.

Metaphorics are like iconic gestures in that they depict images of objects. The gestural images, however, do not refer to actual objects in the world, but seem to represent abstract concepts in the mind of the speaker. These gestures may “give metaphorical expression to the type of idea expressed” or “reflect a particular mood or attitude” (Brennan, 1992, p. 11). Brennan provides an example of a gesture known as the ‘precision grip’ in which the thumbtip and index finger touch to form a closed circle. Here the fingers are gripped tightly together as if holding a tiny or delicate object, for example, and may suggest the speaker’s desire for precision or exactness. Metaphorical gestures may thus become quite abstract, drawing on particular culturally-specific metaphoric images. The gesture shown here appears to be a metaphor for transition or processes of change. As the speaker begins to explain the main part of the movie he has just seen, he uses a gesture suggesting moving into the story proper through a forward motion, combined with a rotating gesture which appears to represent the unfolding events which he is about to relate.



“And now we get into the story proper...”
(McNeill, 1992, p. 160).

1.3.2 Rhythmic gestures (beats)

In contrast to iconic and metaphoric gestures, beats do not provide an image of any object, real or imagined. The shape or location of the hand is of little importance, and does not vary from one situation to another. In fact, beat gestures may consist of little other than a simple up-and-down or back-and-forth movement, moving along with the rhythm of speech. Beats provide a gestural accompaniment to the patterns of intonation, rhythm and stress in spoken language. They may also be used to show the relationship of particular words or phrases to each other. A beat gesture may accompany a newly introduced element in the discussion, for example, or may serve to “stress some elements of the speech for the sake of clarity or emphasis” (Rimé & Schiaratura, 1991, p. 243). They are thus perhaps the most dependent on the spoken message and, unlike representational gestures, may consist of small undifferentiated movements with little meaning of their own.

1.3.3 Pointing (deictic) gestures

Deictic or pointing gestures, as the name suggests, involve movements of the hand that point to real, absent or abstract objects. These gestures are often used to clarify or disambiguate persons or objects being referred to, for example, by indicating the specific referent (pointing to someone in the distance) or some object associated with the referent (pointing to someone’s car) in the speaker’s physical environment. In his research, McNeill (1987) had also found, however, that speakers may simply point off into the distance when discussing persons or places not physically present, even if the actual physical locations being referred to are unrelated to the places pointed at. One example came from a conversation in which a subject asked “Where did you come from before?” while pointing to a point in space midway between him-

self and his addressee. The point in space indicated seemed to represent an abstract concept of the place the addressee came from. McNeill (1987) found that such pointing gestures often occur at the beginnings of conversations and at the start of new episodes in storytelling, and seem to be part of a speaker's attempt to structure the conversation, perhaps helping to guide the listener through the details of a story. Pointing to locations in the gesture space can also serve as a way of referring to abstract concepts or relationships. For example, the action of a person or object being discussed may be represented by an iconic gesture in a certain location in the gesture space. This location then becomes established as representing the person and pointing gestures return to this location when reference to this person, object or action is made again (McNeill & Pedelty, 1995).

1.3.4 Gesticulation and sign

Many writers have perceived links between gesticulation and sign language, and some have suggested that signed languages may have their roots in the gestures that accompany speech. Brennan (1990, 1992), for example, has compared the sign formation processes at work in British Sign Language (BSL) with the patterns of organisation evident in the gestures which co-occur with speech. While stressing that the spontaneous use of gestures by non-signers clearly plays a different communicative role from the use of gestures in sign languages, she pointed out that both systems "share common formational elements" (1992, p. 11). A range of different handshapes may be used in gesticulation, and these handshapes may be used to represent the location, movements, size and shape of objects. The iconic and pantomimic gestures found in gesticulation seem similar to the use of classifier handshapes in sign languages (see Chapter 3 for a description of the various classifier forms in Auslan). The kind of abstract pointing and referential use of space McNeill (1992) noted in his research with non-signers above also seems reminiscent of the grammatical use of space found in visual-gestural languages (Johnston, 1989b, 1991b).

Although much of this work shows how contrastive and distinctive gestural patterns may be spontaneously produced by hearing non-signers, recent empirical studies comparing gesticulation and the use of gesture as a primary means of communication have shown that there are limits to these similarities (Singleton, Goldin-Meadow & McNeill, 1995; Singleton, Morford & Goldin-Meadow, 1993). In a series of studies, Singleton, Morford, Goldin-Meadow and McNeill asked hearing subjects with no sign language experience to re-tell a cartoon story, studying the spontaneous gestures which appeared as they spoke. The same subjects were asked to then re-tell the story without speaking, using gesture alone. When these subjects had to use gesture as their sole means of communication, a number of language-like properties emerged which were lacking in the gestures which accompanied their speech. Specific gestures were used to iconically represent specific objects, information about these objects became incorporated into the gestures which represented their actions, and the object and action gestures were combined to form gestural phrases.

Singleton et al. (1995) found that the gestures which accompany speech, however, generally occurred alone and were never combined in sentence-like patterns. Although some symbolic patterning was present, the handshapes, locations and movements in the gesticulation of the subjects mostly remained highly context-dependent and idiosyncratic. The iconic gesture shown here, for example, was produced as the speaker was explaining that a character from a cartoon climbed up inside a drainpipe. Although complementing the speech, this gesture is somewhat ambiguous. Does the finger represent the character, the path or simply point to the destination? McNeill (1987) found his subjects all represented the upward movement of a character in the cartoon by gesticulating upwards, yet the many different gestures made by the various subjects had little else in common. This lack of standards of form is common in gesticulation, and as Brennan (1992) explained, “different individuals tend to develop a habit of using the same few gestures again and again” (p. 12). Unlike signs in a visual-gestural language, iconic, metaphoric, beat or deictic gestures tend not to be produced in highly standardised ways by an entire community of users, nor are they combined to form complex gestures and gestural phrases.



An ambiguous representational gesture (McNeill, 1992, p. 106).

1.4 Language-like gestures

Language-like gestures are similar in form to gesticulation, but, unlike the gesture types discussed above, they function in a more language-like way. Rather than accompanying what is being said, language-like gestures replace spoken words and phrases. These gestures, unlike gesticulation, appear to occupy “a particular grammatical slot” in a spoken utterance, one that is more usually filled by a word (Singleton, Goldin-Meadow & McNeill, 1995, p. 287). As a result, such uses of gesture are referred to as lexical substitutions by some researchers (Marschark, 1994). An example may be the gesture used by a speaker when asked about the weather on his holiday who replies: “Well, it was [oscillating hand gesture]”. Here the ‘so-so’ gesture replaces an adjective (Studdert-Kennedy, 1994). Language-like gestures may fulfill a grammatical function and, thus, are one step closer to the kinds of uses of gesture we see in sign language.

1.5 Mime

Mime, as Brennan (1992) observed, is a traditional art form in many countries. Many people will be familiar with the art of mime through children’s theatre, television game shows, or popular party games such as charades. Strictly speaking, mime involves imitating real-life activities without the object and people normally involved being physically present. A mime artist “may act out the process of riding a bike, going to bed or driving a bus without any props other than her or his own gestures and body movement” (Brennan, 1992, p. 12). Generally, artistic forms of mime are performed in silence. Everyday use of mimetic gestures, however, may often be accompanied by onomatopoeic sound effects (“whee!”, “click!”, “splat!”). This optional use of speech puts mime in the middle of the gestural continuum.

Mime shares some of the features of gesticulation and language-like gestures. Brennan (1992) noted that the mime artist often may use *empty-handed* gestures: handshapes and movements that are appropriate to the handling of the object are made to communicate an idea of the size and shape of the object being mimed about. A closed fist may be used if the mime artist is holding a tool, an index finger contacting the thumb may suggest a small object such as a needle or piece of string, and a spread, flat hand may be used to represent carrying a box. A mime artist may also use iconic gestures which represent the location and actions of people and objects in the world. Two fingers may be used to depict a person's legs moving away into the distance, or the hand may become an imaginary spider crawling along the mime artist's arm. Various exaggerated facial expressions may be used to communicate information about the people's personalities and emotional states. Imaginary objects may be placed at a particular point in space and "eye gaze, pointing and directed movement, used to refer back to the located object" (Brennan, 1992, p. 13). The use of appropriate representational handshapes, facial expressions and spatial patterns is also exploited in the sign languages of the deaf. We shall see in the chapters to follow, however, that these uses of gesture in sign languages take on a more sophisticated form, one which forms part of highly-structured linguistic system.

Mime, however, is not language. The gestures are often highly context-dependent, and are not standardised across a community of users. As a result, the mimed communication of the types seen in TV game shows or in the theatre simply requires too much time and space to work as "an effective communication system in daily life" (Brennan, 1992, p. 13). The mime artist must tell a story by acting it out in real time, as if it were happening in the present, and must walk around the stage in order to suggest the location and spatial arrangement of the objects and people being described. As Brennan (1992) explained:

"If the artist wishes to convey the meaning expressed by the sentence 'I over-indulged last night by eating an enormous meal' an elaborate replay of the activity involved would be required...In contrast, sign languages can exploit the potential of space and gesture while honing the medium into a fast and efficient linguistic tool. (p. 13)"

The existence of a standardised vocabulary of signs means that users of sign languages can refer freely to events in the past, present or future, and do not require such elaborate acting out of activities to communicate basic information. The grammatical organisation of sign languages also allows signers to quickly and efficiently communicate who did what to whom. Thus signers may remain in one place, using only the space around themselves as a "stage" in which to represent people, objects and actions.

Additional evidence supporting the distinction between mime and sign language comes from the study of *aphasia*. Aphasias are communication disorders that result from damage to the language areas of the left hemisphere of the brain, often as a result of a stroke, head injury or a brain tumour. The left hemisphere appears to control the use of language and, as a result, aphasias involve a complete or partial language impairment. It has been demonstrated that sign

language aphasias in deaf people seem to be are very much like the aphasias seen in speaking patients (Poizner, Klima and Bellugi, 1987). This relationship between aphasia and sign, however, does not appear to be true of the use of mime. Corina et al. (1992) discuss a patient with damage to the left hemisphere who exhibited severe disorders in his use of American Sign Language, but apparently preserved an ability to communicate through mime.

1.5.1 Mime and sign

Although mime may not be an efficient communicative tool in itself, it seems able to form part of the basis on which more structured linguistic systems can eventually develop. In a series of studies mentioned above, Singleton et al. (1993, 1995) asked hearing individuals with no knowledge of sign language to describe events seen in short films using only gesture and no speech. Although their study emphasised the striking differences that became apparent between sign language and the communicative gesture of non-signers, it is important to note their conclusion that:

“...when an individual is asked to abandon speech and generate gestures on the spot to convey information, that individual—whether child or adult—is likely to be able to do so. Indeed, the gestures which are produced tend to be relatively good representations of the objects and movements to be described” (Singleton, Morford, & Goldin-Meadow, 1993, p. 709).

Their research also included a study of a deaf child from a hearing family, David, who, over a number of years, invented and developed a spontaneous gesture system to communicate with his hearing family. The researchers found that not only were his gestures “adequate representations of objects and movements in the world, but that they conformed to an internally consistent and contrastive system” (1993, p. 710). Furthermore, like the sign systems created by other deaf children in such situations, David’s signing might be considered relatively grammatically complex. David’s sign system reportedly contained a substantial set of rules for modifying signs and creating new ones. Singleton et al. (1993) suggested that this finding may be due to the properties of the visual-gestural medium, that the difference may emerge because “the iconic resemblances between form and meaning” formed the basis of grammatical rules (1993, p. 711). These regularities of patterning between form and meaning set the stage for the emergence of language. Gestures can be used to represent objects and actions, and can depict the size, shape and other characteristics of these objects and actions. These nominal, verbal and adjectival gestures can then be concatenated into gestural phrases, or recombined to make complex gestures.

Thus the art of mime and the use of gesture by hearing people in experimental studies provide a hint of the powerful “communicative potential that is available within the gestural medium” (Brennan, 1992, p. 12). The actions of a highly trained mime artist and the development of home sign systems in deaf children without sign language role models all demonstrate that the hands, face and body can be used to build contrastive and distinctive visual patterns, the building blocks of language in the gestural mode. Although less formally structured than in the

sign languages of deaf communities (which have evolved over several generations of users), and used in a more iconic and mimetic fashion, these subcomponents can be combined to create specific meaningful gestures by people with no prior knowledge or use of a sign language. Numerous works by Brennan (1990, 1992, 1993) on sign formation processes in BSL have emphasised that it is precisely this possibility of exploiting mimicry and spatial patterning which always exists as a source of creativity in sign languages.

1.6 Conventional gestures (emblems)



The
'V for victory' gesture

Unlike other forms of gesture, emblems usually involve the use of very specific handshapes, hand locations and movements which are linked to specific meanings. In Britain, for example, Churchill's palm-forward 'V for victory' gesture differs only slightly from the palm-backwards 'up-yours' insult. Emblems also have a different relationship to speech, often replacing it completely. These gestures also have particular functions, being used mainly as forms of greeting, command, request, insult, or threat. Examples of emblematic gestures include hand-waving for 'hello' or 'goodbye', the 'okay' sign, and the 'thumbs-up' gesture.

The precise meaning of particular emblematic gestures is often only known to a particular group, class or culture. Thus, like the words of spoken languages, emblems vary from one part of the world to the next. Referring to research by Morris et al. (1979), McNeill (1992) explained that the 'hand purse' gesture (made by placing the fingers and thumb together, pointing upwards) is used to signal a 'question' or 'query' in Italy, 'good' in Greece, and to express fear in France, Belgium and Portugal. Similarly, the 'okay' sign, so widely known throughout Europe, is considered a threatening gesture in North Africa.

Emblematic gestures may thus be comparable to the signs in human sign language for these reasons (Brennan, 1992). Unlike signs, however, such gestures tend to be restricted in number and function. Non-signers tend to use very few emblems and there do not appear to be rules for producing new emblematic gestures. Nor are emblematic gestures combined into complex gestures and phrases.

1.7 Features of Kendon's gesture continuum

As we have seen above, each stage along the gestural continuum reflects an increasing complexity in the structure, use and meaning of gestural communication (McNeill, 1992). The various linguistic properties which develop as we move from left to right along the continuum can be represented as in Table 1.1.

I have added two properties to McNeill's list of features: the concept of tradition, referred to elsewhere in his work and discussed by other writers (Singleton et al., 1993), and the degree of interdependence with speech. In Table 1.2, I show how each of these features combine to produce the gesture types along the various stages of Kendon's continuum.

