Simultaneous Constructions
in Greek Sign Language (GSL)

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Chapter 1: Introduction

In signed languages, some signs are made by one hand while other signs are made by two hands. There are two main types of two-handed signs. In the first type, both hands produce the same sign; in the second type only the dominant hand moves while the non-dominant hand remains in stationary position and acts as a place of articulation. The role of two-handed signs in ASL was first observed by Stokoe (1960) and later by Battison (1978). Battison examines the function of the two hands in depth and proposes two conditions which are reproduced below:

1) *The Symmetry Condition* states that (a) if both hands of a sign move independently during its articulation, then (b) both hands must be specified for the same handshape, the same movement (whether performed simultaneously or in alternation), and the specifications for orientation must be either symmetrical or identical.

2) *The Dominance Condition* states that (a) if the hands of a two-handed sign do not share the same specification for handshape (i.e. they are different), then (b) one hand must be passive while the active hand articulates the movement and (c) the specification of the passive handshape is restricted to be one of a small set: A, S, B, G, C, O.

(Battison 1978:34-35)

The existence of the non-dominant hand does not mean that in signed languages, there are two completely independent articulators in the formation of signs, but the non-dominant hand is used as subordinate articulator for the dominant hand (Sandler 1993a). It is worth mentioning that for right-handed signers, the right hand is the dominant hand while the non-dominant hand is the left hand. For left-handed signers, the dominant hand is the left hand while the non-dominant hand is the right hand. However, besides its role in the formation of signs, the non-dominant hand also plays an important role in the grammar of signed languages, e.g. in prosody and discourse. A study of prosodic constituents in Israeli Sign Language (ISL) (Nespor & Sandler 1999) shows that the non-dominant hand can mark the beginning or the end of a phonological phrase. Regarding the discourse, the use of the non-dominant hand in classifier constructions may serve as a morpheme which is independent from the dominant hand (Sandler & Lillo-Martin 2006). For example in the sentence “I wrote a poem and I was thinking whether it is good or not”, the sign WRITE makes use of a B-classifier produced by the non-dominant hand. It is common for the signer to keep the non-dominant hand in stationary position during the whole sentence and produces other signs, i.e. THINK, GOOD and NOT with the dominant hand. Thus, the non-dominant hand functions as a classifier morpheme for a flat object such as the piece of
paper on which the signer wrote the poem. The non-dominant hand may remain in
this position as long as it is relevant for the discourse. The phenomenon in which the
non-dominant hand holds a sign or the end state of a sign in stationary position while
the dominant hand produces other signs is called *simultaneity*.

1.1 Simultaneity: Literature Review

One difference between spoken and signed languages is that in spoken languages,
people have only one vocal tract while in signed languages they make use of more
than one articulator. In spoken languages, the speaker produces only one word each
time. In signed languages on the other hand, the signer can use two hands as well as
facial expressions, mouthing, eye gaze, etc in order to express linguistic messages. As
I mentioned above, this phenomenon is known as simultaneity. Three types of
simultaneity have been identified in the literature (Vermeerbergen, Leeson &
Crasborn 2007a:2):

a) *Manual simultaneity* occurs when each hand conveys a different linguistic
message. For example, the non-dominant hand is held in a stationary position
while the dominant hand continues signing, thus each hand produces two
different lexical items.

b) *Manual-oral simultaneity* makes use of both oral (mouthing) and manual
articulators. For example, in British Sign Language (Sutton-Spence 2007a)
there is a sign meaning “roll over in bed”. The signer signs “roll over” and at
the same time mouths the English word “bed”.

c) *Simultaneous use of other (manual or non-manual) articulators* occurs when
non-manual articulators other than the mouth such as eye gaze and body lean,
are combined with manual and oral articulators.

The earliest published work on manual simultaneity comes from Friedman (1975).
Friedman observed the syntax and discourse structure of ASL and mentioned several
examples of simultaneous constructions. In 1994, four papers related to simultaneity
in signed language appeared (Engberg-Pedersen 1994; Pinsonneault & Leliévre 1994;
Miller 1994a,b). In 2007 the first collection of articles on simultaneity was published
by Vermeerbergen, Leeson & Crasborn (eds.).
Miller (1994a,b) described a variety of simultaneous constructions found in informal conversations between Quebec Sign Language (LSQ) signers. Miller (1994) mentioned four different constructions in LSQ:

- a) A pointing sign is produced by the weak hand while the other hand articulates a series of other signs.
- b) Perseveration of one sign on the one hand while the other hand produces one or more signs.
- c) An enumeration morpheme expressed by the weak hand in relation to a sign produced by the dominant hand.
- d) Two hands producing two different signs simultaneously.

Miller (1994) argues that there is a distinction in manual simultaneity between foreground and background information. Foreground information is central for the discourse while background information is peripheral. Miller focuses on non-classifier constructions involving the simultaneous use of different signs and makes a distinction between full simultaneity and perseveration (Miller 1994a). Full simultaneity appears when two hands produce a different sign simultaneously. Perseveration occurs when the non-dominant hand remains stable, while the dominant hand produces other signs. The difference between these two types of simultaneity is that in full simultaneity, there is a simultaneous movement on the two hands whereas in perseverations only the dominant hand moves.

Engeberg-Pedersen (1994) investigates some simultaneous constructions involving classifiers in Danish Sign Language (DSL) and discusses central and non-central types of simultaneity. In the central type of simultaneity both hands produce classifiers, which expresses a locative relationship. Non-central simultaneity refers to all types of simultaneity that do not present a locative relationship between two elements.

Liddell (2003) mentions some simultaneous constructions in ASL. He discusses signs produced by both the weak hand, which remains in stationary configuration, and the dominant hand, which simultaneously produces other signs. Liddell (2003) calls these signs “buoys”, since they guide the discourse and serve as “conceptual landmarks as the discourse continues” (Liddell 2003:223). Liddell et al (2007) describe different constructions of buoys in three sign languages, American, Norwegian and Swedish sign language. They illustrate four types of buoys: List
buoys, THEME\textsuperscript{1} buoys, POINTER buoys and fragment buoys. List buoys are produced with handshapes used for numeral signs, ONE, TWO, THREE, FOUR and FIVE and are used to indicate from one to five entities (Liddell 2003). A THEME buoy denotes that “an important discourse theme is being discussed” (Liddell 203:242). A THEME buoy is produced by a raised, vertical index finger on the non-dominant hand while the dominant hand produces other signs. The POINTER buoy is also an index finger, pointing toward an important element in the discourse. It differs from the THEME buoy in that the “pointer buoy does not acquire any new significance through blending; it points at an element of real space or a real space blend” (Liddell et.al. 2007:212). The fragment buoy is the perseveration of a two-handed sign on the non-dominant hand as the dominant hand produces other signs.

Simultaneity as I mentioned above makes use of different articulators such as facial expressions, eye gaze, body lean and the two hands conveying different messages. Although, all these aspects are important in the analysis of the discourse in this paper I focused only on manual simultaneity. In particular, I will try to compare several examples of manual simultaneous constructions in GSL with those found in other signed languages and show the differences and similarities of simultaneity between GSL and other signed languages. This thesis is a first attempt to investigate this phenomenon in a non-well studied signed language so it would be a helpful and accessible study to the linguistic researchers who investigate sign language phenomena. Three types of simultaneous constructions will be discussed i.e. simultaneity involving I) pointing signs, II) numeral signs and III) perseverations. Perseverations signs will be analyzed in terms of prosody and discourse. Two important questions are discussed: whether the non-dominant hand marks prosodic domains in GSL and what the function is of the non-dominant hand for the discourse. Regarding pointing and numeral signs, I will focus on the function of these two types of simultaneity and discuss the parallels between the simultaneous use of manual articulators by signers and the simultaneous use of speech and gesture by speakers.

The thesis is organized as follows: Chapter 2 provides some general information on GSL as well as a brief description of the data and methodology. Chapter 3 analyzes simultaneous constructions involving pointing signs, Chapter 4

\textsuperscript{1} The reason of writing POINTER and THEME boy in capitals and list buoy and fragment buoy in small letters is based on Liddell (2003) which I have followed here.
looks at the numeral signs and Chapter 5 examines perseverations signs in GSL. The conclusions are presented in Chapter 6.
Chapter 2: Data and Methodology

In this section I will provide all the information regarding GSL, the materials that were used, the backgrounds of the subjects as well as the coding and the conventions of the data.