Table 1.1 Features of Kendon's continuum. (Adapted from McNeill, 1992, pp. 38-39)

segmentation	meaningful gestures are can be broken down into segments
compositionality	meaningful gestures are constructed by combining segments
lexicon	meaningful gestures or gesture segments recur in the same form in different contexts
syntax	combinations of gestural segments adhere to standard patterns
paradigmatic oppositions	gestural segments are organised into contrasting sets
distinctiveness	details are added to the form of meaningful gestures solely to distinguish these gestures from other gestures
arbitrariness	meaningful gestures are used to refer to entities and events in contexts where their iconicity is ruled out
standards of form	gestural segments and/or combinations of segments are held to standards of form
a community of users and tradition of use	a community exists that understands the gestures and gesture combinations, and this community spans several generations
co-occurrence with speech	meaningful gestures and/or combinations of meaningful gestures occur without speech

Table 1.2 Features of gesture types

	Gesticulations	Language-like gestures	Mime	Emblems	Sign languages
without speech	no	yes	yes	yes	yes
segmentation	no	no	limited	yes	yes
compositionality	no	no	limited	limited	yes
lexicon	no	no	limited	limited	yes
syntax	no	no	limited	no	yes
paradigmatic oppositions	no	no	limited	no	yes
distinctiveness	no	no	limited	limited	yes
arbitrariness	no(?)	no(?)	no(?)	yes	yes
standards of form	no	no	limited	yes	yes
community	no	no	local	yes	yes
tradition	no	no	no	yes	yes

1.8 The gesture continuum and sign language

We can see quite clearly how the properties of gestural communication become more language-like as we move from left to right across Kendon's gestural continuum. Gesticulation appears to lack most of the characteristics of language, yet, together with speech, it forms part of an integrated linguistic system. With language-like gesture, spontaneous movements of hand and body may replace words, but remain heavily dependent on the surrounding speech for interpretation. Mime involves the systematic use of iconic gestures for communication, but is limited in efficiency and its capacity for abstraction. Emblems involve the use of highly structured and socially-regulated gestures, but these are restricted in number and function.

Signs in a natural sign language (like words in a spoken language), however, are composed of smaller meaningful gestural units. These formational units are combined in standard ways, and these units can be recombined to create new signs. Signs, like the words of a spoken language, form a lexicon, and these signs can be combined, following standard rules of organisation (i.e., a grammar), into hierarchically-structured phrases, clauses and sentences. Signs are organised into contrasting sets, and formational units from which signs are made can be used solely to distinguish one sign from another. Signs may exhibit arbitrariness, they can be used in contexts where any motivated connection between form and meaning is lost. Signs and combinations of signs have standards of form: different signers will use the same gesture for the same meaning in particular contexts, and this aspect will be true of all those who form part of that signing community. The use of a sign language may span several generations, with the language being passed down from one generation of signers to the next.

It is only in such sign languages, and not in other communicative uses of gestures, that we thus find all the characteristics common to the world's spoken languages. In the next chapter, we shall more closely examine the formational properties of the signs in one particular sign language, Auslan.

THE FORMATIONAL STRUCTURE OF SIGNS

One of the defining features of language is that the symbols that are used in language can be broken down into smaller parts. In the last chapter, I referred to this notion as segmentation, and segmentation was shown to be less characteristic of most forms of non-linguistic gestural communication. Before moving on to explore in detail how this concept applies to the signs used in a sign language, I shall briefly outline the internal structure of words in spoken languages. Since linguistics has traditionally focussed on the study of speech, many of the key concepts and much of the terminology in the study of sign languages has been adapted from the description of spoken languages.

2.1 The internal structure of words

The words in a spoken language are not produced simply as a random combination of sounds, but are made from a limited set of sounds. Sounds from this limited set are used to build all the hundreds of thousands of words in the spoken language. These sounds act as the smallest contrastive units of the language, since a change in even one of these sounds can change the meaning of the word, as in the contrast between the words *pat* versus *bat*. The smallest units of sounds which are used to distinguish two words are known as *phonemes*. The number of phonemes varies from language to language, although most languages appear to have between 20 and 40 (Crystal, 1987). The variety of English spoken in Australia, for example, has 44 phonemes, as shown in Table 2.1.

2.1.1 The production of speech sounds

The phonemes of English are produced as a combination of a number of major features of articulation known as *parameters*. Each of these parameters can be varied independently of each other to create the different phonemes of English (Katamba, 1989). For consonants, the three major parameters are *voicing*, the *manner* of articulation, and the *place* of articulation in the speech tract. Voicing refers to the use of the vocal cords in the articulation of a particular sound. Making the vocal cords vibrate produces a *voiced* sound (as in the sound /v/), while allowing the air to pass the vocal cords without vibration produces a *voiceless* sound (as in /f/). The manner of articulation refers to the way in which the sound is articulated. The two main ways consonants are produced are either by shutting off the air completely (producing *stop* consonants such as /p/ and /t/), or by constricting the airflow so that it comes through noisily (producing *fricative* consonants such as /v/ and /z/). The place of articulation is the point in the speech tract where this stopping or constricting may occur, for example at the lips (producing a *bilabial* sound such as /m/), or at the gum behind the front teeth (producing an *alveolar* consonant such as /d/). Table 2.2 summarises the interplay of these parameters in the production of

English consonants¹.

Table 2.3 illustrates how each individual speech sound is produced as the combination of articulatory features. The sounds /p/ and /b/ have a bilabial place of articulation, and they are produced as stops. For /p/, there is no voicing, while /b/ is produced as a voiced sound. In section 2.2, we will see how signs can also be described using combinations of articulatory features.

Table 2.1 List of phonemes of Australian English.

IPA	Consonants	IPA	Consonants	IPA	Vowels	IPA	Vowels
p	as in <u>p</u> ill	v	as in <u>y</u> an	æ	as in <u>p</u> at	eɪ	as in <u>b</u> ay
b	as in <u>b</u> ill	θ	as in <u>th</u> in	a	as in <u>p</u> art	aɪ	as in <u>b</u> uy
t	as in <u>t</u> own	ð	as in <u>th</u> en	ɛ	as in <u>p</u> et	ɔɪ	as in <u>b</u> oy
d	as in <u>d</u> own	s	as in <u>s</u> ue	ɪ	as in <u>p</u> it	aʊ	as in <u>h</u> ow
k	as in <u>c</u> ot	z	as in <u>z</u> oo	i	as in <u>b</u> eat	oʊ	as in <u>b</u> oat
g	as in <u>g</u> ot	ʃ	as in <u>sh</u> ip	ɒ	as in <u>p</u> ot	ɪə	as in <u>b</u> eer
m	as in <u>m</u> eat	ʒ	as in <u>b</u> eige	ɔ	as in <u>p</u> ort	ɛə	as in <u>b</u> ear
n	as in <u>n</u> eat	w	as in <u>w</u> et	ʊ	as in <u>p</u> ut	ə	as in <u>t</u> our
ŋ	as in <u>s</u> ing	j	as in <u>y</u> et	u	as in <u>b</u> oot		
l	as in <u>l</u> ake	h	as in <u>h</u> at	ʌ	as in <u>b</u> ut		
r	as in <u>r</u> ake	tʃ	as in <u>ch</u> in	ɜ	as in <u>b</u> ird		
f	as in <u>f</u> an	dʒ	as in <u>g</u> in	ə	as in <u>a</u> part		

Table 2.2 The consonant inventory of Australian English.

Manner of Articulation	Voicing	Bilabial	Labio-dental	Inter-dental	Alveolar	Palatal	Velar	Glottal
Stop	voiceless	p			t		k	
	voiced	b			d		g	
Fricative	voiceless		f	θ		ʃ		h
	voiced		v	ð		ʒ		
Affricate	voiceless					tʃ		
	voiced					dʒ		
Nasal	voiced	m			n		ŋ	
Lateral	voiced				l			
Approximant	voiced	w			ɹ			

¹ For a fuller description of the production of speech sounds and of the technical terms used in Tables 2.2 and 2.3, see Fromkin, Rodman, Collins and Blair (1996), Crowley, Lynch, Siegel and Piau (1995), or Katamba (1989).

Table 2.3 Individual consonants as bundles of articulatory features.

	p	b	s	z
place	bilabial	bilabial	alveolar	alveolar
manner	stop	stop	fricative	fricative
voicing	voiceless	voiced	voiceless	voiced

2.1.2 Minimal pairs

How do linguists know which sounds act as phonemes, the smallest formational units in a language? One method traditionally employed to determine whether two sounds are phonemic is to identify *minimal pairs*. A minimal pair is a pair of words that differ only by a single sound where this sound is in the same position in both words. As mentioned above, the words *pat* and *bat*, have different meanings, yet they differ in only one sound: *pat* begins with a /p/ and *bat* begins with /b/. This is the smallest amount by which the two words could differ. Any smaller difference would be impossible in English, because English speakers does not divide /p/ and /b/ into smaller parts (Aitchison, 1992). These two sounds are two of the 44 phonemes in English.

It is often difficult to see how the basic contrastive sounds or phonemes work in such minimal pairs, because the English spelling system does not always accurately reflect the number and type of sounds in a particular word (Brennan, 1992). Although the pronunciation of English has changed over the last few centuries, much of the writing system has not. English has also borrowed many words from languages with different writing systems. Linguists and lexicographers have attempted to overcome this problem by using a *transcription* or *notation system* which directly represent the sounds themselves. As in the list of phonemes shown above in Table 2.1, the minimal pairs in Table 2.4 below are presented in the symbols of the International Phonetic Alphabet (IPA).

If we ignore the traditional spelling used in the left columns in Table 2.4, and look just at the sounds represented on the right, we quickly see how this set of minimal pairs illustrates some of the basic distinctive formational units (i.e., phonemes) of English, and how these smallest units are used to build words. Sometimes there may be slight differences in the sound of the phoneme itself, depending on its position in the word. English speakers will notice that the /k/ sound at the beginning of *cat* is slightly different from the /k/ sound at the end of *beak*. When it is at the beginning of a word, as in *cat*, the /k/ sound is pronounced with aspiration (a puff of breath). At the ends of words, such as *beak*, this puff of breath disappears. These slight differences in pronunciation may be important in other languages, but they are not contrastive in English. The human speech organs are capable of producing an enormous number of different speech sounds. Every spoken language, however, takes only a limited set of sound contrasts, and builds them into a linguistic system (Brennan, 1992).

Table 2.4 Examples of minimal pairs in English.

(Adapted from Brennan, 1992, p. 19.)

English	IPA	English	IPA
cat	/kæt/	bat	/bæt/
bat	/bæt/	bit	/bit/
bit	/bit/	bill	/bil/
bill	/bil/	bin	/bin/
bin	/bin/	been	/bin/
been	/bin/	beat	/bit/
beat	/bit/	beak	/bik/

2.2 The internal structure of signs

It was not until recently that the similarities between the linguistic uses of sounds in spoken languages and of gesture in sign languages were recognised. With the publication of *Sign Language Structure* in 1960, William Stokoe was the first researcher to demonstrate that the signs used by deaf people actually had internal structure in the same way as spoken words. Before Stokoe, signs had been regarded as simple, unanalysable gestures with no internal organisation, rather like those used in gesticulation (Woll, 1990). This meant that signs were thought to be unlike words since they could not be broken down into smaller, recurring segments. Stokoe (1960) showed, however, that just as hundreds of thousands of English words are produced using a very small number of different sounds, the signs of American Sign Language (ASL) were produced using a limited number of gestural features. Stokoe found that the action of a sign had three main parts or *aspects*: a specific *handshape*, a particular *location* and a particular *movement*.



THANK YOU

2.2.1 Handshape, location and movement

Handshape, as the name suggests, refers to the shape of the hand used in a sign. In the sign THANK-YOU², for example, the fingers of the hand are held flat and close together. The human hand is, however, capable of assuming a vast array of other possible shapes. It may be closed into a fist, or the fingers may be spread out or held together; there may be bending of the hand at the wrist, or the fingers may be bent at the knuckles or joints; the thumb may be

² The Auslan signs discussed in this monograph are represented by glosses. A gloss is one or more English word(s) used as a 'reference name' for a particular sign and is written in upper-case letters. The gloss is not meant as an exhaustive definition of a sign, but as an attempt to represent in English the central or most common meaning associated with that sign. All glosses are based on those used in Johnston (1989a).

extended, held parallel to the fingers or held across the palm or closed fist; the index, middle, ring or little finger may be extended, bent, or in contact with each other. As we will see below, despite the great number of possible hand configurations that can be produced, each particular sign language tends to only use a limited number of handshapes.

Location refers to the position of the hand on the body or in the space around the signer. In THANK-YOU, the hand is initially held on the chin and moves to a location a short distance away. As with handshape, there are a great number of different locations on the body and in space which may be used. Users of sign languages, however, tend to use only those parts of the body and locations in space which fall into what sign linguists call the *signing space*. The signing space refers to an area which "extends from approximately just above the head to the waist, and in width from elbow to elbow when the arms are held loosely bent" (Brennan, 1992, p. 22). It is in this area that the hands and arms can move and make contact with the body and each other easily and naturally.

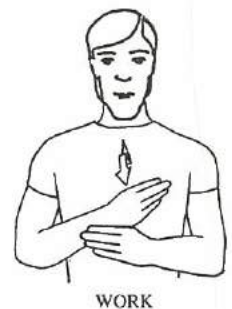
Movement is perhaps the most complex of the three basic aspects. The movement in the sign THANK-YOU is quite simple: the hand moves in a straight line away from the signer. The hand may move upwards, downwards, to and fro, in an arc, a circle, or spiral. The handshape may change, or the direction of the palm and fingers. Many signs use simple movements, while others may be realised as complex combinations of different types of movement. As with handshape and location, the signs of a sign language exploit only a subset of all those movements of the fingers, hands and arms which are physically possible.

2.2.2 Other aspects of sign formation

Since Stokoe's original work, further research has shown that other features of sign formation need to be taken into account. Battison (1978) suggested that *orientation*, which refers to the direction of the palm and fingers, is also an important component of sign formation. A particular handshape can be oriented in a number of different ways in relation to the signer's body. The palms and fingers may be oriented left, right, up, down, towards or away from the signer. In the sign THANK-YOU, for example, the fingers are oriented upwards and the palm is facing the signer.

Some signs also make contrastive use of *hand arrangement* and *point of contact*. In signs which involve two hands, such as the sign WORK, hand arrangement refers to the placement of the hands in space with respect to each other. Note that in this sign, the hands cross each other at the wrist. In a two-handed sign like WORK, only one hand moves, repeatedly contacting the passive hand. The point of contact describes the part of the active hand which may be used to contact the passive hand (Brennan, 1992). In this sign, it is the little finger side of the active hand which makes contact.

Other features, such as the *stress and duration of sign production*, and the *rate of repetition of movement* are also employed in the formation of signs in Auslan (Johnston, 1989b). Many linguists also recognise that *non-manual features* (such as facial expression, mouthing and



movement of the head and body) play an important role in the internal structure of signs (cf. Valli & Lucas, 1995).

Of these additional features, sign linguists now generally include orientation in their descriptions of signs and most appear to agree that it counts as one of the four most basic parts of sign formation (Woll, 1990). The other features listed above, however, do not appear to be essential to describe every sign in Auslan and other sign languages. In this account, we shall generally not include discussion of hand arrangement, point and place of contact, stress and rate of repetition unless these appear to be necessary to describe a particular sign. Non-manual features will be discussed separately since they can appear without or without manual signs, and because they appear to play a variety of different roles in sign languages.

2.3 Sign parameters and transcription systems

In this description of signs in Auslan, we shall represent each sign as being articulated with one or more handshapes, which are oriented in a specific direction and which perform one or more distinct movements at a location or locations in the signing space or on the signer's body. Each sign may also be accompanied by a particular non-manual feature. These five visual-gestural features are known as the *parameters* of sign production, analogous to the parameters of speech production mentioned in section 2.1.1 above. Just as in spoken languages, transcription systems have been developing using symbols for each of contrastive units involved in sign production. These systems have enabled researchers to describe the production of signs in written form. In general, we shall refer to signs in this book by means of glossing and illustrations only. We could, however, represent signs using a transcription system, as in the following examples: SISTER $\text{hook} \wedge \text{up} \text{nose} \text{X}^+$, THANK-YOU $\text{flat} \wedge \text{up} \text{chin} \text{X}^{\uparrow}$. The transcription system shown in these examples is known as HamNoSys, the Hamburg Notation System. This was developed at the Centre for German Sign Language at Hamburg University, Germany, and has been used by some sign linguists in Australia as a way of recording signs in written form (Johnston, 1991a). Each symbol is explained in Table 2.5 below.



SISTER

Table 2.5 A specification of the parameters of the signs SISTER and THANK-YOU. (Note that all signs are conventionally described from the point of view of a right-handed signer.)

	SISTER		THANK-YOU	
HANDSHAPE	hook	Hook	flat	Flat
ORIENTATION	$\wedge \text{up}$	Hand up, palm left	$\wedge \text{up}$	Hand up, palm towards the signer
LOCATION	nose	Nose	chin	Contact chin
MOVEMENT	X^+	Contacts twice	X^{\uparrow}	Moves away from the signer
NON-MANUAL FEATURES		—		—

2.4 Minimal pairs in Auslan

How have sign linguists determined which formational units are of importance in a sign language like Auslan? As in the study of spoken languages, linguists have isolated the basic parts of signs through the study of **minimal pairs** (Johnston, 1989b). Many signs in Auslan differ in only one parameter, and these can be compared. For example, in citation form³, the signs **WORK** and **TALK** are the same in orientation, location and movement. The signs differ in meaning, yet the only difference occurs in the handshape used in each sign. Thus we can see that handshape is an important part of signs, and that it is used to distinguish signs from each other. Other signs, such as **ON** and **TRUE**, differ only in orientation. Here the handshape is the same, and only the orientation of the palm distinguishes the two signs. Similarly, **BEAUTIFUL** and **WELL** differ only in location, and **BROTHER** and **PAPER** differ only in movement. Additional examples of sign minimal pairs are included in Table 2.8 below, but for a more extensive discussion, see Johnston (1989b).

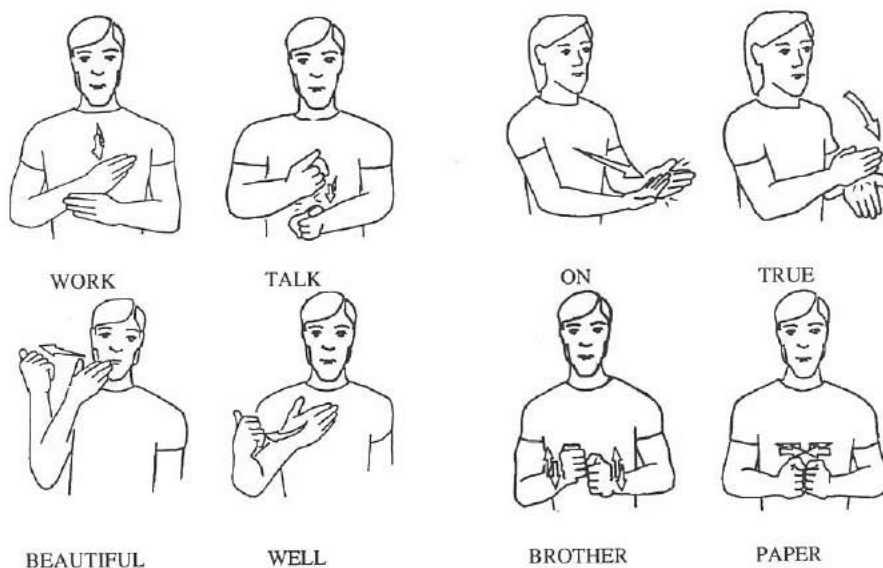


Figure 2.1 Examples of minimal pairs in Auslan citation forms.

2.5 Sign types




Brennan (1992) grouped BSL signs into three main formational types: *manual* signs, *non-manual* signs and *multi-channel* signs. Table 2.6 below is an adaptation of Brennan's sign classification scheme, providing examples of each type from Auslan.

Not surprisingly, manual signs are by far the most frequent type in Auslan, followed by multi-channel signs (Johnston, 1989b). The use of non-manual features without a manual sign can occur, though it is relatively rare. Non-manual signs tend to co-occur with manual signs, either as part of an individual multi-channel sign, or in combination with a whole string of signs. When combined with individual signs, non-manual features often modify the meaning

³ The citation form is the form of a sign when it is produced in isolation or in response to the question 'How do you sign ___?' or 'What is the sign for ___?' (Baker & Cokely, 1980).

of the sign in some way, perhaps intensifying or adding other nuances to its meaning. If they are used with an entire signed phrase, non-manuals usually fulfil a grammatical function, being used to distinguish questions from statements, for example, or to mark the topic of a sentence (Johnston, 1989b, 1996).

Table 2.6 Sign types. (Adapted from Brennan, 1992, p. 17)

Sign type	Example
<p>Manual signs: signs which can be made with only the hands, such as SIGN or GOOD. These signs are formed from the four basic parameters: handshape, orientation, location and movement</p>	 SIGN
<p>Non-manual signs: signs which are made with other parts of the body, excluding the hands, such as the head nod or head shake to mean YES or NO. Non-manual signs can involve particular facial expressions, mouth patterns or head movements, or a combination of two or all of these features.</p>	 NO
<p>Multi-channel signs: signs which are made with the hands and with other parts of the body such as the sign REALISE (produced with the mouth pattern "pah!") or JUST-RECENTLY (shown here). These signs thus have five component parts: handshape, orientation, location, movement and non-manual features.</p>	 JUST-RECENTLY

2.6 Manual Signs




Manual signs can be divided into three main categories, based upon the involvement of one or both hands. As shown in Table 2.7, signs may be *one-handed*, *two-handed* or *double-handed*. One-handed, two-handed and double-handed signs each consist of the hand or hands assuming a particular handshape, orientation, location and movement. In the sections below, we shall now examine the use of handshape, location, movement and other formational features in Auslan.

2.6.1 Handshape in Auslan

There are 63 handshape types listed in the *Auslan Dictionary* (Johnston, 1989a). During his data collection, Johnston found it necessary to specify these 63 different handshapes in order to adequately describe the range of handshapes used in the manual and multi-channel signs of Auslan. According to Johnston's early research, only 31 of those handshapes are truly distinct-

tive (i.e., handshape phonemes), with 32 being regular variants of these 31 handshapes.

Table 2.7 Types of manual signs. (Adapted from Brennan, 1992, p. 18.)

Hand arrangement	Example
<p>One-handed signs: signs involving only one hand, located in space or on the body, as in UNDERSTAND and SISTER.</p>	 UNDERSTAND
<p>Two-handed signs: signs involving two hands with different handshapes which are located in space or on the body, as in MONEY or THEATRE.</p>	 THEATRE
<p>Double-handed signs: signs involving two hands which are located in space or on the body, both having the same handshapes. Double-handed signs come in two kinds: <i>symmetrical</i>, having symmetrical or complementary movement, as in PLAN or EXPLAIN; or <i>asymmetrical</i>, where one hand does not move, as in BROWN or TRUE.</p>	 PLAN

Variant handshapes are hand configurations which differ non-contrastively from each other, and which the language may treat as equivalent despite small differences in production. This non-distinctive variation is similar to the slight differences in pronunciation of /k/ which are not contrastive in English. The handshape in the sign NATURAL, for example, is usually made with the thumb in, but can also be made with the thumb extended. The positioning of the thumb in this handshape is not significant. These two handshapes are thus considered variants of one handshape (known as the "Spoon" handshape, see Table 2.8).

The figure of 31 basic handshapes was the result of detailed study of signs in the database which produced the dictionary of Auslan (Johnston, 1989a). Johnston thus focussed on handshapes that appeared to work contrastively in lexicalised signs, adopting an analysis similar to earlier work on British Sign Language (Brennan, Colville & Lawson, 1984). His list of basic handshapes does not necessarily include all those hand configurations which work contrastively in classifier signs, such as those which represent the size and shape of objects. Research has suggested that handshapes in classifier signs tend to work differently from those in lexicalised signs (for a discussion of the difference between lexicalised signs and classifier signs, see Chapter 3). For classifier handshapes, the number of fingers, their distance from



NATURAL



SPOON
HANDSHAPE
VARIANT 1



SPOON
HANDSHAPE
VARIANT 2

each other and their degree of constriction may work contrastively (Corina, 1990). In lexicalised signs, however, such differences may simply result in variant forms of the same handshape, as explained above.

2.6.1.1 Distribution of handshapes

Johnston (1989b) showed that the productiveness of the major handshapes in Auslan varies considerably. Just four of the 31 are distributed amongst approximately 56% of all the signs in the dictionary (the Point, Flat, Five and Fist handshapes). One of these handshapes, the Flat hand, occurs in almost 25% of all signs. The 10 most frequent handshapes account for 80%, while the next 12 handshapes account for almost all the remaining 20%.

Johnston (1989b) considered nine of these 31 distinctive handshapes to be "marginal" and of limited importance in the phonology of Auslan. These handshapes accounted for only 1% of the Auslan signs in Johnston's dictionary (Johnston, 1989a). This tiny percentage reflects the fact that these handshape types occur only in number signs (such as the Nine handshape), or in a small number of initialised signs⁴ borrowed from ASL or other sign languages (such as MATHEMATICS or NORWAY). In no cases, Johnston (1989b) explained, are these nine marginal handshapes "found in 'genuine' signs: that is, signs which are not simply letters of the alphabet, numbers, or connected with either letters or numbers" (p. 94). As a result, he suggested that only 22 distinctive handshapes are regularly found in "natural" signing (compare this with similar claims for ASL made by North American researchers, such as Sandler, 1996).



MATHEMATICS

Although particular handshapes may only occur in number signs or signs derived from fingerspelling, such signs are used in a number of important ways in the grammar of the language. It is true that the Nine handshape exploits a particular combination of fingers that only occur in number signs, perhaps so as to enable all the numbers from one to ten to be articulated coherently on one hand (Sandler, 1996). This aspect of the handshape does not mean, however, that it is not used in everyday signed interactions. The Nine handshape does, for example, occur in a range of signs which incorporate numerical information, such as NINE-YEARS-AGO, NINETEEN-YEARS-OLD and so on.

As for initialised signs, it does seem true that many of the handshapes that occur in initialised signs are not native to Auslan. Many of these handshapes reflect the influence from the one-handed American or Irish manual alphabet, or from Australasian Signed English (Jeanes & Reynolds, 1982). As a result, signers tend to modify these handshapes so that they more closely resemble common handshapes in the language. The handshapes in signs derived from the American one-handed alphabet, such as the M and N in MATHEMATICS and NORWAY respectively, are often produced with the Auslan handshapes used in the signs MOTHER and

⁴ An initialised sign is one in which the original handshape of a sign is replaced by a handshape used in a manual alphabet which represents the first letter of the gloss of that sign (Johnston, 1989a).

NATURAL. In a similar fashion, Auslan signers do not generally distinguish between the American P and K handshapes, so that the ASL loan signs POLITICS and PHILOSOPHY are often signed with the K, rather than the P, handshape. It is also rare for these hand configurations, unlike the more basic handshapes, to appear in signs where one handshape changes to another. Thus many handshapes found in initialised signs do appear to have a rather uncertain status in Auslan, and appear to be less relevant to the phonological system of the language. It is not clear, however, that they can be considered unproductive, as ASL continues to be an important source of borrowed signs for Australian signers.

2.6.1.2 Handshape minimal pairs

Table 2.8 includes almost all of Johnston's original 31 distinctive handshapes, but some of the handshapes he described as variants have been listed as separate distinctive handshapes here. Johnston (1989b) treated some of these not as minimal pairs of handshape, but as minimal pairs of orientation, point of contact or stress. In this analysis, I am analysing these as contrastive handshapes, since in a small number of signs it seems the handshape alone is distinctive. Note that, unlike Johnston's analysis, the following hand configurations have been listed separately as fully contrastive handshapes: the Five and the Hooked Five, the Fist and the Soon, the Eight and Hooked Eight, the Middle and Irish K, the Hook and C, the ILY and Which, and the Two and Hooked Two handshapes. Many of these configurations appear in minimal pairs, such as ANGRY versus UPSET, and STAND versus KNEEL, where they appear to be used contrastively.



































Examples of minimal pairs for each of the 34 handshapes below have been included to illustrate their contrastive role in the language. Although more systematic research is required before the exact number of handshapes needed to describe the signs of the Auslan lexicon can be specified (and the complexity of classifier usage and the influence of other sign languages on Auslan make this a difficult task), the chart below lists what appear to be the 34 most important hand configurations in the language. As Corina (1990) observed, our understanding of the formational processes of sign languages is just beginning. As more data becomes available, descriptions such as those found here will naturally be subject to revision.

2.6.2 Location in Auslan

The location of the sign may refer to the hand's actual point of contact on the body, or to the hand simply being significantly near some location on the body. When the sign has no contact with the body, or when it is not located near some part of the body, it is described as being articulated in *neutral space*. Neutral space is the area in front of the signer's chest where the hands can move freely and easily. Most citation forms of signs are made in the centre of neutral space, such as SIGN and CLASS, although others are specified for relatively higher (e.g., HEAVEN) or lower (e.g., FLOOR) locations.



Table 2.8 Chart of major handshapes in Auslan with minimal pair examples. (Illustrations reproduced with permission from Prillwitz et al., 1989.)