2.1 General Information on Greek Sign Language

Greek Sign Language (GSL) is used by Greek deaf people, by hard-hearing and hearing people living in Greece (Papaspyrou 1994; Lampropoulou 1997; Kourbetis 1999a). It was claimed that GSL is one of the youngest signed language in the world (Hatzopoulou 2008). The first school for the deaf was an oral school and was established in 1923 (Lampropoulou 1999). There is no evidence of any organized community of Greek deaf people from before 1923, thus researchers believe that the language emerged during ‘20s (Kourbetis et al. 2005). In 1948, the first organization for the deaf was established. However, the earliest records of the existence of GSL are placed in ancient Greek society and come from the teachings of Plato and Aristotle (Lampropoulou 1999). In 2000, by the command of the Ministry of Education, Law 2817/2000 was implemented, and GSL was officially recognized as the first language of deaf and hard-hearing people. The impact of this law on the Greek deaf community was huge regarding the acceptance and the use of the language in deaf people’s social life such as education, politics, television and every day activities.

According to the Greek Deaf Federation, the Greek Deaf community consists of about 8,500 to 10,000 signers. Greek signers usually live in major urban centers of Greece, i.e. Athens and Thessalonica, which is where the Greek Deaf Federation and Deaf clubs are located. The Greek Deaf community mostly consists of labourers, teachers, interpreters of GSL and educators. Linguistic research on GSL has started in the late 90’s (Efthimiou & Katsoyannou 2000; 2001; Antzakas 2006; Sapountzaki 2003; 2007; Hatzopoulou 2008). As happens to most sign languages, the spoken language of the wider community, i.e. spoken Greek has contributed features to GSL.

According to Sapountzaki et al (2007), there are some regional and social varieties of GSL, mainly at the level of vocabulary. The existence of regional varieties is due to the fact that groups of adult signers were isolated until very recently. Social varieties, on the other hand, are due to the existence of social groups within the deaf community. One example of social variety in GSL is linguistic preference: users who consider themselves as mostly Greek (as opposed to mostly deaf) tend to use more
Greek structures in their sign language, whereas users who feel mostly deaf use more GSL structures (Sapountzaki et al 2007). This linguistic preference is related to the signer’s educational level and primary social identity. Attitudes towards GSL at present are not consistent. Many people see GSL as a tool of helping Deaf people to acquire Greek, while others believe that the use of GSL will lead to confusion, lower level of education and lower social achievements.

GSL was used in small communities with limited access to the main community. Users of GSL were mostly deaf signers and members of their families. These users transferred GSL from one generation to another through social activities and face-to-face interaction (Sapountzaki et al 2007). Despite the fact that there was limited access for hearing people to GSL, linguistic transmission of GSL was continuous through the small but stable proportion of deaf children who come from deaf families (Kourbetis & Adamopoulou 2003). However, this situation has been changed in recent years. In the present context, more and more hearing people are willing to learn GSL, and dictionaries and academic papers have started to appear. However, GSL has attracted extremely limited interest, thus research on this language would help to complement current typological studies on signed languages and give us a better understanding of the structure of GSL. Research in GSL will also help to improve the education of deaf people as well as students who learn GSL as a second language.

2.2 Material
The data come from 2 DVDs. DVD 1 is about 25 minutes containing 14 spontaneous monologues and DVD 2 is about one hour and 36 minutes containing fifty spontaneous monologues. Most of these monologues/stories lasted approximately two minutes and the content of the stories varies from everyday life experiences, a student’s experiences, problems that deaf people face within Greek society and fictional stories. The subjects were standing and telling the stories while a digital video camera was used and placed on a tripod for recording them. The data were recorded with the help of a Deaf informant who was familiar with digital video cameras. After the data had been collected, all data were transferred from video tape to DVD with a computer.

The recording of the data took place in the Greek Deaf Federation in Athens, since the data were initially designed for exam material for prospective candidates in
GSL proficiency. The data were collected between May and November 2007. After the permission of the vice-president of the Greek Deaf Federation, Agapi Dimopoulou, the data were given to me with the promise that they would be used only for linguistic research.

2.3 Backgrounds of Subjects

For the collection of GSL data, native signers have been carefully recruited. The subjects had to meet several criteria in order to participate in the recording such as fluency, native knowledge of GSL, belonging in the Deaf community, every day contact with other GSL signers and familiarity with recording. Eight and ten adult signers participated in DVD 1 and DVD 2 respectively. All signers were Deaf and used GSL as their first language. Some of them had grown up in hearing, non-signing families and others in Deaf, signing families. All subjects live in Athens, Greece and were aged between twenty and 65. All of them were willing to participate in the videotaping as volunteers.

2.4 Coding

In order to investigate the GSL data, software called ELAN (the Eudico Linguistic Annotator) was used. ELAN is a tool for creating complex annotations to a video file, which helps us study sign language data much easier. It is downloadable from the website of the Max Planck Institute for Psycholinguistics (http://www.lat-mpi.eu/tools/). Since ELAN enables the user to slow down the movement of the signs, it helps us to discover grammatical principles in the language such as phonological, morphological, syntactic and semantic features.

ELAN maintains an annotation file (.eaf) which is associated with a video file from Windows Media Player or Quick Time. In order to annotate a video file, all changes are recorded in the annotation file while the video file remains unchanged. At this point, I would like to mention that a manual for ELAN, provided by Albert Bickford (2005), downloadable at http://www.und.edu/dept/linguistics/textbooks/UsingElan.pdf, was a very helpful guide for annotating files and using them in sign language research. The annotation files were saved with the same name as the video files because it enables us to order the video files that have been annotated. The new annotation file was an empty file
without glossing conventions or tiers. The following tiers were added to all annotation files that were necessary to analyze the data:

GlosL
GlosR
Remarks
Mouth
Translation
Checking

The tiers GlosL and GlosR contain the glosses for the activities of the left hand (GlosL) and the right hand (GlosR) respectively. The tier Remarks contains important points that I noticed in GSL data such as whether a sign is a gesture or when a sign that is usually two-handed is produced by only one hand. Also, this tier includes all the simultaneous constructions that I identified in the data. Every time that a simultaneous constructions appeared, it was marked by the word “simultaneous” so it was easy to go back and find them instead of looking at the whole annotation file. The tier Mouth contains any mouth activity that was important for the analysis. For example, the signer signs RELATIONSHIP and at the same time he pronounces the Greek word WOMAN which means “relationship with a woman”. This tier consists only of instances of mouthing that are important for the meaning of the sentence. The tier Translation includes the English translations of the GSL sentences and the Checking tier contains all the comments and mistakes that a second annotator noticed.

After I completed the transcription by myself, I asked for Sara Siyavoshi, a fellow student, who also transcribes data from Persian Sign Language, to check my data and correct the transcriptions. The comments or the mistakes that she found had to do with the timing, the exact start and end point of a sign as well as cases in which a two-handed sign appeared only in GLOS L or GLOS R tier and not in both of them.

2.5 Conventions

The glosses in the annotation files indicate the exact start and end time of signs. The signs from GSL are glossed in English for simplicity and convenience. Glosses are based on the form of the sign with reference to the Lexicon rather than on its meaning in a specific context. For example, the sign glossed as REASON might be translated as “reason”, “because” or “what’s the reason”, depending on the context. Similarly,
the sign glossed as NICE is glossed as “nice” or “good”. Typos and spelling mistakes have been corrected as much as possible, i.e. about 90-95%. The glosses are only related to the manual articulators and not to the body or facial activities which also often contribute to the meaning of the sentence. For example, when the signer produced a sign and at the same time makes a head shake, only the sign has been annotated, not the negation. The meaning of negation appears in the Translation tier. For the glosses, I followed a manual provided by Crasborn & Zwitserlood (2008).