Major handshapes in Auslan					
Flat	Point	Hook	Five	Hooked Five	Four
					
TRUE vs FAULT	TOMORROW vs ALWAYS	WORRY vs COMMITTEE	FINISH vs WRONG	ANGRY vs UPSET	FORTY vs THIRTY
Fist	Soon	Good	Spoon	Gun	C
					
STUPID vs MIND	PAY vs OBJECT-TO	PLENTY vs HOLIDAY	CLEAN vs BEFORE	WHY vs CLOSE-SHAVE	DRINK vs COFFEE
Write	Eleven	Round	Cup	Two	Hooked Two
					
RUBBER vs SHOES	BIRD vs PARROT	BUSINESS vs FREE	COUSIN vs MISS	VERY vs MOTHER	KNEEL vs STAND
Okay	Middle	Irish K	Bad	Three	Which
					
PERFECT vs HOPE	FRONT vs PENIS	GAY vs TWELVE	IMAGINE vs CONSIDER	THIRTY vs TWENTY	COW vs KNOW
Eight	Hooked Eight	Twelve	Rude	Wish	Mother
					
SHOW vs NATURAL	EYES-POP-OUT vs SHOW	DUCK vs BIRD	SILLY vs THINK	RESPONSIBLE vs PROFESSIONAL	SCOUT vs SALUTE
Perth	Animal	Nine	ILY		
					
PROGRAM vs PROJECT	CHEESE vs SHINE	NINE vs THREE	I-LOVE-YOU vs YOUR		

Signs involving contact or proximity to the body fall into two categories: those on the body itself, and those on the hands (Johnston, 1989b). The second type refers only to all those signs which are two-handed, and some of those which are double-handed. Locations on the body are known as *primary* locations, those on the hand as *secondary* locations.

2.6.2.1 Primary locations

There are a large number of distinct locations on or near the body needed to describe signs in Auslan. Comparing some sets of minimally distinct signs, as in Figure 2.2, illustrates the importance of this parameter, and how apparently subtle differences in location work to distinguish signs with different meanings.



Figure 2.2 An example of signs contrasting in location.

Table 2.9 attempts to present the major locations in Auslan, and examples of lexicalised signs which are produced at each location.

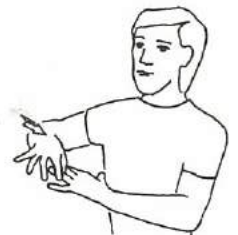
2.6.2.2 Secondary locations

Although particular locations on the hand and fingers are important for a number of signs, it has proven difficult to produce a definitive account of the contrastive status of the various locations on the hand. Johnston (1989b) explained that one reason for the lack of clear minimal pairs involving secondary locations is that “a change in the point of contact on the hands almost invariably requires a change in orientation and direction of movement of the hand or hands” (p. 158). This factor makes it difficult to collect and compare minimal pairs which contrast only in secondary location. As a result, specification of secondary locations is important for the accurate description of signs, but they appear to be of lesser contrastive significance than primary locations.

Nevertheless, it is clear that a range of secondary locations are regularly used in Auslan. Signs make contact with the tip of the thumb (e.g., ALCOHOL) or the side of the thumb (e.g., FIRST-OF-ALL), the tip of the index finger (e.g., POINT), the side of the index finger (e.g., ENGLISH), the tip of the middle finger (e.g., COINCIDENCE), the ring finger (e.g., SPOUSE) and the little finger (e.g., MENSTRUATION).



ALCOHOL



SPOUSE



MENSTRUATION

Table 2.9 Types of primary locations in Auslan.

Location	Example	Location	Example
1. Whole of face	EMBARRASSED	22. Chin	FRUIT
Head		23. Under chin	DON'T-CARE
2. Above head	SHOWER	Neck	
3. Top of head	BALD	24. Ipsilateral	MEAT
4. Side of head	NOISY	25. Central	VOICE
Forehead		Shoulders	
5. Ipsilateral	THINK	26. On shoulders	BURDEN
6. Central	INDIA	27. Against shoulders	RESPONSIBLE
Eye		Chest	
7. Side of eye	LOOK	28. Ipsilateral	LIVE
8. Under eye	CRY	29. Central	ME
Nose		30. Contralateral	PROFESSIONAL
9. Bridge of nose	SISTER	31. Arm pit	HUSBAND
10. Side of nose	INTUITION	32. Stomach	HUNGRY
11. Tip of nose	HOW-OLD	33. Waist	INCOME
12. Under nose	SNOB	34. Back	BACK
Ear		35. Thighs	DOG
13. Ear	LISTEN	Arm	
14. Ear lobe	EAR-RING	36. Upper arm	VIRGIN
15. Behind ear	COCHLEAR-IMPLANT	37. Lower arm	POOR
16. Over ear	CHERRY	38. Elbow	BISCUIT
17. Cheek	WATER	39. Wrist	TIME
18. Jaw	BEARD	Hand	
Mouth		40. Back of hand	THEATRE
19. Mouth/lips	RED	41. Palm	CENTRE
20. Teeth	METAL		
21. Side of mouth	JEALOUS		

Signs can also make contact with the thumb side of the hand (e.g., WORK), with the little finger side (e.g., SKILL) or with the ends of the fingers as a group (e.g., DOLLAR). Signs may also be located between the thumb and fingers (e.g., BANK) or between the fingers (e.g., THROUGH). Note that signers appear to vary in their use of locations between the fingers. Signs like THROUGH (and others such as LETTER, BETWEEN, etc.) may, for some signers, make contact between the index and middle, middle and ring, or ring and little fingers without contrasting in meaning.

2.6.3 Movement in Auslan

Movement types in sign formation have been classified into two major categories: *primary* and *secondary* movements. Primary movements are sub-classified into *path* movements (movement from one location to another) and *local* movements (changes in handshape and orientation). Secondary movements refer to rapidly-repeated local movements which can be performed during a path movement or while the hand is stationary.

2.6.3.1 Primary movements

Brennan (1992) showed that path movement can involve changes in location along one of three axes: vertical path movements involve the contrasts up, down and up and down; path movements along the bilateral axis involve contrasts right, left and side to side; and path movements along the horizontal depth axis involve contrasts towards the signer, away from the signer and to and fro. Movement may also be circular or elliptical along any of these axes.

Table 2.10 . Examples of path movement in Auslan.

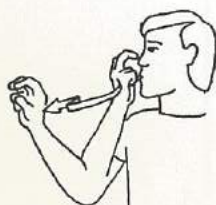
Major Types of Path Movement	Sign Examples
Up	GROW-UP, LIFT
Down	PULL-DOWN, REDUCE
Up and down	CITY, DOUBT
Right/Left	NIGHT, DAY
From side to side	SCHOOL, RUGBY
Away from signer	I-GIVE-YOU, GO
Towards signer	YOU-GIVE-ME, COME
To and fro	INTERVIEW, COMMUNICATE
Horizontal circular	SWIM, WASH
Vertical circular	BICYCLE, SIGN
Elliptical	THINK-FOR-A-LONG-TIME, WAIT-FOR-LONG-TIME



HAVE



REBEL

NONE-OF-YOUR-
BUSINESS

TICKET



BELIEVE

Johnston (1989b, p. 166) pointed out that path movements are not limited to these three axes: "...all possible diagonals can also be expressed by combining these values (e.g., 'up left' for 'diagonally up and towards the left')". Sign linguists also recognise that oscillating movements along these axes may be either unidirectional or bidirectional (i.e., they may be repeated single upwards movements, or they may be combinations of upwards and downwards movements, produced with more or less equal stress in both directions). Examples of the major types of path are shown in Table 2.10.

Local movements refer to changes in handshape and orientation. Handshape changes generally involve changes in *aperture*. This means that handshapes will change from open or spread hand configurations to closed, bent, flattened or hooked handshapes (or vice versa). An example of a closing handshape occurs in the sign HAVE. The hand configuration opens in the sign FORGET. In the sign UNDERSTAND, the index finger flicks open, while in IDEA, it bends into a hooked handshape.

The fingers and palm may be oriented up, down, left, right, towards the signer or away, and in any manner of directions which combine these features. Finger and palm orientation changes are generally achieved through movements of the wrist and/or arm. In the sign REBEL, for example, the palm moves from a position facing the signer to one that is directed away from the signer. In the signs DISLIKE and CAN'T, the opposite sequence of orientations occurs.

Changes in handshape and orientation may combine with path movements. The sign BELIEVE involves both a handshape change (from Five to Fist) and a path movement (from a location at the forehead to one contacting the base hand in front of the signer's chest). Signs such as SHAME-ON-YOU and NONE-OF-YOUR-BUSINESS usually combine a change in palm orientation (from towards the signer to away from the signer) with a path movement (from a location on the face to one in the direction of the addressee). Many signs in Auslan (and in ASL, see Liddell, 1993) which involve local movements can be produced either with or without path movements (e.g., DIE which may consist of either a simple orientation change, or an orientation change plus downward movement). Van der Hulst (1993) made the point the such complex combinations typically involve the complete synchronisation of the two types of movement, so that it is atypical to produce an aperture change at the end of a path movement. Examples of exceptions to this tendency can be found in Auslan, such as the sign TICKET (where the handshape appears to close at the end of a short path movement), but it seems that complete synchronisation is more typical.

2.6.3.2 Secondary movements

Secondary movements typically involve rapidly repeated changes in handshape or orientation. The analysis of secondary movements is a matter of debate amongst sign linguists (van der Hulst, 1993), but examples of a number of secondary movement types found in Auslan are listed in Table 2.11.

Table 2.11 Examples of secondary movement in Auslan. (Adapted from van der Hulst, 1993)

	Without Path Movement	With Path Movement
Hooking	ONE-MORE	RESEARCH
Flattening	WET	GOSSIP
Squeezing	ORANGE	CATCH-UP
Wiggling	WHEN	MANY
Rubbing	SALT	PIZZA
Twisting	TREE	VERY-FAR
Nodding	YES	VARY
Pivoting	WHAT	LIGHTNING
Circling	COFFEE	ROLL

2.6.4 Minor parameters in Auslan

2.6.4.1 Orientation

Orientation refers to the direction in which the fingers and palm of the hand are pointing during the production of a sign. Johnston (1989b) used a system of cardinal directions to describe orientation. The fingers and palm may be oriented upwards, downwards, right, left, towards or away from the signer's body. Diagonal orientations may involve a combination of these elements. Although widely discussed in the sign phonology literature (Baker & Cokely, 1980; Klima & Bellugi, 1979; Valli & Lucas, 1995; Wilbur 1987), Johnston (1989b) noted that some sign linguists believe orientation is a relatively redundant feature. Often other formational elements of a sign, such as the location on the body or in space or the point of contact on the hand, will mean that a particular sign can only be comfortably executed with certain orientations.

The use of different orientations also appears to be more variable than other features of sign formation. The citation form or signs such as SAY, SEE or THINK show considerable variation in orientation (Brennan, 1992). The palm may be oriented towards the signer, or towards the right, and the choice between the two appears to be more or less arbitrary. Similarly, in signs such as PROGRAM or COURSE, the base hand may have its palm oriented upwards or away from the signer.

Despite these observations, there is little doubt that many signs can only be accurately described by including orientation information. As Johnston (1989b) pointed out, this is particularly true of signs which do not make contact with the body or hands. Minimal pairs such as THING versus SAME, or SOME versus FLOUR, differ only in palm orientation (the palm in the first sign in each case is oriented upwards, downwards in the second). Signs such as DRUG



SAY 1



SAY 2



BASTARD



DRUG

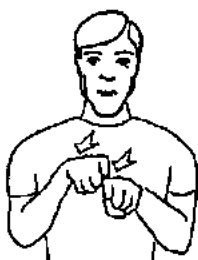
(knuckles contacting) and BASTARD (knuckles upwards) differ only in finger orientation. Other signs, such as WORK and WINDOW, or HOLIDAY, SWIM and PLAY contrast in both the direction of the palm and fingers.

2.6.4.2 Hand arrangement

In signs involving two hands, the hands may be arranged in a variety of locations with respect to each other. The two hands may be held side by side as in GIVE, move together as in COMPARE, interlink as in JOIN, move apart as in DISCONNECT, or cross as in CONFLICT. The dominant hand may be held above the subordinate hand as in WIPE, below the subordinate hand as in BAKE, behind it as in HIDE, in front of it as in ADVERTISE, or inside it as in DROWN.



PARALLEL

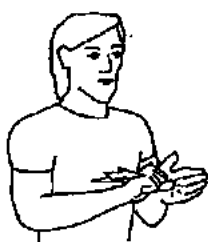


FOLLOW

Brennan (1992) showed that minimal pairs can be found in BSL which contrast only in hand arrangement. Similarly, in an Auslan sign like PARALLEL, the two hands are held beside each other, whereas in FOLLOW, one is held behind the other with the index finger contacting the back of the hand. These signs are identical in all other respects. Such signs, however, could also be described adequately using a combination of other features, such as location and point of contact. Hand arrangement, however, appears to be of particular importance in classifier constructions, as we shall see in the next chapter. For most lexical signs, however, Johnston (1989b) described the various hand arrangement possibilities as features of movement (e.g., “interlink” or “separate”) or location (e.g., “behind dominant hand”, “above subordinate hand”, etc.).

2.6.4.3 Point of contact

For those signs that make contact with the body or hand, the point of contact sometimes needs to be specified. This is because different parts of the hands may be involved in contacting the location. If we take signs that involve the Good handshape, for example, we can see that different parts of the thumb and fist may act as the point of contact (Brennan, 1992). In the signs KNOW and MONEY, it is the tip of the thumb which contacts the location on the body or passive hand. In BEST and BETTER, it is the side of the thumb which makes contact. In RIGHT, it is the palm side of the hand, in the sign NUMBER it is the little finger side, and in REGULAR, the back of the hand is the point of contact. There are a similar range of options for other handshapes. Although it is sometimes predictable from the combination of other parameter choices (given the handshape, orientation, and location of the dominant hand in the sign MONEY, for example, the contacting surface of the hand is obvious), point of contact appears nevertheless to be important part of sign description.



MONEY



REGULAR

2.7 Non-manual and multi-channel signs in Auslan

2.7.1 Non-manual signs

The term *non-manual* groups together a wide range of possible features. The non-manual means of articulation in sign languages include movements of the eyes, head and body, various kinds of facial expression, and mouth patterns.

In sign formation, the use of facial expression, head movements and mouth patterns together form the most important non-manual features (non-manual aspects of Auslan are discussed in more detail in Chapter 3, whilst mouth patterns based on spoken English words are discussed separately in Chapter 4). The head and face are highly mobile and contain a large number of different muscles "...which can generate a great array of different actions and combinations of actions" (Brennan, 1992, p. 32). Table 2.12 provides an overview of the range of facial expression types (as well as head and body movements) that are available to the Auslan signer, subdivided into movements and actions of the head, eyebrows, eyes, nose, mouth, and cheeks.

Despite this enormous potential for creating contrasts in meaning, however, it seems that sign languages rarely use non-manual features alone to form signs. A number of head movements, such as those in YES and NO, and facial expressions can be used without an accompanying sign, some of these in ways similar to the conventional facial gestures found in the non-signing community. Such signs appear to serve an interpersonal function, however, and there are very few examples of non-manual signs being used for propositional information (Johnston, 1996). There are no non-manual signs, for example, which have meanings such as 'tomato', 'cat', or 'supervisor' (Brennan, 1992). In fact, non-manual features almost always co-occur with manual signs, forming multi-channel signs.

2.7.2 Multi-channel signs

Multi-channel signs combine actions of the hands with those made by other parts of the body. For Brennan (1992), the distinguishing characteristic of multi-channel signs was that the manual and non-manual features form a single integrated sign, with both components being compulsory. Examples in Auslan seem to include signs which might be glossed as REALISE and AT-LAST (produced with the mouth pattern "pah"), FORBID ("hup") and BIZARRE ("bah-bah") which are accompanied by particular lip patterns. Signs such as JUST-IN-CASE and TYPICAL are produced with puffed cheeks. The sign GULLIBLE/GIVE-IN is produced with a forward tilt of the head.