In order to determine the sign boundaries carefully, I applied the following criteria (Crasborn & Zwitserlood 2008:5): The initial point of the sign is:

1) when the hand(s) start(s) to move away from the initial location of the sign to the final location of the sign, e.g. WOMAN as shown the following example:

Figure 1: WOMAN

2) In case there is no movement of the sign, when the handshape starts to change, e.g. DARK:

Figure 2: DARK

3) If there is neither movement nor handshape change, when the orientation of the hand(s) start(s) to change.

Figure 3: CHANGE_MIND
A sign ends when the handshape(s) start(s) to change after the sign was completed or when the hand(s) start(s) to move away from the final location of the sign. As I stated above there is a different tier for the right and the left hand. If the sign is left-handed, it is annotated in the tier GLOSSL and when the sign is right-handed, it is glossed in the tier GLOSSR. If a sign is two-handed, it is annotated in both the GLOSSL and the GLOSSR tier. This situation holds when both hands move together, e.g. in the sign for FINNISH or when only one hand moves while the other hand remains in stationary position, e.g. in the sign for INCLUDE as shown in figure (4). It is worth mentioning that in two-handed signs the hands do not always move exactly at the same time. There are cases that one hand remains in stationary position, while the other hand starts to produce the next sign. In these cases, I tried to keep the exact duration for each hand as accurate as possible.

Figure: 4

FINNISH  INCLUDE

There are signs for which it is hard to find a good English word to describe them because these signs combine multiple meanings. In these cases, the description of the sign was given in small letters and preceded by the “@” character, e.g. ‘@look at each other angrily’.

Also, there are some signs that have a fixed form and meaning but it is difficult to annotate them with just one English word. In such cases the signs are glossed by a fixed combination of English words which are linked together by underscores:

PEOPLE_WALK_AROUND
MAN_YEARS
NIGHT_TILL_MORNING
All sign verbs are glossed in the finite form. For example, GO instead of GOES or WENT. If a signer uses a fingerspelling, all letters are glossed preceded by the character “#”: #EMMANOUIL MPENAKI (a name of a street in Athens, Greece)

Regarding the pointing signs, a special gloss called “INDEX” is used. When the signer points to him/herself the gloss is INDEX-1, which is translated as “me” or “I” in English. Pointing signs referring to the first person in GSL may occur in a different form regarding the handshape, where instead of the index finger, the signer may use a relaxed B-hand. This B-hand sign is also glossed as INDEX-1. When the signer points to other persons, separate glosses of INDEX are used such as INDEX-HE/SHE, INDEX-YOU, INDEX-THIS. When a signer refers to locative adverbs, the pointing sign is glossed as INDEX-DOWN which in English is translated as “here”. The same holds when the signer refers to time adverbs; the sign is then glossed as INDEX-DOWN as well, but it is translated in English as “now”. If the signer points to several things, like an arc movement pointing sign, it is annotated as INDEX-ARC.

There are some signs which are produced with an index and middle finger and expressed the meaning of “togetherness”. These signs have been annotated as follow:

TWO_OF_US
TWO_OF_YOU
TWO_OF_THEM

Signs which denote numbers have been annotated in numerals:

214 not TWO_HUNDRED_FOURTEEN
2nd, 3rd not SECOND, THIRD

In the cases that I was not sure about the interpretation of the sign, a gloss preceded by a question mark is used: ?MAN. Two question marks are used in the cases that I was not familiar with the sign or I could recognize it: ?? . When the sign was not well-formed a gloss preceded by a “~” is used: ~BECAUSE.

2.6 Simultaneity in Greek Sign Language
Fifty-six (56) simultaneous constructions were found in my GSL data which have been classified in three types. The classification is based on the form of the signs. Thus, simultaneous constructions have been listed as pointing signs, numeral signs and perseverations. The following table summarizes the amount of simultaneous constructions identified in GSL data as well as how many times each type appears in the data.
Table 1

<table>
<thead>
<tr>
<th>Type of simultaneous constructions</th>
<th>Times of occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pointing</td>
<td>8</td>
</tr>
<tr>
<td>Numeral</td>
<td>11</td>
</tr>
<tr>
<td>Perseveration</td>
<td>37</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>56</strong></td>
</tr>
</tbody>
</table>

Simultaneous constructions involving all the above types have been observed in other signed language as well, such as: Quebec Sign Language (LSQ) (Miller 1994a,b), American Sign Language (ASL) (Liddell 2003; Sandler & Lillo-Martin 2006), Israel Sign Language (ISL) (Sandler & Lillo-Martin 2006), Norwegian Sign Language (NSL) (Liddell et al 2007; Vogt-Svendsen & Bergman 2007a), Swedish Sign Language (SSL) (Liddell et al. 2007a, Vogt-Svendsen & Bergman 2007a; Lena-Nilson 2007a), Sign Language of Netherlands (NGT) (Crasborn 2006), Flemish Sign Language (VGT) (Vermmerbergen & Demey 2007a) and Jordanian Sign Language (LIU) (Hendriks 2007a). The next section offers a deeper analysis of simultaneous constructions found in GSL.
Chapter 3: Pointing signs

In signed language literature the term *pointing sign* refers to pointing with an extended index finger. Referents are usually associated with locations in space. When the signers refer to present entities, they just point at the actual locations of entities. When the referents are not present, signers usually establish locations in the signing space and refer anaphorically to these entities. Thus, pointing signs make use of a locus which represents a direction in the signing space associated with referents. Loci in signed languages can be used in all signs that are not articulated on the body and head. Moreover, according to Engberg-Pedersen (1993; 2003), almost every fourth sign in signed discourse in DSL is a pointing sign.

Engberg-Pedersen (1993) notes that not all referents are associated to a locus. Usually more concrete referents such as individuals, objects, geographical locations, moment or periods in time are better candidates to refer to a locus than abstract referents such as plans, hopes or decisions. In the signed language literature two uses of space have been proposed: topographical and grammatical (Poizner, Klima & Bellugi 1987). Topographical space is a more iconic use of space to represent locations while grammatical space is an arbitrary established space which serves syntactic purposes (Engberg-Pedersen 1993). However, Liddell (1996) and Engberg-Pedersen (1993; 2003) argue that space in signed language is topographically organized or semantically motivated and does not serve any grammatical purpose. In particular, Liddell (1996) proposes that there are two parts of spatial representations; the linguistic part, which is related to the hand form, the type of movement and the hand orientation, and the non-linguistic part, which correlate the sign to the locus and/or direction in which it is moved.

3.1 Simultaneous constructions involving pointing

Engberg-Pedersen (1993; 2003) observed that in Danish Sign Language (DSL) there are four types of pointing signs: pronouns, determiners, verbs and pro-forms. Determiners occur with a noun to form a noun phrase while pronouns could form a noun phrase by themselves. Pointing signs that are analyzed as verbs can be used to predicate the location. Examples of these verbs are the stative verbs BE-AT or the dynamic verb GO-TO. However, Engeberg-Pedersen (2003:272) points out that “the functional difference between pointing signs in referential expressions and pointing signs used for predication correlates with a difference in form”. For example, in DSL,
the singular pronoun and determiner are produced with a short movement, and the hand and arm are not usually pronated. On the other hand, the movement of pointing signs in referential expressions is longer than in the movement of pronoun and determiner signs, and the hand is pronated. A pro-form is different in form and function from the other types, i.e. pronouns, determiners and pointing signs in referential expressions, since a pro-form “is used as a carrier of information which is otherwise expressed in spatial modifications of manual signs” (Engeberg-Pedersen 2003:275). A pro-form is articulated on the non-dominant hand while the dominant hand produces other signs. An example of a proform sign from DSL is shown in (1).

(1) Proform in Danish Sign Language (Engberg-Pedersen 1993:124)

dh: POSS FAMILY DEAF+redupl
ndh: PROFORM+sideways-movement

“In my family everyone is deaf”

According to Engberg-Pedersen the pointing sign in the above example cannot be analyzed as a determiner since it occurs along with a predicate, nor can it be a pronoun, because “it is not possible to use the reduplicated form of DEAF followed by plural form of the pronoun (expressed by a sideways movement of the index hand)” (Engberg-Pedersen 1993:124). In other words, the plural form of the pronoun cannot be combined with the reduplicated predicative sign because this is not possible in a non-simultaneous construction. For that reason, Engberg-Pedersen analyzed this type of sign as carrying spatial information “either when the sign cannot be modified because it has a place of articulation on the body or head, or as an intensification of the spatial modification” (Engberg-Pedersen 1993:276). Moreover, pro-forms can occur with both a referential nominal or predicate. Liddell and Engberg-Pedersen seem to agree that pointing signs produced by the non-dominant hand, even if they have the same handshape as pronouns, should not be considered as pronouns. Specifically, Liddell mentions that there is no evidence that pronouns could be produced simultaneously with other signs (Liddell 2003: 255).

Similar to Engberg-Pedersen, Liddell et al. (2007a), investigating the simultaneous constructions of three sign languages (American Sign Language (ASL), Norwegian Sign Language (NSL) and Swedish Sign Language (SSL)), also found two types of pointing signs produced by the non-dominant hand and called them THEME and POINTER buoys. The POINTER and THEME buoy have the same form but a
different function. A THEME buoy denotes that “an important discourse element is being discussed” (Liddell 2003:242). An example of a THEME buoy comes from NSL in which the NSL signer is telling the problems she is having with an alarm clock:

(2) THEME buoy in Norwegian Sign Language (Liddell et al. 2007a:207)

\[
\begin{align*}
\text{dh:} & \quad \text{WEEK PRO}^{\rightarrow[\text{alarm clock}]} \text{contact THEME GO THERE TWO MINUTE} \\
\text{ndh:} & \quad \text{THEME} \\
\text{dh:} & \quad \text{FAST PRO}^{\rightarrow[\text{alarm clock}]} \text{NEXT WEEK GO FOUR MINUTE FAST} \\
\text{ndh:} & \quad \text{THEME}
\end{align*}
\]

“In one week the alarm clock went two to three minutes fast, the next week four minutes fast”

In the above example the THEME buoy remains stationary on the non-dominant hand during the production of more than ten signs by the dominant hand. The THEME buoy stays in place during the description of all the problems that the signer had with the alarm clock. Thus, the THEME buoy helps the addressee to not lose the theme which is the alarm clock.

According to Liddell et al. (2007a), the POINTER buoy does not offer “any new significance through blending\(^2\). Instead it points toward an important element in the discourse” (Liddell et.al 2007a:212). Thus, the hand points at things and does not become a particular concept through blending. It is used to direct attention toward a thing by pointing at it. An example of a POINTER buoy from SSL is provided in (3). The SSL signer is talking about the foundation of EFTA. First, he signed EFTA in the area in front of him, and after that he made a POINTER sign with his non-dominant hand, which he held during the whole sentence:

(3) POINTER buoy in Swedish Sign Language (Liddell et al. 2007a:213)

\[
\begin{align*}
\text{dh:} & \quad 19-\text{HUNDREND}^{\rightarrow[\text{EFTA}]} \text{FIVE}^{\rightarrow[\text{EFTA}]} \text{NINE}^{\rightarrow[\text{EFTA}]} \text{STOCKHOLM HERE} \\
\text{ndh:} & \quad \text{POINTER}
\end{align*}
\]

\(^2\) Conceptual blending is “a cognitive process that involves two separate mental-space inputs. These inputs comprise particular structures and elements, some of which are mapped onto a third mental space, creating the blend (Fauconnier & Turner 1996, 1998)” (Dudis 2002:54). According to Liddell (1998, 2000), signers make use of grounded blend which are blends “that involve elements within the signer’s environment including their own bodies. When signers are part of a grounded blend, which very common place in signed language discourse, addresses understand the signer or the signer’s hands to be physically manifesting a particular concept” (Dudis 2002:53). Thus, the signers map the visible and non-visible conceptual entities with particular concepts on the body or space resulting a blend.
“(And so EFTA was founded). It was in 1959 here in Stockholm”

The POINTER buoy is used to direct the addressee towards some conceptualized entity as the other hand produces other signs related to it. Vogt-Svendsen and Bergman (2007a) looked at simultaneous constructions in NSL and SSL and identified another type of pointing sign, i.e. POINT-G\(^3\), which is produced by the non-dominant hand while dominant hand maintains other signs. POINT-G is different from other kinds of buoys because it is used to represent a point in space. An example of POINT-G from NSL is presented in (4), in which the NSL signer is wondering whether to take the bus or the train to the airport:

(4) *Example of POINT-G from Norwegian Sign Language (Vogt-Svendsen & Bergman 2007a:219)*

```
dh: PRO-1 LIVE CLOSE-TO moves from POINT-G to forward HAVE SAY
ndh:POINT-G___________________________________________________
dh: AIR^BUS point forward
ndh:___________________________________________________________
“It is very short distance from where I live to the airbus (stop)”
```

To sum up, four types of simultaneous constructions involving pointing signs (which are represented by the same form, i.e. an extended index finger) have been discussed in this section:

a) Pro-forms, which carry spatial information and are produced by the non-dominant hand while the dominant hand articulates other signs (Engberg-Pedersen 1993; 2003).

b) POINTER buoys, which point toward an important element in the discourse and are maintained by the non-dominant hand while the dominant hand produces other signs (Liddell 2003; Liddell et.al. 2007a).

c) THEME buoys are used to denote that an important element for the discourse is being discussed. It is also produced by the non-dominant hand while the other hand articulates other signs (Liddell 2003; Liddell et al. 2007a).

d) POINT-G, which represents a point in space or point in time. It is produced by the non-dominant hand while dominant hand maintains other signs (Vogt-Svendsen & Bergman 2007a).

---

\(^3\) Vogt-Svendsen & Bergman (2007a) refer to POINT-G in capitals letters that I have followed here.
3.2 Simultaneous constructions involving pointing signs in Greek Sign Language

Similar to other signed languages, GSL pointing signs can be used in the following ways (Hatzopoulou 2008:38):

a) Pronouns and determiners combined with a noun phrase referring to persons and other entities. An example of such a sign is INDEX-1, which can be translated as “me” or “I” in English, or the sign INDEX-HE/SHE/IT, which can be translated as “he”, “she” and “it” respectively.

b) Locations denoting adverbs. An example of such a sign is INDEX-DOWN, which can be translated in English as “here”.

c) Points in time denoting time adverbs. An example of such a sign is again INDEX-DOWN, which can be translated as “now”

d) Verbs denoting activities, events or states. An example of such a sign is the sign GO-THERE, which can be translated in English as “go to”.

Also, pointing signs in GSL are used to denote a part of the body by pointing at it (e.g. NOSE, STOMACH) (Hatzopoulou 2008:39). Moreover, pointing signs are used in classifier constructions denoting the movement or location of an entity. For example, the index refers to a person while the movement denotes the entity’s locations in space, e.g. a person going away or coming close (Hatzopoulou 2008:39).

Eight instances of simultaneous constructions involving pointing were found in my GSL data. Two of the examples involve personal pronouns and are presented in figure 5 and 6. Note that the signer in figures (5) and (6) uses his left-hand as the dominant hand. In (5), the story is about an advertising company which put a poster with a woman lying aside, outside of a man’s house. The man was upset because he did not want to have this poster outside of his house so he started to throw stones at the poster. Suddenly, the woman from the poster came down and said:

*Figure 5: Pointing sign involving pronoun in GSL*

```
dh: BOTHER
ndh: INDEX-1
```

```
dh: INDEX-1
ndh: INDEX-1
```

```
dh: WHY
ndh: INDEX-1
```
“Did I bother you? Why? Did I bother you? Did I hurt you?”