Brennan (1992) suggested that some lexical items in BSL may be distinguished from one another solely on the basis of non-manual features. Such minimal pairs do seem to also occur in Auslan. The signs RECENTLY and JUST-RECENTLY, and PROPER and USE-SOMEONE, for example, appear to differ only in non-manual features (JUST-RECENTLY requires the head to tilt and lips to be drawn back, whilst USE-SOMEONE requires a grimace



MOUSE/ORGASM

and protrusion of the tongue). For some signers, the sign MOUSE (neutral facial expression) forms a minimal pair with a sign that may be glossed as ORGASM (produced with the cheeks sucked in).

Table 2.12 Non-manual features in Auslan. (Adapted from Brien, 1992, pp. xxv-xxvii.)

Non-manual movements & expressions			
Head	Shaking the head	Mouth	Opening the mouth
	Nodding the head		Closing the mouth
	Turning the head to the left		Poking out the tongue
	Turning the head to the right		Protruding the lips
	Tilting the head to the left		Rounding the lips
	Tilting the head to the right		Vibrating the lips
	Tilting the head backwards		Pressing the lips together
	Tilting the head forwards		Drawing the lips back
	Moving the head backwards		Stretching the lips
	Moving the head forwards		Turning up the corners of the lips
	Moving the head from side to side		Turning down the corners of the lips
			Pushing the tongue into the cheek
			Pushing the tongue down behind the lower lip
Eyebrows	Raising the eyebrows	Cheeks	Biting the lips
	Lowering the eyebrows		Sucking in air
Eyes	Blinking		Blowing out air
	Closing the eyes		Puffing out the cheeks
	Opening the eyes		Sucking in the cheeks
	Opening the eyes wide	Shoulders	Hunching the shoulders
	Narrowing the eyes		Moving the shoulders forward
	Directing the gaze forwards and down		Moving the shoulders backwards
	Directing the gaze forward and up		Turning the shoulders to the left
Nose	Directing the gaze to the left	Body	Turning the shoulders to the right
	Directing the gaze to the right		Moving the body forward
	Wrinkling the nose		Moving the body backwards
			Turning the body

Johnston (1989b), however, speculated that only a relatively small set of signs in Auslan obligatorily take a non-manual component. During his extensive data collection, Johnston (1989b) observed that not all signers appear to agree on whether certain non-manual features are actually obligatory for particular multi-channel signs. Certainly, other researchers have had similar difficulty in eliciting these judgements from signers. Engberg-Pedersen (1993) found

that signers appear to be very aware of the role of non-manual features in the expression of emotion, but less aware of their many other roles in sign languages. In her own research on the function of facial expressions in Danish Sign Language, she was told by her informants that "if you use the sign HAPPY, you should look happy" (p. 23). This did not appear to be completely true, however, since signers would use quite a different facial expression while uttering the sign equivalent of the question "Are you not happy?". This may be due to the fact that many non-manual features co-occur with individual manual signs to signal grammatical functions such as negation, questions, affirmations and topicalisation and thus "...it can be difficult to sort out just what the role of the specific non-manual features might be in any given context" (Brennan, 1992, p. 33). There is little difference between the non-manual components which are obligatory components of multi-channel signs and those which are optional means of modifying manual signs. The facial expression which accompanies the sign JUST-RECENTLY, for example, is used with many signs (HERE, THERE, SOON, TOMORROW) to indicate that something is extremely close in space or time. Therefore, JUST-RECENTLY sign may be more appropriately seen as a modified form of the sign RECENTLY rather than as a true multi-channel sign. Detailed analysis of the many non-manual features available to the Auslan signer and their role in both the formation of individual signs and in the grammar needs to be carried out before we can have a clear understanding of the use of multi-channel signs in Auslan.

2.8 Constraints on word and sign structure

The sections 2.1 through to 2.7 above have illustrated that Auslan signs, like the words of spoken languages, are made from smaller formational units. Another fundamental aspect of language, both spoken and signed, is that any particular language exploits only a selected subset of all possible formational components. Furthermore, each language has a set of rules which determine which combination of these units are allowed, and which combinations may be impossible. These language-specific constraints restrict the number and possible combinations of formational units which can occur in a language (Klima & Bellugi, 1979).

The first constraint is true of all spoken languages. English, as we have seen, draws on a limited set of 44 sounds. This set represents a small subset of all the sounds which are physically possible and which occur in the world's spoken languages. English, for example, does not use the nasal vowels of French, nor the click sounds which occur in African languages such as Zulu. Even when the sounds of two languages appear to be similar, they may actually differ in phonetic detail. The English sounds /t/, /d/ and /n/, for example, are made with the tongue tip contacting the alveolar region of the mouth (the gum behind the teeth). In Spanish and French, the same sounds are made with the tip of the tongue contacting the upper teeth (Klima & Bellugi, 1979).

Under the second constraint, not all combinations of these language-particular sounds may occur. If users of English look at the nonsense words on the following page, most will agree

which combinations of English phonemes would make possible new words in the language, and which would not make possible new words.

klosp	psken	trest	srbob
charp	tlit	strok	tsmtot
fliss	brkow	skriff	ptlin

English speakers would tend to agree that the words on the right side of each column do not follow the usual rules of word formation in the language, because the English sound system generally does not allow combinations of consonants like 'brk-' or 'ptl-'. In English, a word which begins with three consonants must always use one of limited subset of phonemes and must combine them in a particular sequence as follows:

- (1) The first phoneme must be /s/.
- (2) The second phoneme must be /p/ or /t/ or /k/.
- (3) The third phoneme must be /l/ or /r/ or /w/ or /j/.

The result of this rule is that words such as *spring*, *string*, *squeal*, *splendid* and *stew* are permitted. Words such as *thbnak*, *bdling*, *sgteal* and *wbtenid*, however, are not possible in English (Aitchison, 1992). In Russian, on the other hand, initial clusters of three or even four consonants (such as /tkn-/ or /vzdr-/) are more frequent and less restricted.

In signed languages, too, not all possible combinations of formational features occur. Instead, there are particular sets of phonological constraints which restrict combinations of handshape, location and movement. Some of these constraints seem to be common to many of the world's sign languages, others appear to differ from one sign language to another.

2.8.1 Linguistic constraints

Constraints on sign formation are realised in two ways in Auslan. Firstly, Auslan signers do not appear to use all possible combinations of handshapes, locations and movements which can be produced by the body. For example, no Auslan signs use the hand configurations shown below, just as English does not use all possible combinations of sounds. These handshapes are found in other sign languages, however, just as sound combinations not possible in English are found in other spoken languages (Baker & Cokely, 1980; Kendon, 1988).

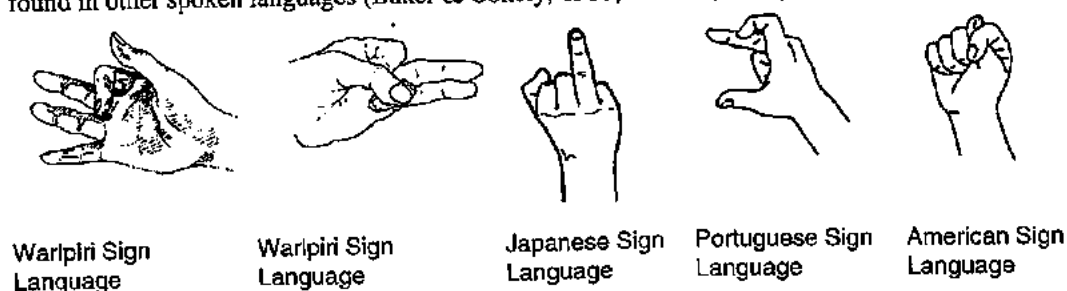


Figure 2.3 Examples of handshapes not found in Auslan.

Secondly, even when Auslan signers do use the same handshapes, locations and movements found in other sign languages, they may not always combine these formational units in the

same way. In a detailed study by Klima and Bellugi (1979), signs from ASL and Chinese Sign Language (CSL) were compared. They found a range of formational differences, ranging from parameter combinations in CSL that seemed impossible in ASL, to subtle differences in the production of similar hand configurations. Although detailed comparative work has not as yet been carried out for Auslan, we can use the data collected in the Klima and Bellugi study to suggest what differences may be found in a comparative study of Auslan and CSL.

In Figure 2.4 below, we can see examples of a number of signs from CSL that appear to be unknown or impossible in Auslan. The CSL signs INCREASE and SUSPECT each uses types of movement generally not seen in Auslan signs. The sign INTRODUCE use handshapes which occur in Auslan, but these are combined in ways that seem to be rare or impossible in Auslan. Similarly, many Auslan signs have the handshape which we see in the CSL sign TOPIC. In Auslan, however, it is the thumb and index finger which contact each other or other parts of the body, not the three extended fingers. In CSL, the three extended fingers are used to contact the base hand and other parts of the body. Figure 2.5 illustrates this difference by comparing the Auslan signs INTERPRET, VOTE and JOIN with a number of CSL signs.

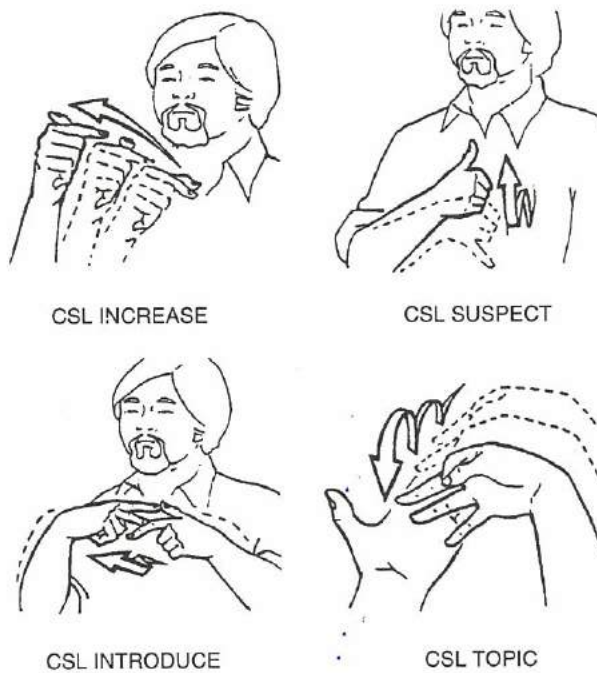


Figure 2.4 Signs from Chinese Sign Language. (Reproduced with permission from Klima & Bellugi, 1979.)

The comparison of Auslan signs with signs from other sign languages suggests that Auslan, like English, has distinctive formational constraints. We can see that certain handshapes, locations and movements may occur in one sign language and not in another. Furthermore, two sign languages may use the same formational units, such as handshape, and yet have different restrictions on how these units can combine in the signs of the two languages (Klima & Bellugi, 1979).

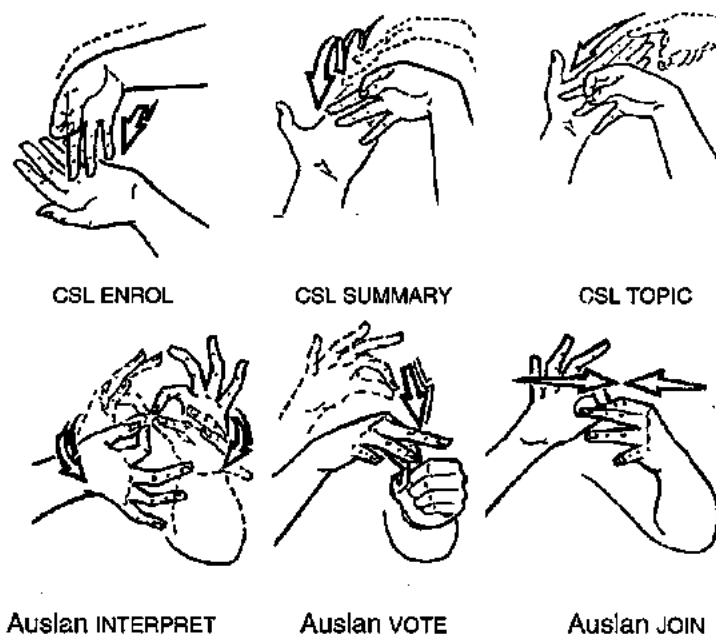


Figure 2.5 The use of handshapes in CSL and Auslan. (Adapted and reproduced with permission from Klima & Bellugi, 1979.)

These differences seem quite arbitrary and unpredictable from language to language. The differences between sign formation in CSL and Auslan cannot be explained by physical limitations on handshapes, locations and movements. Many of the patterns in sign formation in Auslan, however, do seem to reflect such physical limitations. The signs in sign languages need to be clearly seen by other people and to be produced easily by the signer's body, allowing communication to occur quickly and efficiently. The limits of the human visual system and the workings of the muscles of the arms, hands and fingers appear to have influenced the way signs are produced in Auslan. These constraints mean that some handshapes, locations and movements, and some combinations of these parameters, occur much more frequently in Auslan signs than others, and that some parameter combinations may never occur.

2.8.2 Perceptual constraints

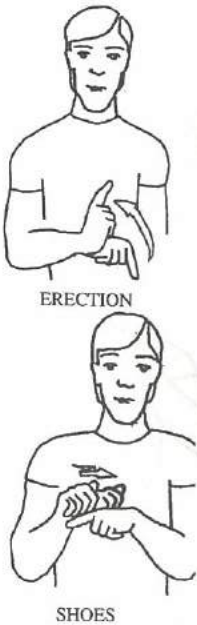
American researchers have pointed out that peripheral vision appears to have a large effect on the location of signs on the body (Baker & Cokely, 1980). Our eyes tend to focus on objects that are in the centre of our field of vision. Humans do, however, perceive a great deal with their peripheral vision. Baker and Cokely (1980) illustrated this with the diagram which is reproduced in Figure 2.6. If you look at the series of numbers in Figure 2.6 and focus on the number 7 in the middle of the series, you will notice that it is very clear and sharp. The other numbers are less clear, and the numbers on the edges are the least clear. Although they are less clear, you can still see the numbers further from the centre by using your peripheral vision. Thus, the thing we focus on is the thing we see most clearly, but our visual acuity decreases in our peripheral vision (Baker & Cokely, 1980).



Figure 2.6 Peripheral vision. (Adapted from Baker & Cokely, 1980, p. 80.)

Research has shown that signers usually look at the face when they sign, and not at the hands (except perhaps when fingerspelling an unfamiliar word). Thus the face of the signer and the area around the face is most clearly seen during signing. As a result, signs tend to be restricted to locations within the signing space (as mentioned in section 2.2.2 above). This space is the region bounded by the top of the head, the back, the arms and down to the waist.

In the last chapter, we saw that sign languages differ from mime in this respect. Brennan (1992) pointed out that in order to mime tying a shoelace, one might bend down and simply enact the concept. Signers, however, use a much more limited space for signed communication. Even signs that are related semantically to parts of the body outside the signing space tend to occur within the signing space. Signs such WALK-ON-HIGH-HEELS, SOCKS, PENIS, ERECTION, CONDOM and VAGINA are all produced within this space. Other signs, such as SHOES, are made only on the hands. Some of these signs, such as ERECTION, CONDOM and VAGINA, can be made in a more explicit location, but despite the fact that sign position "...can be influenced by real world physical locations, there is a strong pull towards locating all signs within a more restricted signing space" (p. 22).



Inside the signing space, there appear to be further restrictions. It is clear from the discussion in section 2.6.2 above that signers exploit a range of different locations on the body. It appears, however, that the various possible locations on the body are not used to the same degree. This differential use of locations can be demonstrated by examining Table 2.13 below. The figures shown result from a sample of 244 signs which were randomly selected from the *Auslan Dictionary* (Johnston, 1989a). This number represents some 10% of the total number of signs in the dictionary which are made on or near the body. The effect of peripheral vision on the location of signs becomes immediately apparent when we examine the number of signs made at each location on the body.

Table 2.13 Distribution of signs according to location.

Location	Number of Signs (Percentage of Total)	
Head, Face, Neck Locations	186	(76%)
Trunk and Arm Locations	58	(24%)
Total	244	

We can see from this table that those signs in Auslan which have locations on the body are more often made in the face, head and neck area than in the chest, arm or waist area. Thus more than 75% of these signs are made in the area where signers' visual acuity is greatest.



HUNGRY



WATER

A second way in which vision appears to influence sign formation relates to differences between one-handed and double-handed signs. If we examine where one-handed and double-handed signs are made in the same sample of 244 signs mentioned above, we can see that the signs made on the trunk tend to have more double-handed variants (such as HUNGRY, ACCEPT, TIRED), while more of those that are usually only one-handed (such as WOMAN, WATER, THINK) are made on the head, face and neck. Baker and Cokely (1980) suggested that this may be due to the fact that if two hands are acting in an identical fashion, then the visual system has more information for identifying the sign. This extra information is important in locations that are perceived through the peripheral vision, such as the chest and stomach, but less important in locations such as the face and neck where visual acuity is greatest.

Table 2.14 Distribution of one- and double-handed signs according to location.
(Two-handed signs are not included here.)

Head, Face, Neck Locations		Trunk Locations	
One-handed signs	(79%)	One-handed signs	(54%)
Double-handed signs	(21%)	Double-handed signs	(46%)

2.8.3 Production constraints

It is not only perceptual constraints which influence the form of signs. Auslan signs also appear to be shaped by the needs of the signer's body. In order for quick and efficient communication to occur, the body has to be able to produce signs easily and with little effort. This constraint means that only particular combinations of handshape, location and movement are possible in the language, and that some parameter combinations appear more frequently than others. We can especially see this in two rules for forming signs that use two hands, known as the *Symmetry Condition* and the *Dominance Condition* respectively.

Battison (1978) was the first to observe that if the two hands in a sign move around the signing space independently, as in the signs PLAY, TRAVEL, COMMUNICATE, SIGN, CONGRATULATE, HOLIDAY, they will usually have the same handshape, location and type of movement. If both hands moved around in different ways, this would naturally make the sign physically more difficult to produce. Although differences in movement may sometimes occur with classifier signs, it is typically not found in lexicalised signs (see the next chapter for a discussion of these different sign types). This principle is presented in (a) below.



HOLIDAY

(a) The Symmetry Condition

If both hands of a sign move independently, then both hands must be specified for the same location, the same handshape, the same movement (whether performed simultaneously or in alternation),

and the specification for orientation must be either symmetrical or identical. (Battison, 1978, p. 33).

Signers are generally either left-hand or right-hand dominant, depending on which hand usually performs one-handed signs. Following Brentari (1995a), I shall refer to the *dominant* hand (also known as the *active* or *strong* hand in the literature) as H1. The *subordinate* hand (or *passive*, *base* or *weak* hand) will be called H2. In two-handed signs (those which have different handshapes on H1 and H2) such as RIGHT, RUN-OUT, VIDEO, THEATRE, BUY, BLUE, only H1 has independent movement. H2 usually will not move. This constraint is referred to as the Dominance Condition. Thus, although having two different handshapes on H1 and H2 makes a sign more physically difficult to produce, this difficulty is reduced by allowing only one hand to move. This principle is given in (b) below.



(b) The Dominance Condition

If the hands of a two-handed sign do not share the same specification for handshapes, one hand must be passive while the active hand articulates the movement, and the specification of the passive hand is restricted to a small set (B, A, S, C, O, 1, 5). (Battison, 1978, p. 33).

Note that another important aspect of the Dominance Condition reduces the difficulty of these signs. If we look at the H2 hand, the handshape will usually have one of six handshapes shown in Figure 2.7, known in the American literature as the B, 1, 5, S, O and C handshapes respectively. This is a rule which appears, however, to be realised slightly differently in Auslan. Around 95% of two-handed signs in Auslan use one of these handshapes as the passive hand, but a small number of two-handed signs use other handshapes. Signs such as COINCIDENCE and LAST, for example, have the Middle and Bad handshapes as H2. Thus the handshape restrictions in the Dominance Condition seem to have exceptions in Auslan, although the constraints on H2 movement appear to be the same.

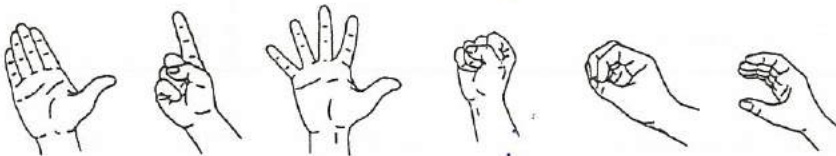


Figure 2.7 Examples of unmarked handshapes in Auslan. (Illustrations reproduced with permission from Prillwitz et al., 1989.)

The six hand configurations shown above are examples of what Baker & Cokely (1980, p. 82) described as “the most natural, basic and easy-to-make handshapes in ASL”. These hand configurations are known as *unmarked* handshapes in the sign linguistics literature, since they appear to be among the most frequent in sign languages. As mentioned above, just four of these handshapes (the Flat, Point, Five and Fist) occur in approximately 56% of all the signs in the *Auslan Dictionary* (Johnston, 1989a). These also appear to be the most basic handshapes in many other sign languages (Collins-Ahlgren, 1989; Penn, 1992; Brennan, 1992; Schermer,

1992). There seem to be two main reasons for this phenomenon. Firstly, this small set of handshapes appear to be the most physically and perceptually distinct from each other (Battison, 1978). They can be contrasted with the less frequently occurring handshapes which involve complex articulations, such as the Nine hand, the Animal hand, and the Middle hand. These handshapes are known as *marked* handshapes (see Figure 2.8 below). Secondly, unmarked handshapes appear to be the first handshapes that signing children acquire. There is evidence that young children learning sign languages substitute the physically simpler unmarked forms for the more complex configurations in the early stages of acquisition (McIntire, 1977).

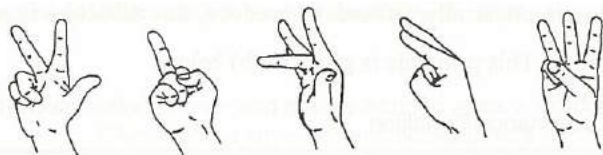


Figure 2.8 Examples of marked handshapes in Auslan. (Illustrations reproduced with permission from Prillwitz et al., 1989.)

Conversely, marked hand configurations are used in far fewer signs in Auslan. They also often interact with location, so that contrasts using the less perceptually distinct unmarked handshapes occur in locations further from the centre of the signing space, while contrasts using the less distinct marked handshapes tend to occur in the central parts of the signing space. If we draw on the signs from our Auslan database again, we see that marked handshapes are thus more likely to occur in signs that are made around the face (see Table 2.15).

Table 2.15 Distribution of marked handshapes according to location.

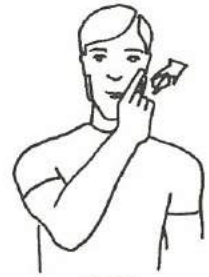
Location	Unmarked Handshapes	Marked Handshapes
Head & Neck Locations	(53%)	(47%)
Trunk Locations	(65%)	(35%)

Handshape is not the only parameter which is influenced by physical constraints on sign formation. The use of particular location combinations also appears to be constrained by the needs of the signer's body. Signs that move from one location on the body to another, for example, tend to occur within the same major area of the body (Battison, 1978). Sign linguists have suggested that there appear to be four major body areas in which double-location signs tend to occur: the head, the trunk, the arm and the hand. Signs with two locations will generally fall within one of these major body areas. Examples of signs made in two separate locations include (a) on the head—FLOWER, DEAF, HEARING; (b) on the trunk—ARMY, MORNING, GOVERNMENT; (c) on the arm—BEFORE-THAT, MUSCLE; (d) and on the hand—SUBJECT, TOAST, LESSON. Signs which are exceptions, such as BELIEVE or

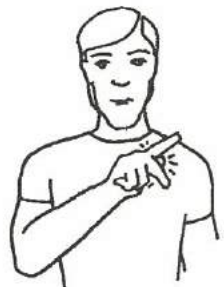
BOYFRIEND, appear to be compounds or signs which are derived from compounds (see Chapter 4 for a discussion of compounds in Auslan).

Similarly, there also appear to be lateral restrictions on sign locations, with the greatest percentage of signs occurring centrally or ipsilaterally (on the same side as H1) rather than contralaterally (on the opposite side of the body to H1). Some contralateral signs do exist, such as GIRL, RESPONSIBLE, PROFESSIONAL, but historically we know such signs tend to move into the centre of signing space over time (Woll, 1990). The sign GIRL does in fact have an ipsilateral variant in some varieties of Auslan. The other signs, such as RESPONSIBLE and PROFESSIONAL, are recent introductions into the language and may move into a more central location over time (although ipsilateral locations are unlikely for these signs, since their handshapes and point of contact on the hand make an ipsilateral location difficult).

Thus, like the words of spoken languages, signs in Auslan are made up of smaller formational units which are constrained by phonological rules. Phonemes only occur in particular combinations in English: some combinations of sounds occur often, some less often, some never occur. Due to variation language-specific rules and also to numerous perceptual and production constraints, this is also true of the combinations of handshape, orientation, location and movement parameters in Auslan signs.



GIRL



PROFESSIONAL

2.9 Simultaneity and sequentiality in sign structure

In spoken languages, the basic formational units can be put together in a variety of ways into larger units that are known as *syllables*. In English, a syllable is usually a group of consonants clustered around a vowel sound. These units are organised in sequence, so a syllable may consist of a consonant, then a vowel, then another consonant. A single word may consist of a number of syllables. The word 'computer', for example, is made up of three syllables: 'com', 'pu', 'ter' (or /kɒm/, /pju/, /tə/).

According to Stokoe's original description of sign structure in ASL, signs seem to be organised differently. The three aspects of handshape, location and movement appear to be produced simultaneously by the signer. For Stokoe and other linguists, it seemed clear that the nature of the formational units of a sign meant that simultaneous production was inevitable. It is, after all, physically impossible to produce a handshape that is not in some location on and near the body, and to produce some kind of movement that does not involve a change in location, handshape or orientation. Thus there is always some degree of simultaneity in sign production.

Sign linguists initially believed that this characteristic of sign formation made signs quite different from the words of spoken language. As we have seen, spoken words, in contrast to Stokoe's simultaneous model of sign structure, result from the sequential combination of phonemes. Although each phoneme in English is the product of a simultaneous combination of the parameters of voicing, place and manner of articulation, the vast bulk of syllables in spoken languages result from a sequential concatenation of phonemes. A single combination of the

parameters of speech production may produce the phonemes /b/ or /p/, but there are few words that are made from a single phoneme. Syllables generally contain two or more phonemes strung together, and words may result from the combination of many such syllables. It is contrasts in such linear strings of phonemes which forms the basis of the minimal pairs in English which we discussed in section 2.1.2 above.

The contrast we find in many minimal pairs in Auslan, however, may be described as simultaneous contrast. Many signs consist of a single handshape, produced in a single location and combined with a single type of movement. These elements are produced simultaneously by the signer, and appear to lack any internal sequential organisation. A sign such as WHEN, for example, is produced by placing the Five hand on the cheek and wriggling the fingers. The sign HOW-MUCH differs only in location, as shown by Table 2.16 below.

Table 2.16 Example of signs showing simultaneous contrast.

	WHEN	HOW-MUCH
HANDSHAPE	Five hand	Five hand
LOCATION	On the cheek	On the chin
MOVEMENT	Wriggling movement	Wriggling movement

The internal structure of many signs in Auslan thus appears to differ fundamentally from the words of a spoken language, where the formational elements (consonants and vowels) are organised in a linear fashion.

Stokoe's analysis did recognise that there are examples of sequential contrast in ASL. He noted that the movement parameter often involved a sequence of movements and that many ASL signs were formed from the sequential combination of two individual signs (Meier, 1993). Work on ASL since the early 1980s, however, has made it clear that Stokoe's simultaneous model is not an adequate account of the phonological structure of the language, and this seems equally true for Auslan. Many signs in both ASL and Auslan show sequential patterning, and changes in sequence are used contrastively. With the Auslan sign GIVE, for example, the contrast between the Auslan signs which mean 'I gave it to you' and 'you gave it to me' is a sequential contrast. To represent I-GIVE-YOU, the sign begins at a location near the signer's body and ends at some location away from the signer. For YOU-GIVE-ME, the sequence of locations is reversed.



There are many other examples where linear ordering of parameters is important in Auslan. The sign DEAF, like the various forms of GIVE, uses a sequence of locations. The handshape first contacts the ear and then moves to the chin. The chin location is not essential, and a common variant of the sign consists of a single contact on the ear. Compound signs (see Chapter 4), on the other hand, consist of the sequential combination of individual signs. The sign

SOUVENIR, for example, is derived from a compound of the signs MIND and STICK. The correct ordering of these parts is required to produce both these signs. Reversing the sequence of either DEAF (i.e., moving the handshape from chin to ear) or MEMORIAL (i.e., combining the signs in reverse order as in STICK + MIND) does not produce acceptable variants of these signs.

Thus sign languages such as Auslan appear to employ both simultaneous and sequential patterns of organisation. The realisation that sign languages show sequential contrast has important ramifications for an understanding of sign formation processes, and has led many sign linguists to suggest that the formational elements of signs, like the phoneme segments of spoken words, are organised into syllables. The notion of a sign syllable has proved important for understanding the constraints on location and handshape change in individual signs, as well as the processes at work in numeral incorporation, number reduction, compounding, and lexicalised fingerspelling.