In figure (5), the pointing sign produced by the non-dominant hand, i.e. INDEX-1, is the first person singular, translated in English as “I”. This pointing sign, which occurs simultaneously with the production of more than one sign, cannot be analyzed as a POINTER buoy because Liddell (2003) suggests that the POINTER buoy does not function as a pronoun because he “is not aware of any evidence that other pronouns are produced and held as other signs are produced” (Liddell 2003:235). Moreover, Liddell notes that POINTER is oriented palm-down which is not the orientation found in pronouns. Also, this pointing sign cannot be analyzed as a pronoun either because the argument position is occupied by another pronoun produced by the dominant hand. Thus, the pointing sign in the weak hand does not have a grammatical role in the sentence, since the subject is produced by the dominant hand. One could support the idea that the pointing sign functions as a Subject Pronoun Copy (Padden 1988 [1983]) but it is not the case here. According to Padden (1988 [1983]), pronoun copy of the subject of a clause can occur only at the end of the sentence and there is no evidence that it is produced by the non-dominant hand and held stationary during the production of other signs by the dominant hand. Consequently, there is no reason to assume that the pointing sign in the above example functions as pronoun. Nor can this

---

4 Note that the signer uses his left hand as the dominant hand.
pointing sign be analyzed as a pro-form, because pro-forms are used to carry spatial modification. Engberg-Pedersen (2003:276), following Friedman (1975), points out that pointing signs produced by the non-dominant hand, in addition to carrying spatial modification, can be analyzed as having an emphatic or contrastive reading. Thus, the function of the pointing sign in the above example is not POINTER, pro-form or pronoun, but it is used to emphasize “I”. Thus, it could be an emphatic pointing sign. Friedman (1975) also notes that emphasis can be “indicated when both the dominant and the non-dominant hand articulators simultaneously index an area with the same referent” (Friedman 1975:954). In our example, the signer uses both the dominant and the non-dominant hand simultaneously to sign INDEX-1, translated as “I”, and does so three times. Also, the double manifestation of INDEX-1 is accompanied by tense musculature as shown in the pictures.

In figure (6) the signer is telling a story about a man who likes to do dangerous things in his life. For example, he prefers to enter the house from the window instead of the door.

*Finger 6: Pointing sign involving pronoun in GSL*

```
<table>
<thead>
<tr>
<th>dh: HE</th>
<th>dh: LIKE</th>
<th>dh: CLIMB_BALCONY</th>
</tr>
</thead>
<tbody>
<tr>
<td>ndh: CLIMB_BALCONY</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>dh: THINK</th>
<th>dh: DOOR</th>
<th>dh: NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>ndh: INDEX-HE</td>
<td>ndh: DOOR</td>
<td>nd: NO</td>
</tr>
</tbody>
</table>
```

“Imagine, he likes to climb the balcony and not (to go inside) through the door”
In figure (6) the pointing sign produced by the non-dominant hand is the third person singular, translated in English as “he”. This pointing sign, which occurs simultaneously with the production of the sign THINK, can not be analyzed as a pronoun. The sign THINK is accompanied with a mouth activity which means “you”. The signer produces THINK and at the same time he pronounces “you”. Thus, the subject for the verb THINK is “you”. On the other hand, the subject of the main clause is INDEX-HE, translated as “he”. This pointing sign does not offer any grammatical role to the sentence, since it is clear that the subject of the main clause LIKE CLIMB_BALCONY DOOR NO is INDEX-HE while the subject of THINK is the mouth activity “you”. I assume that this pointing sign has a contrastive reading between “you” and “he”. It is worth mentioning that the pointing sign accompanied simultaneously with THINK could be analyzed as a pro-form. As I mentioned above pro-forms are used to carry spatial modification to the signs that are articulated by the body or head. However, this is not the case here, because there is a mouth activity simultaneously with the sign THINK, which denotes the subject of the verb. If the pointing sign was a pro-form, the signer should produce an INDEX-YOU sign and not an INDEX-HE.

In figure (7) the signer is talking about a question that she asked her friends, but they did not know the answer.

*Figure 7: Proform in GSL*

```
<table>
<thead>
<tr>
<th>dh: DEAF</th>
<th>dh: NOT_KNOW</th>
<th>dh: NOT_KNOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>ndh: QUESTION</td>
<td>ndh: INDEX-ARC</td>
<td>ndh: INDEX-ARC</td>
</tr>
</tbody>
</table>
```

“Deaf did not know the question”

Following Engberg-Pedersen (1993;2003), I will analyze the pointing sign articulated on the non-dominant hand as a pro-form. This pointing sign cannot be analyzed as a pronoun because the argument position is occupied by DEAF. The pro-form is used to carry spatial modification. Because the sign NOT_KNOW is articulated on the head.

---

5 The signer is left-handed.
and cannot be modified in space, the spatial information is transferred to the pro-form by an arc movement. In GSL, when the signers want to point to several persons, they use an arc movement. In other words, the sign NOT_KNOW is repeated at the head and the arc movement is made by the non-dominant hand. This pointing sign cannot be analyzed as having an emphatic or contrastive reading because the signer does not emphasize or contrast anything, but she wants to make clear that she asks a group of people (her deaf friends) but they did not the answer.

The remaining examples refer to a point is space. Specifically, in figure (8) the story is about a man who wants to travel to Spain via Belgium. When he arrived in Belgium, he got confused so the airport guard told him to remember a certain place in the airport.

*Figure 8: Pointing sign referring to space in GSL*

```
ndh: INDEX-THERE   rh: GO-THERE   rh: REMEMBER
```

“Remember to go there”

The pointing sign produced by the non-dominant hand is similar to POINT-G (Vogt-Svendsen & Bergman 2007a), which represents a point in space, i.e. the place in the airport that the signer needs to go to. Thus, the signer first establishes a point in space and then articulates other signs with his dominant hand.

Another example about a point in space is shown in figure (9), which is about a signer who wanted to go to a wedding in Crete (a Greek island). In the example below the signer wants to denote the location of the island CRETE. Friedman (1975) notes that a pointing sign, produced by the non-dominant hand, simultaneously with other signs, is used to establish or refer to the location of the NP. So, the signer wants to denote a location that is far away from her.
“The wedding is in Crete and I am happy because it is nice”

In figure (10) the story is about the Theater of Deaf in Greece. In particular, the signer wants to mention that there is one theater of Deaf located in Athens. The pointing sign INDEX-HERE represents a location in space, i.e. Athens, which is the city the signer lives in. The signer does not mention the sign ATHENS, instead she uses INDEX-HERE with her non-dominant hand to refer to Athens.

Figure 9: Pointing sign referring to space in GSL

Figure 10: Pointing sign referring to in GSL
“There is one theater for Deaf in Greece which is located here (in Athens)”

The pointing signs in the above examples (8-10) are similar to what Vogt-Svendsen & Bergman (2007a) call POINT-G. In particular, POINT-G is used to represent a location in space and more specifically to visualize spatial locations. They cannot be analyzed as POINTER buoys because they do not point to something that it is important for the discourse. POINTER buoy does not represent anything but the index finger presented in examples (8-10) shows a point in space.

3.3 Pointing signs discussion

In our data instances of what Liddell (2003; Liddell et.al. 2007a) calls POINTER and THEME buoys have not been observed. This does not mean that GSL lacks POINTER and THEME buoys, but more research is needed before a definite answer can be given for the existence of these two kinds of buoys in GSL. Most of the simultaneous constructions involving pointing signs found in my GSL data make use of the POINT-G signs.

The use of pointing signs in simultaneous constructions has been described for many sign languages as well as for co-speech gestures (Vermeerbergen & Demey 2007a). According to Kita (2003), the pointing gesture is a ubiquitous and universal phenomenon. A pointing gesture is used to refer to a certain location, direction and object. In GSL we saw examples of signers using pointing signs produced by the non-dominant hand to refer to a location in space (8-10). However, it is claimed that one difference between signed languages and co-speech gestures is that the pointing signs in signed languages could carry personal pronominal reference, which is not true for gestures in spoken languages. As shown in figures (5-6), the pointing signs on the non-dominant hand do not carry any pronominal reference, since personal pronouns also appear on the dominant hand. As I stated above, the use of the pointing sign produced by the non-dominant hand is for emphatic or contrastive reasons. Zwets (2009) examines the interaction between pointing gestures and personal pronouns and she observes that pointing gestures occurring simultaneously with personal pronouns may have a more powerful or contrastive reading. Thus, the pointing sign in figure (5-6) can be described as pointing gestures. The use of pointing signs in simultaneous constructions has been discussed for many signed languages, but less attention has been paid to simultaneous constructions involving pronouns. Even though Liddell
(2003) points out that pronouns can not be produced by the non-dominant hand, at least in ASL, Friedman (1975) gives an example of a pronoun which appears simultaneously with a verb and incorporates the subject plus its location:

(5) *Simultaneous construction involving pronoun in ASL (Friedman 1975:955)*

R have more variety same store my home
L they-there(INDEX)

“They have more variety there, like the stores at/in my home”

To conclude, in this section I analyzed simultaneous constructions involving pointing signs in GSL. Because of the limited GSL data regarding pointing signs in simultaneous constructions, I can not give a definite answer about the function of these signs or whether a pronoun can occur on the non-dominant hand. We need more data for GSL as well as for co-speech gestures in Greek in order to investigate the role of pointing signs on the non-dominant hand and whether there is a parallelism between pointing signs and pointing gestures.
Chapter 4: Numeral signs

Signers frequently produce handshapes with the weak hand corresponding to those found in the numeral signs: ONE, TWO, THREE, FOUR and FIVE. Liddell (2003) describes these kinds of constructions as *list buoys*. In list buoys, the numeral sign is articulated on the non-dominant while the dominant hand touches the fingertips of the numeral sign. In list buoys, each fingertip is associated with a specific referent or entity. One example of a list buoy is mentioned below and comes from ASL. In this example the signer talks about his four nieces and nephews. The American signer produces a FOUR-list buoy in order to present the four nieces and nephews according to their ages. The oldest one is linked with the index finger and the youngest with the little finger. The signer makes associations by touching the fingers of the FOUR-list buoy with a pointing sign produced by his dominant hand. The signer first touches the index finger of the list buoy and then he signs GIRL. This means that the oldest of his nieces and nephews is a girl. After that, he signs BOY while raising his middle finger. This is an association between the middle finger and his oldest nephew who is a boy. The same happens with his third nephew. He first signs BOY and then raises his ring finger. Thus the ring finger is associated with a younger nephew. At the end, the signer first signs GIRL and touches his little finger with his dominant hand. Thus, the signer’s little finger is associated with his youngest niece.

![Example of list buoy in ASL (Liddell et. al 2007a:193)](attachment:image)

(6) Example of list buoy in ASL (Liddell et. al 2007a:193)

```
dh: pointing-contact GIRL BOY BOY GIRL pointing-contact
ndh: FOUR
```

“The oldest (of four) is a girl, the next a boy, another boy, and the youngest, a girl”

List buoys have the same hand configuration as numeral signs but their form is different from numeral signs in three ways (Liddell 2003):

1) Numeral signs are produced by the strong hand while list buoys are maintained by the weak hand.

2) List buoys are usually articulated in front of the chest while numeral signs are produced in front of of the shoulder.

3) In the list buoys, the fingertips are oriented in a more horizontal position while in the numeral signs the fingers are oriented upwards.

---

6 I will refer to an extended index finger produced by the dominant hand and touching at the numeral sign as pointing-contact.
Apart for the difference in form, there are also some grammatical and semantic differences between numeral signs and list buoys (Liddell 2003). Numeral signs can be used as part of a noun phrase in order to quantify nouns, or alone when they have a pronominal function. List buoys cannot be used in either of these ways. Numeral signs serve as numerical values while list buoys “express the existence of a list of a certain length” (Liddell et. al. 2007a: 191). Moreover, list buoys can remain in place during the whole utterance while numeral signs are usually replaced by the following signs.

According to Liddell (2003), list buoys are “self blending” signs because their semantic function and handshapes automatically blend when they are used. Thus, the fingers are a visual representation of entities and not what they are in reality, i.e. parts of the hands. List buoys are used for making associations with ordered sets of entities. In the case that the thumb is extended, it is linked with the first referent or entity of the set. If the thumb is not extended, the index finger is associated with the first referent or entity of the set. The next element is linked with the next extended finger and so on. Signers usually refer to the elements on the list buoys by touching the appropriate finger and describing the entity to be associated with the fingertip. The contact may precede or follow the description. Liddell describes the contact of the strong hand as a meaningful pointing gesture and not as a fixed lexical item. If the entities linked with the fingers are described briefly, the weak hand remains in place until the end of the description. In case of a lengthy description of an entity, the signer can drop the list buoy in order for a two-handed sign to be produced normally.

Miller (1994) discusses list buoys in QSL in terms of enumeration morphemes. According to Miller (1994) an enumeration morpheme is a numeral morpheme (ONE to FIVE) in which each finger is associated with a distinct discourse referent. Miller’s enumeration morphemes have the same form and function as what Liddell’s describes as list buoys.

To sum up, list buoys use the same handshapes as the numeral signs ONE to FIVE do. List buoys are different from numeral signs in form and function and have been observed in several sign languages such as SSL, ASL, NSL, VGT and LIU. The next section describes the list buoys observed in GSL.
4.1 Simultaneous constructions involving numeral signs in GSL

Two types of simultaneously produced list buoys were found in GSL data. Both of them are comparable to what Liddell (2003) defines as a list buoy. The non-dominant hand signs the list buoy and the dominant hand touches the fingers of the list buoy for each referent. In GSL, the hand configuration found in numeral signs and the one found in list buoys could be the same. This is contrary to what has been observed in other sign languages such as ASL, SSL and NSL (Liddell et.al. 2007a). Specifically, numeral signs in GSL are always produced by the dominant hand and are placed in front of the shoulder or the head, with the fingers oriented upwards. The list buoys in GSL are always produced by the non-dominant. The list buoys are usually placed in front of the chest but sometimes they can be produced in front of the head like numeral signs and the fingertips are not always oriented in horizontal position. They may be oriented in the same position as numeral signs. Thus, list buoys in GSL may have the same form as numeral signs but they are different from them because they are produced by the non-dominant hand. Figure (11) shows an example of the numeral sign 2 and the TWO-list buoy. Note that the signer in the second picture is left-handed.

*Figure 11: Numeral and list buoy in GSL*

In GSL, the counting may start at the thumb or at the index finger. Also, like in other sign languages, there are some grammatical differences between list buoys and numeral signs in GSL. Numeral signs can be used to modify a noun phrase or can have a pronominal function, while list buoys are only used to make associations between the extended fingers and various entities.

In figure (12), the signer says that two things have influenced the lives of deaf people nowadays. The first one is the computer and the second one is the mobile phone.
Figure 12: A TWO-list buoy in GSL

```
<table>
<thead>
<tr>
<th>dh: COMPUTER</th>
<th>ndh: COMPUTER</th>
<th>TWO-list buoy</th>
</tr>
</thead>
<tbody>
<tr>
<td>dh: pointing-contact</td>
<td>ndh: TWO-list buoy</td>
<td>MOBILE_PHONE</td>
</tr>
</tbody>
</table>
```

“There are two things, the first one is computer and the second one is mobile phone”

In the above example the signer first produces COMPUTER which is a two-handed sign and after that he articulates a TWO-list buoy by his non-dominant hand. He places the TWO-list buoy in front of his chest with the fingertips oriented in a horizontal position. He then touches the middle finger and signs MOBILE_PHONE. From the example above, we can infer that COMPUTER is associated with the index finger while MOBILE_PHONE is associated with the middle finger. The TWO-list buoy is not a numeral sign but a list of two things.

In example (7) the story is about a performance, given by the theater of deaf in Greece, and the signer talks about the performance’s participants:
(7) dh: pointing-contact DEAF pointing-contact HEARING
ndh: 4________________________________________

“There are four (participants) three are deaf and one is hearing”

It is worth mentioning that in the above example the hand configuration of the list buoy is the same as the numeral sign FOUR in the sense that the FOUR-list buoy is articulated in front of of the shoulder and the fingers are oriented upwards, like in
numeral signs. However, I have listed this hand configuration as a list buoy because it is produced by the weak hand and its function is similar to what Liddell (2003) describes as list buoys. In this example, the signer describes the four participants of the theater performance and associates each one with a finger of the FOUR-list buoy. She explains that the first three participants are deaf and the last one is a hearing person. The signer squeezes the first three fingers together with the help of a pointing motion produced by the strong hand and then signs DEAF. Afterwards, she makes a pointing sign by her dominant hand and touches the little finger, and then she signs HEARING. This separation shows that the first three participants form a group, i.e. a set of three deaf people, and the last one forms a separate group consisting only of one hearing person.