2.10 The sign syllable

Since the 1980s, several researchers have developed models to describe the sequential structure of signs. Perhaps the most influential account has been the *Movement-Hold* model developed by Liddell and Johnson (1989). The details of this approach are complex, and there is insufficient space to cover them all here. The following summary of the Movement-Hold Model by Valli and Lucas (1995) provides a basic definition:

"The basic claim about the structure of signs in the Movement-Hold Model is that signs consist of hold segments and movement segments that are produced sequentially. Information about the handshape, location, orientation, and non-manual signals is represented in bundles of articulatory features...Holds are defined as periods of time during which all aspects of the articulation bundle are in a steady state; movements are defined as periods of time during which some aspects of the articulation is in transition. More than one parameter can change at once. A sign may only have a change of handshape or location, but may have change of both handshape and location, and these changes take place during the movement segment" (Valli & Lucas, 1995, p. 36).



MAN

The form of the Auslan sign MAN shown above would thus be described as beginning with a hold on the chin. The hand then moves slightly down and ends with a second hold under the chin. The sign begins with a Cup handshape and ends with a Fist. In simplified Movement-Hold notation, it would be represented as in Figure 2.9.

This hold-movement-hold (HMH) structure is perhaps the most frequent type of sequential organisation in the language. There appear to be at least five other possible structures in ASL and Auslan: M, H, MH, MHMH, MMMH (see Table 2.17 below). Some structures, such as HM or MMMMH, do not seem to be possible in either sign language. This constraint is similar to the restrictions on phoneme combinations in the words of spoken languages, and some sign linguists have seen an analogy between the movements and holds of Liddell and Johnson's

model and the consonants and vowels of spoken languages.

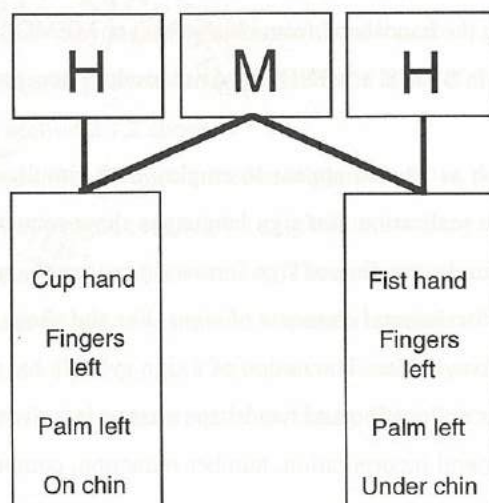


Figure 2.9 A diagrammatic representation of the movement-hold structure of the Auslan sign MAN.

Some of the claims made by this model have, however, been criticised by a number of linguists (Sandler, 1989; Perlmutter, 1993; Wallin, 1994; Wilbur, 1990, 1993). Although there is no question that holds occur during the production of individual signs, and that they can be identified and measured, the majority of holds appear to be dropped in signed interactions (Wilbur, 1990). There appear to be no cases where signs are produced only as holds, despite the examples given in Table 2.17 above. Signs appear not to be well-formed unless they have some kind of movement, either movement from one location to another, or a change from one handshape or orientation to another. Even those signs that appear to consist only of a hold, such as the signs HOW-MUCH or ONE, are always produced with either some secondary movement, or a transitional movement. Psycholinguistic studies of sign perception also suggest that movement is the most central formational category. Studies have shown that the perception of sign movement appears to be crucially different from that of the static parameters, such as handshape and location (Poizner, Klima & Bellugi, 1987). Thus movement appears to be central to sign production and perception, and to form the core of what has come to be known as the sign syllable.

It appears that Chinchor (1978, cited in Corina & Sandler, 1993) was the first to argue that ASL signs were organised into syllables in which movement corresponds to the core or *peak* of the syllable, analogous to the vowels of spoken language syllables. Wilbur (1993) has also adopted this description, and she regarded each of the following patterns of movement as constituting a single syllable:

- (a) path movement (change of location, e.g., GIVE)
- (b) local movement (change of handshape or orientation, e.g., HAVE, REBEL)
- (c) combinations of path and local movement (change of location and handshape, e.g., BELIEVE, NONE-OF-YOUR-BUSINESS).

Table 2.17. Possible sign movement-hold structures in Auslan.
(Adapted from Valli & Lucas, 1995, p. 38.)

STRUCTURE	SIGN EXAMPLES
M	WHO, SIGN, RUDE
H	HOW-MUCH, WHEN, ONE
MH	THINK, KNOW, MY
HMH	MAN, FORGET, COPY
MHMH	CHILDREN, FLOWER
MMMH	FATHER, MOTHER, PAPER

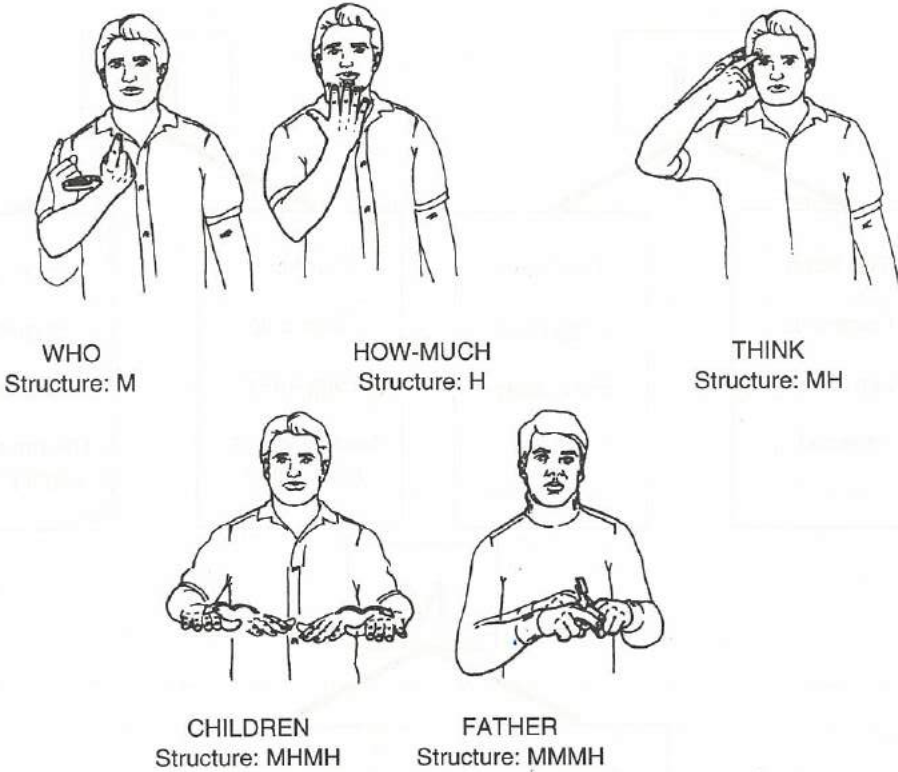
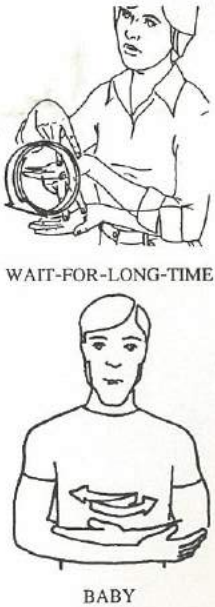


Figure 2.10. Examples of possible sign movement-hold structures in Auslan. (Illustrations adapted and reproduced with permission from Valli & Lucas, 1995, p. 38.)

Elliptical movements constitute two syllables (WAIT-FOR-LONG-TIME), as do bidirectional (or back-and-forth) movements (e.g., BABY). A single circular movement is considered to be one syllable (e.g., SIGN), and the wriggling, fluttering and tremoring movements one finds in many signs (e.g., HOW-MUCH) are also counted as a single syllable, analogous to the rapidly repeated articulation of consonants such as the trilled /r/ (Brentari, 1996). Some lexical items—in particular those derived from fingerspelt English words—involve a sequence of two or more handshape changes (e.g., S-O-N, C-L-U-B). These items would be considered multi-syllabic forms.



The concept of a sign syllable, although controversial amongst sign linguists, is significant because it appears that sign languages such as ASL and Auslan favour signs which are monosyllabic (Brentari, 1995b; Corina & Sandler, 1993). The vast majority of uninflected Auslan signs appear to have only one change in handshape, orientation, location and/or movement. In fact, there appear to be no signs which have a citation form that is longer than two syllables, and a number of processes appear to be at work in the language which reduce multisyllabic signs (i.e., signs with more than one change in location, handshape or orientation) into monosyllabic signs. As we will see in Chapter 4, this is true of compound signs which are derived from combinations of two individual signs (e.g., BELIEVE, BOYFRIEND). Although the individual signs in a compound each form a separate syllable, the compounding process often produces a monosyllabic, rather than disyllabic, sign. A similar process occurs in fingerspelling and in a process known as *number reduction*.

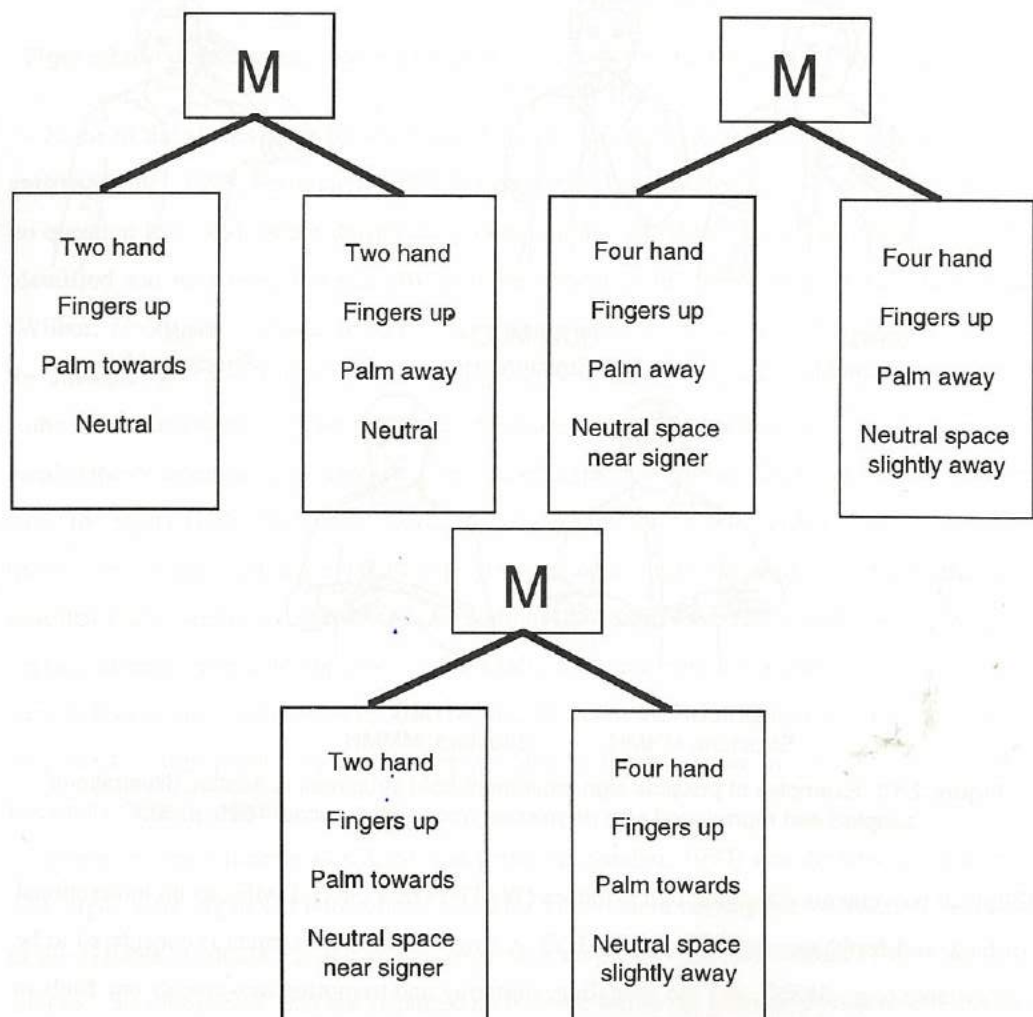


Figure 2.11. A diagrammatic representation of number reduction.

Figure 2.11 provides an example of number reduction. The signs TWENTY and FOUR are usually each produced with a single movement, and thus would each count as a single syllable (TWENTY has a change in orientation, FOUR has a transitional movement). However, in the

sequence TWENTY-FOUR, a reduction commonly occurs so that the form is produced not as a disyllabic sign, but as a monosyllabic form that changes the handshape in a single movement. The syllable also appears to be important in other processes, such as *reduplication* (repetition of a sign to signal aspectual meanings, as in WAIT-FOR-LONG-TIME) which generally involves the addition of extra syllables to a monosyllabic or disyllabic form.

2.11 Iconicity and sign structure

Signs and spoken words thus appear to share the same basic principles of organisation. Both words and signs have internal structure, and in both, the types of internal structure possible are constrained by specific rules. Woll (1990) pointed out, however, that "one of the most striking differences between signs and words is the prevalence of signs which bear some visual relationship to their referent" (p. 752). Perhaps this greater degree of iconicity in visual-gestural languages is not particularly surprising, she observed, "since objects in the external world tend to have more visual than auditory associations" (p. 752). Links between form and meaning are also characteristic of other communicative uses of the gestural channel, as we have seen in the previous chapter. Of course, like the difference between simultaneous and sequential organisation, this difference may be less one of kind than of degree. The use of onomatopoeia and sound symbolism in word formation and the iconicity of many grammatical constructions show that connections between form and meaning are also a feature of spoken language (Johnston, 1989b).

Nevertheless, iconicity is undoubtedly a much more prevalent aspect of sign languages than spoken ones. Iconicity is characteristic of both individual lexical items and much of the grammatical organisation of sign languages (see Johnston, 1989b). The majority of words (and many grammatical features) in English, however, show no relationship between form and meaning.

Certainly, iconicity is also a reality for most signers. Signers often can provide explanations for why a sign is produced in a particular way, and these folk etymologies often emphasise some perceived link between the formation of a sign and its meaning (Johnston, 1989b). In the next chapter, we will see how these links are frequently exploited in the formation of new signs in Auslan. Engberg-Pedersen (1993) and Johnston (1989b) noted, however, that iconicity presents a methodological danger to the researcher. Often folk explanations of a particular sign will differ. Signers also may sometimes alter citation forms of signs to emphasise their iconicity, or may be tempted to see links between form and meaning where there are none. As a result, Woll (1990) has observed that:

"The presence of iconicity in sign languages has...often led to mistaken assumptions. It has been thought that signs could only express concrete or visual meanings and that the presence of iconicity meant sign languages are universal. Neither of course is true" (1990, p. 752).