In figure (12) and example (7), the signers use a list buoy in order to make associations with the referents or entities. They produce the list buoy and keep it throughout the description without changing it. This is the first way of producing list buoys in GSL. In the second type the list buoys are built sequentially. Figure (13) illustrates a sequentially built list buoy. In this example, the signer talks about what she learnt in the theater of Deaf that she was involved in. She learnt three different things: improvisation, yoga and some theoretical background about the performance.

*Figure 13: A sequentially built list buoy*
“(We tried) three different things: improvisation, yoga and explanation (of the theory)"

The signer first signs IMPROVISATION, which is a two-handed sign, and then she produces the ONE-list buoy in her non-dominant hand, starting with her index finger. She then makes a pointing sign and touches it to the ONE-list buoy. Thus, the signer associates the ONE-list buoy with improvisation. After that, the signer makes a pointing sign with her dominant hand simultaneously with a TWO-list buoy. The signer touches the pointing sign of the dominant hand to the middle finger of the TWO-list buoy. Then she signs YOGA, which is a two-handed sign. After signing YOGA, the signer makes a pointing sign simultaneously with a THREE-list buoy and touches the ring finger of the buoy and then she produces EXPLANATION and THEORY. In this example a buoy is built sequentially and is presented during the whole utterance. Some of the signs produced are two-handed, so the signer drops the list buoy in order for a two-handed sign to be produced normally.

In example (8) the signer wonders why there are people with disabilities in our world. She listed four categories of people with disabilities: blind, handicapped, deaf and retarded people.

(8) dh: pointing-contact BLIND WHAT_REASON
   ndh: 1___________________________________
   dh: pointing contact HANDICAPPED pointing-contact DEAF
   ndh: 2_________________________ 3________________
   dh: pointing contact RETARDED
   ndh: 4____________________
   “Why there are first blind, second handicapped people, third deaf people and fourth retarded people.”

In the above example the signer sequentially builds a FOUR-list buoy. The signer first makes a pointing sign with her dominant hand and then touches the thumb of her non-dominant hand which represents the ONE-list buoy, and then she signs BLIND and WHAT_REASON. After signing WHAT_REASON, the signer again produces a pointing sign and touches the index finger of the non-dominant, which maintains the TWO-list buoy. She drops the TWO-list buoy in order to produce the two-handed sign HANDICAPPED. After that, she touches the middle finger in the THREE-list buoy
and then signs DEAF. After signing DEAF, she touches the ring finger, which presents the FOUR-list buoy and she signs RETARDED. In this example, each finger is associated with a group of people with disabilities, and the list buoy is built sequentially.

The next two examples show that list buoys are not always touched by the dominant hand. In figure (14) the signer talks about her husband’s mother, who gave birth to four children. The first child is hearing and the other three children are deaf.

_Figure 14: sequentially built list buoy_

```
dh: MOTHER                     GIVE_BIRTH                HEARING
ndh:                                     GIVE_BIRT                   ONE-list buoy

dh: GIVE_BIRTH                        DEAF                         GIVE_BIRTH
ndh: TWO-list buoy________________________        THREE-list buoy

dh: DEAF                         GIVE_BIRTH                 DEAF
ndh:_______________     FOUR-list buoy___________________________
```

“His mother (husband’s mother) gave birth to 4 children, one is hearing and the other three are deaf”

In figure (14) the FOUR-list buoy is built sequentially and appears simultaneously with the signs referring to the listed referents, without being touched at all. The signer
first signs GIVE_BIRTH which is a two-handed sign. Later, she produces the ONE-list buoy and the sign HEARING simultaneously. After that, she signs GIVE_BIRTH with her dominant hand, and at the same time produces the TWO-list buoy. She keeps the TWO-list buoy stationary until the production of the sign DEAF. She produces the THREE and FOUR-list buoy in the same way as the TWO-list buoy. In this example the thumb is associated with the oldest child, who is hearing, the index finger with the second child who is deaf, the middle finger with the third child, also deaf, and the ring finger with the youngest child, who is deaf as well. The signer presents the four children according to their ages.

In example (9) the signer talks about a family consisting of three members: the mother, the father and 1 boy.

(9) dh: 1 FAMILY MOTHER FATHER 1 CHILD 1 BOY
    ndh:    FAMILY 1                 2               3__________

“1 family (consisting of) three members, the mother, the father and 1 boy”

In the above example the signer builds a sequential list buoy without touching it with the dominant hand. The signer, after signing 1 FAMILY, signs MOTHER simultaneously with the ONE-list buoy, starting with the thumb. Then, she signs FATHER simultaneously with the TWO-list buoy. After that, she signs the numeral sign 1 with her index finger of the dominant hand and at the same time signs the THREE-list buoy. She keeps the THREE-list buoy stationary during the production of CHILD, 1 and BOY. In this example, each finger is associated with a member of the family.

4.2 List buoys discussion

List buoys in GSL are always produced by the non-dominant hand and they are used to make associations with ONE to FIVE entities. Also, they have the ability to remain in place as other signs are produced. Our examples reveal that there are two ways in GSL to present list buoys. Some signers start with the production of a list buoy and then keep it during the whole utterance without changing it. Thus, the list buoy is a complete form from the very beginning. For example in figure (11) the GSL signer produced a TWO-list buoy, referring to the two entities. Other signers make use of sequentially built list buoys, so the first item on the list is introduced with the ONE-list buoy, the second with the TWO-list buoy and so on, as shown in figure (12). The
signer may touch the list buoy with the dominant hand or not. If there is no contact with the list buoy, the signer produces the list buoy simultaneously with the entity associated with it. Similar to numeral signs, the enumeration of list buoys in GSL may start at the thumb or at the index finger depending on the signer. These properties are common to list buoys found in ASL, SSL and NSL (Liddell et. al. 2007a).

There is another type of simultaneous construction involving numerals, shown in example (10). This is a very interesting example and appears only once is GSL data. Even though the numeral has some characteristics of list buoys, i.e. the hand orientation resembles that of list buoys and it is produced by the non-dominant hand, its function is different from them. This numeral is not used to make associations with entities or referents but to modify a verb. The signer talks about a woman who got pregnant five times but she lost her baby four times and only the fifth time did she manage to save it.

(10) dh: GIVE_BIRTH pointing-contact MISS MISS MISS MISS

   ndh: GIVE_BIRTH 1__________________ 2 3 4

dh: pointing-contact SAVE

   ndh: 5____________SAVE

“She gave birth 5 times but she lost (the baby) 4 times and in 5th time she saved (the baby).”

In the above example, there is a sequentially built list buoy in which only the ONE and FIVE-list buoys are contacted by the index of the strong hand. The TWO, THREE and FOUR-list buoys are produced simultaneously with the verb MISS. Thus, the signer, after producing ONE-list buoy and MISS, again signs MISS three times, each time adding a finger to the numeral of her non-dominant hand. After that, she touches the FIVE-list buoy with her dominant hand and signs SAVE, which is a two-handed sign.

Another interesting example that appears in GSL data thrice from three different signers is shown in (11). In this example the signer signs DIFFERENT on his dominant hand simultaneously with a FOUR-list buoy on his weak hand.

(11) dh: GAME DIFFERENT DIFFERENT DIFFERENT DIFFERENT

   ndh: GAME 1 2 3 4

“Many different games”
In example (11) the numeral has the same form as a list buoy, since it is produced by the non-dominant hand and it is articulated in front of the chest and oriented in a horizontal position. However, its function is different from that of list buoys, because it is not associated with a specific referent or entity. However, DIFFERENT normally is a symmetrical two-handed sign with the index finger of both the dominant and non-dominant hand extended and moved in the same direction several times. In this case, the signer keeps the hand configuration, the orientation, the location and the movement of the sign DIFFERENT in her dominant hand while she signs a FOUR-list buoy in her weak hand. The numeral sign is built sequentially starting at the index finger. Each time that the signer signs DIFFERENT, she adds a finger to the numeral on her non-dominant hand. This sign does not have the meaning of “four different things” but it means “many different things”.