A range of different evidence can be presented to demonstrate that the presence of iconicity in sign languages should not be overemphasised (Woll, 1990). Firstly, like all languages, sign also exhibits arbitrariness of form. Many signs in Auslan have no iconic relationship to their referents (e.g., SISTER, CAN, BAD). This lack of a form-meaning relationship is also found in other sign languages (Engberg-Pedersen, 1993; van der Hulst, 1996; Penn, 1992; Valli & Lucas, 1995). In addition, the formation of signs in visual-gestural languages is never determined solely by their resemblance to an object or action (Meier, 1991). As we have seen above, signs are also constrained by the complex interactions of perceptive and productive restrictions as well as language-specific phonological rules. Furthermore, processes of historical change in signs result in many iconic signs developing into arbitrary symbols over time (Frishberg, 1975; Klima & Bellugi, 1979; Kyle & Woll, 1985). Together these facts mean that the sign vocabularies of unrelated sign languages, such as CSL and Auslan, are generally mutually unintelligible.



Secondly, even when signs are iconic in origin, the particular relationship represented can be specific to that language, as a number of well-known examples first presented by Klima and Bellugi (1979) demonstrate. They compared the CSL, Danish Sign Language and ASL signs for TREE. They found that each of them is in some sense visually motivated, but that each sign represents a different part of the tree: the CSL sign sketches the shape of the trunk, the sign from Danish Sign Language (also a sign in Auslan) indicates the trunk and foliage, and the ASL sign seems to depict a tree and its branches moving in the breeze. Similarly, the most common Auslan sign for WOMAN is signed with the Flat hand moving down the cheek; in Israeli Sign Language, the index and thumb pinch the ear-lobe; in Danish Sign Language, the sign indicates the shape of the breasts (Woll, 1990).



Thirdly, the presence of iconicity does not appear to greatly affect the learnability of sign languages, either as a second or as a first language. Although much of the basic Auslan vocabulary appears to be considered iconic, so that most naive non-signers will agree on the nature of the visual imagery when told the meaning of a particular sign (e.g., HOUSE, RUN and MILK), there is as yet little evidence that this link between form and meaning greatly facilitates the task of learning sign languages as second languages. The effect of iconicity on second language learning may be partly offset by the fact that the citation form of a sign is an abstraction away from the forms that actually occur in everyday signed interaction (Brennan, 1992). In normal conversation, the production of an individual sign is affected by the surrounding signs. A sign that makes contact on the body may only approach the location without making contact; a sign in neutral space may be produced with a higher location if it is followed by a sign made on the head; the handshape of one sign may be influenced by the handshape of the next sign and so on. These features of fluent sign production can result in considerable loss of iconicity.

In addition to this, iconic signs are made from formational units which may not in themselves have consistent links to their meaning. The iconicity in the language is realised through a complex array of different handshapes, movements and locations. The Flat hand, for example, is conventionally associated with the representation of objects with flat surfaces or with the handling of flat objects, but the links between the various signs which use this handshape are complex and not always immediately apparent. This sign is used in a vast number of different signs: TABLE, WALL, DOOR, FLOOR, HOUSE, BOOK, HIT, RUB, PARK-CAR. It is also used in whole range of signs which seem to be completely unrelated to this group, and to each other, in meaning: TRUE, BROWN, WOMAN, LIKE, WORK, DOG. Thus the use of particular handshapes in the language can appear incredibly complex to the learner.

Fourthly, there is also no evidence that children from signing families learn sign languages quicker than hearing children learn spoken ones, despite the prevalence of links between form and meaning in sign vocabulary and grammar. In a recent summary of twelve years of research comparing the acquisition of speech and sign, and of different sign languages (ASL and LSQ - *Langue des Signes Québécoise*, the sign language used in the Canadian province of Québec), Petitto (1994) presented the following conclusions:

"Deaf children who are exposed to sign languages from birth acquire these languages on an identical maturational times course as hearing children acquire spoken languages. Deaf children acquiring sign languages from birth do so without any modification, loss, or delay to the timing, content, and maturational course associated with reaching all the linguistic milestones observed in spoken language. Beginning at birth, and continuing through age 3 and beyond, speaking and signing children exhibit the identical stages of language acquisition...Though some researchers have claimed that 'first signs' are acquired earlier than 'first words', subsequent analyses have revealed that the claim is wholly unfounded" (1994, p. 177).

The last point makes reference to the widely-known claim by some researchers (Bonvillian, Orlansky, Novack & Folven, 1983) that the first signs made by children acquiring a sign language appear before the first words in children acquiring a spoken language. Iconicity was one reason which was suggested as an explanation for this difference (although Meier & Newport, 1991, offer an alternative explanation). It seems, however, that these researchers had mistaken instances of manual babbling (the sign equivalent of vocal babbling) for "first signs", and further research has failed to find any difference between the timing of the first signs versus the first words (Petitto, 1994).

In fact, research has consistently failed to find any links between the greater prevalence of iconicity in sign languages and first language acquisition. This lack of any link between iconicity and sign language learning is true of every aspect of the language, including the use of deictic gestures. Perhaps nothing else in the grammar of Auslan appears as transparent to adult learners as the pronominal system. The signs for ME and YOU in Auslan are more or less the same pointing gestures that are used by non-signers. It might be expected that children would

acquire this aspect of the language easily, early and without error. Indeed, signing children begin to point to things in their environment between the age of nine and eleven months, as do speaking children. The acquisition of pronominal pointing, however, appears to develop in the same way as the pronoun systems of spoken languages. Signing children pass through a stage where errors of reversal appear in the children's use of pronouns: children point towards themselves to mean YOU and towards the addressee to mean ME. These pronoun reversals are also found in children who are learning spoken language. In both groups, these errors continue until around the age of two and half years (Petitto, 1987).



Finally, interesting evidence comes from experimental studies of short term memory and languages errors ("slips of the hand") which strongly suggests that signers use the formational components of handshape, orientation, location and movement in language processing rather than the iconic properties of signs (Klima & Bellugi, 1979). There is much evidence to suggest that visual-spatial information, such as photographs and maps, and linguistic information, such as spoken and written words, are processed differently by the brain, and in different areas of the brain. For sign language researchers, the question naturally arose: are signs processed more like pictures or more like words? As we have shown, signs differ in the degree to which they are iconic. An Auslan sign like DRINK or THINK seem quite transparent and is readily understood by non-signers, while signs like GREEN or STRANGE or JUST-IN-CASE seems quite arbitrary and unrelated to their meanings. Researchers have thus suggested that highly iconic signs might be easier to recall for signers than less iconic ones, perhaps because of strong connections with visual memories or representations. Klima and Bellugi (1979) reported, however, that experimental studies comparing recall of lists of signs low in iconicity (like GREEN) with lists of highly iconic ones (like DRINK) showed no difference in recall as a function of iconicity.

The errors that signers make in these experimental situations also proved to be of interest (Poizner, Klima & Bellugi, 1987). When asked to remember long lists of signs, the errors signers generally made were formational in nature. Commonly, the sign presented and the sign recalled differed by only one formational parameter. "Moreover, just as phonological similarity among words causes interference in the short-term recall of lists of words, formational (but not semantic) similarity of signs interferes with short-term recall of lists of ASL signs" (Poizner, Klima & Bellugi, 1987, p. 8). These studies show that the signers use their knowledge of sign phonology to help encode and recall signs. Signs are recalled in terms of their formational components rather than simply in terms of the visual impression they make.

So signs can be iconic or arbitrary, but they appear to be acquired and processed by the brain in terms of the formational components rather than as images. However, sign language is paradoxical in this regard, as we will see in the discussion of sign formation processes in the next chapter. Although individual signs may not always be iconic or pictorial, many of the

ways Auslan derives new signs for new ideas make full use of the visual-gestural medium, and the iconic and metaphorical aspects that it makes available.



THE MORPHOLOGICAL STRUCTURE OF SIGNS

The previous chapter showed that, unlike other forms of gestural communication, natural sign languages such as Auslan make use of individual meaningful gestures (known as signs) which have specific formational features. Signs can be broken down into five basic parts or parameters: handshape, orientation, location, movement, and non-manual features. It was shown that there are restrictions on the combinations of parameters that a sign may have in Auslan, and that these parameters might also be analysed as organised into formational units analogous to the syllable.



SISTER



STRANGE



THREE-YEARS-OLD



PERSON-PASS-BY



VEHICLE-PASS-BY

3.1 The morpheme in signed and spoken language

The units of handshape, orientation, location, movement and non-manual features act as the smallest formational units of Auslan. The parameters in signs such as SISTER or STRANGE can be identified separately, but they lack a separate meaning (Valli & Lucas, 1995). In these signs, handshape, orientation, location and movement combine to produce a single meaning.

If we compare the signs THREE-YEARS-OLD and PERSON-PASS-BY with the signs SISTER and STRANGE, we see that signs like THREE-YEARS-OLD and PERSON-PASS-BY are a little different. In the case of THREE-YEARS-OLD, it is easy to see that one of the parameters—the handshape—does have a separate meaning. If we change the Three handshape in this sign to a Four handshape, we change the meaning of the sign to FOUR-YEARS-OLD. With the sign PERSON-PASS-BY, the parameters of handshape, orientation, location or the movement may be modified for different meanings. By changing the movement and orientation, for example, we could produce a sign meaning PERSON-MOVE-TOWARDS. By changing the handshape from the Point handshape to the Flat handshape (and with the fingers and palm oriented in the appropriate way), we have a sign meaning something like VEHICLE-PASS-BY. Thus, although all signs can be analysed into separate formational parameters, in some signs these parameters combine to form a single meaning, while in other signs they can have a meaning of their own. They can act as meaningful units in the language (Valli & Lucas, 1995).

The smallest meaningful units of a language are known as *morphemes*. Morphemes are used in the language to build the larger units we call words and signs (Valli & Lucas, 1995). As we saw in signs like SISTER, a particular combination of parameters may form a single morpheme. The separate parts of the sign can be identified, but they each do not have a separate meaning. This is similar to many words in English, such as 'cat', 'sit', 'desk', 'orange', and 'believe'. These words are made from a combination of English phonemes, but the individual sounds have no meaning of their own. They combine instead to form words which are

single morphemes. Signs like SISTER, and words like 'desk', are thus referred to as *monomorphemic* lexical items.

In other cases, one or more of the parameters can act as separate morphemes, as in the sign THREE-YEARS-OLD, a *bimorphemic* sign (a sign consisting of two morphemes: the nose location plus the number morpheme), or PERSON-PASS-BY, a *polymorphemic* sign (a sign consisting of three or more morphemes). Similarly, words of English may be formed by combining one or more morphemes, producing polymorphemic words such as 'orange-s', 'un-believ-able', 'sitt-ing', and 'cat-s'.

An additional example from English may help further illustrate this difference between the formational units of words and signs and their morphological organisation. The English words 'sing', 'sleep' and 'snake', for example, all begin with the sound /s/. The /s/ sound does not, however, have a meaning of its own in these examples. It simply combines with the other sounds to create a single unit of meaning. On the other hand, in the word 'snakes', the final /s/ clearly has a meaning of its own, and in this case, the meaning is plural (Valli & Lucas, 1995). The /s/ here is acting as a morpheme. The word 'snakes', like the sign THREE-YEARS-OLD, is thus composed of two morphemes.

3.1.1 Types of morpheme

Morphemes can be classified according to how they behave in a particular word or sign (Crowley et al., 1995). The table below presents the four main morpheme types found in spoken and signed languages.

Table 3.1 Morpheme types

	Free	Bound
Root	Free root	Bound root
Non-root	Free non-root	Affix

The first major distinction between types of morphemes reflects whether they are *free* or *bound*. Free morphemes in a language are those that can stand alone. They do not require additional morphemes, and can be produced as an independent word or sign (Crowley et al., 1995). The English words 'school' and 'look', and the Auslan signs THREE and LOOK, are examples of free morphemes. Bound morphemes, however, cannot stand alone as an independent word or sign. They require the presence of some other morpheme. In English, the plural maker '-s' and the past tense marker '-ed' are bound morphemes. Neither of these are ever produced by users of English on their own. They always occur attached to other morphemes, as in 'school-s' and 'look-ed'. An example of a bound morpheme in Auslan is the side-to-side shaking movement in the sign THIRTEEN. This movement occurs in the signs ELEVEN through to NINETEEN. We can see it adds the same meaning to all these signs, changing the number signs from ONE to NINE into ELEVEN to NINETEEN. Although we can compare



THREE



LOOK



AGREE



DISAGREE



LOOK-AT-ME



LOOK-UP-AND-DOWN

this morpheme in Auslan to bound morphemes in English such as ‘-s’ and ‘-ed’, this bound morpheme in Auslan is somewhat different. This is because the -TEEN morpheme in Auslan cannot even be produced in isolation. It is physically impossible to produce a sign’s movement without also simultaneously producing a particular handshape or location.

The second major distinction is between *root* or *non-root* morphemes. A root morpheme can potentially have other morphemes attached to it, whereas a non-root morpheme can never have any other morphemes attached (Crowley et al., 1995). We can further classify root and non-root morphemes as either free or bound.

A free root morpheme is a root which can stand alone, but which can also link up with other morphemes. The English words ‘school’ and ‘look’ are of this type. The Auslan sign LOOK and AGREE may be considered free root morphemes. They can occur in their usual form, or they can be modified by combining with additional morphemes to produce changes in meaning. The movement in LOOK may be modified so that the sign is produced with a lengthened hold. The resulting sign would mean LOOK-FOR-LONG-TIME. The same pattern of movement can be added to a range of other signs to produce a similar modification in meaning. Similarly, a separating movement and handshape change may be added to AGREE to produce the sign DISAGREE.

A bound root is a root which cannot occur as a free morpheme, but which is “...clearly recognisable as the semantic and structural core of the word in which it occurs” (Crowley et al., 1995, p. 5). The English word ‘disgruntled’ includes an example of a bound root. We clearly recognise that the bound morphemes ‘dis-’ and ‘-ed’ are attached to the root ‘-gruntle-’, but this root is not one that occurs on its own. Similarly, the words ‘huckleberry’, ‘cranberry’ and ‘boysenberry’ involve roots which never occur on their own: ‘huckle-’, ‘cran-’ and ‘boysen-’. In Auslan, we might argue that the classifier handshape in the sign PERSON-PASS-BY represents a root morpheme that cannot be produced on its own¹. This handshape must always combine with some location or movement. The Point handshape here appears to be at the core of the meaning of this sign. It can combine with a variety of possible locations and movements to produce a range of signs describing the actions of a human being.

A free non-root is a morpheme that can stand by itself, but which cannot occur with another morpheme attached to it. Words in English which are free non-root morphemes include ‘at’, ‘well’, ‘from’, ‘and’, ‘whose’, and ‘so’. Notice that other morphemes, such as ‘-ed’ or ‘-ing’, cannot normally be attached to these words. In Auslan, signs with a similar grammatical role, such as BUT and WHO, and other lexical signs such as KNOW or LOVE, appear to fall into the free non-root category. It does not seem possible to attach other morphemes to these

¹ Supalla (1982) argues that the movement component of such classifier signs (see 4.3.3) should be considered the root morpheme, while McDonald (1982) presents a case for analysing the handshape as the root. Recent work by Engberg-Pedersen (1993) suggests that the movement units and handshape units of such signs are mutually dependent. See 4.3 for a more detailed discussion of classifier signs.