In the example below, the story is about the signer’s trip to Ireland. Three of the signer’s friends arrived in Ireland and the signer met them there. The signer signs first the number THREE on her non-dominant hand and then this sign remains in stationary position while the dominant hand produces two other signs, as shown in (12). The sign THREE does not represent an item in a list, like list buoys do, but modifies the noun “friends”. The only characteristic that it has in common with list buoys is that it is produced by the non-dominant hand.

(12) dh: FRIEND INDEX-1 GO-THERE
    ndh: FRIEND 3_________________

“Three friends arrived and I met them there”

Although the numeral signs in examples (10-12) share some properties with Liddell’s list buoys (since they are produced by the weak hand), they cannot be considered list buoys because the fingers are not associated with specific referents or entities. For example, the numeral signs in (10) and (12) are used to quantify the verb and the noun respectively. According to Liddell et al. (2007a:191), “numerals can be used to quantify nouns, but list buoys cannot”. GSL data reveal that list buoys are not the only type of numerals that can occur on the non-dominant hand in a simultaneous construction.

There are examples from other sign languages that present numeral signs on the non-dominant hand which are not list buoys. An example, which is the same as example (10) from GSL, comes from LIU (Hendriks 2008). The LIU signer talks
about a person who keeps sending e-mails but gets no reply. The signer produces the verb SEND several times simultaneously with a numeral on her non-dominant hand, as shown in (13)

(13) Numeral sign in LIU (Hendriks 2008:150)

dh: E-MAIL SEND NEG-EXIST SEND NEG-EXIST SEND SEND NEG-EXIST
ndh: E-MAIL ONE-TWO_____________THREE_____FOUR-FIVE____

“He sent an e-mail, no (reply). He sent another one, but no (reply). He sent again and again, but no (reply).”

Friedman (1975:953) also shows an example from ASL in which a list of verbs occurs on the dominant hand and numerals are produced by the weak hand, showing the time at which the verb actions took place as shown in (12):

(14) Expressing time by the non-dominant hand (Friedman 1975:253)

R ENGLISH CLASS GO HOME STUDY EAT
L TWO (O’ CLOCK) FOUR SIX SEVEN

“At two (o’clock) (I go to) English class; from four to six (I) go to home and study; at seven (I) eat”

There are signed languages, other than GSL, which produce numerals that are not list buoys. Because of the limited cross-linguistic data, the difference in function between list buoys and numeral signs produced by the weak hand is not well defined.

Vermeerbergen and Demey (2007a) give some examples of simultaneous constructions involving numerals in co-speech gestures. Using a game in which participants had to remember a list of items, they observed that many of the participants use sequential list buoys while they are referring to the items on the list. Thus, the speakers first extended the thumb or index finger when recalling the first item, the middle finger when recalling the second item and so on. This game shows that speakers use list buoys in order to remember items on a list. Thus, simultaneous constructions using list buoys is not limited to signed languages.

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7 Based on my own observation, two native Greek speakers use list buoys in order to remember items on a list. The first speaker was trying to remember what she had to do in order to get a new passport. She first extended her thumb when saying “I have to go to the City Hall”, then the index finger when saying “I need to make copies” and the middle finger when saying “I have to go to the police department”. The second speaker was naming her four sons-in-law. She first produced the FOUR-list buoy starting with her index finger and point at it, each time that she was saying the name of her sons-
Chapter 5: Perseveration signs

Liddell (2003:248) gives the following definition of perseveration:

“when a one-handed sign follows a two handed-sign, it is common for the weak hand to maintain its configuration from the preceding two-handed signs as the strong hand produces the following one-hand sign. When this occurs, the weak hand is said to persevere into the succeeding one-handed sign”

However, Miller (1994:98) points out that in LSQ “a perseveration may involve either a one-handed sign or one hand of a two-handed sign”. Liddell (2003) makes a distinction between non-meaningful perseverations, which do not serve any semantic function, and meaningful perseveration which show the listener who/what the topic of the discourse is. According to Nespor & Sandler (1999) non-meaningful perseverations may have a prosodic explanation, because they can be used to mark a phonological phrase boundary. Perseverations have often been discussed in relation to classifier constructions. Two types of meaningful perseverations have been proposed in the literature. The first type is the production of a classifier in one hand while the other hand articulates other signs. The second type is the perseveration of a sign in the non-dominant hand while the dominant hand produces other signs. Because perseveration is the result of a one-handed sign or one hand of a two-handed sign remaining stationary, it is hard to define a fixed lexical form for such signs.

Although descriptions of perseverations have been made for different and unrelated sign languages, for example by Miller (1994a,b) for LSQ, by Engberg-Pedersen (1994) for DSL, by Liddell et. al. (2007a) for ASL, NSL and SSL, and by Nespor & Sandler for ISL (1999), the function of these constructions varied considerably. Depending on the linguistic preference, perseverations have a phonological explanation (Nespor & Sandler 1999), a morphological (Engberg-Pedersen 1993) and syntactic or semantic function (Miller 1994a,b). This chapter examines perseverance in GSL and is divided into two sections. The first section explains non-meaningful perseverance according to prosody and the second section gives a morphological or syntactic and semantic explanation of GSL perseverations.

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in-law. Note that neither of these two speakers is familiar with Greek Sign Language or other any signed language.
5.1 Prosody in Signed Language

Prosodic Phonology is a theory about the organization of phonological constituents, which was first developed for spoken languages (Nespor & Vogel 1986). According to Prosodic Phonology, the mental representation of speech is divided into hierarchically arranged chunks. The prosodic hierarchy consists of seven units from large to small (Nespor & Vogel 1986):

(15) Prosodic Hierarchy

<table>
<thead>
<tr>
<th>Prosodic Hierarchy</th>
<th></th>
</tr>
</thead>
</table>
|Phonological Utterance | U \_LARGE
|Intonational Phrase    | I \_↓
|Phonological Phrase    | Φ \_↓
|Phonological Word      | PhW \_↓
|Foot                | F
|Syllabė            | σ \_SMALL

Each prosodic constituent serves as the domain of application of specific phonological rules. Prosodic Phonology supports the idea that phonological constituents are isomorphic with morphological and syntactic constituents. However, there are cases in which prosodic constituents are not isomorphic to syntactic structure as shown in the following example. “Φ” represents the prosodic constituent Phonological Phrase:

(16) Prosodic and Syntactic constituents (Nespor & Sandler 1999:147)

a. Prosodic Constituency
[Φ the coast] [Φ of Greece]

b. Syntactic Constituency
[NP the [N coast] [PP of Greece]]

In the above example, specifiers and heads are grouped together into phonological phrases, but they are not grouped together in syntax. The non-isomorphism of prosodic constituents with morphosyntactic constituents forms one of the strongest arguments that Prosodic Phonology is an independent area of the grammar.

Nespor & Sandler (1999) show that signed languages have a prosodic component similar to that of spoken languages. This paper analyzes the prosodic system of GSL but focuses only on the phonological phrase, i.e. Φ, which is relevant for the questions this paper is concerned with.

5.1.2 Phonological Phrase

The next constituent above the prosodic word is the phonological phrase (Φ). Nespor & Vogel (1986) proposed that this unit is projected from the heads of syntactic
phrases such as Nouns, Verbs and Adjectives. In order to support the existence of phonological phrases, Nespor & Vogel provide examples of phonological rules that have the phonological phrase as a domain of application. For example, the application of an Italian Rule, called Raddoppiamento Sintaticco (RS), is restricted to the phonological phrase. This rule geminates a consonant at the beginning of a word after a stressed syllable as shown in (17). This rule does not apply if the consonant is outside the phonological phrase boundary.

(17) Raddoppiamento Sintaticco (Nespor & Sandler 1999:148)
[Il tuo pappagallo]\_{\phi} [è più Ioquace]\_{\phi} [del mio]\_{\phi}
[your parrot] [is more talkative] [than mine]

In a study of prosodic constituents in Israeli Sign Language (ISL), Nespor & Sandler (1999) show that there is a phonological phrase in that language as well. In particular, they provide evidence that in ISL a phonological phrase is marked by holds, reiterations of the last sign, or pauses. For example, the ISL sentence below contains two intonational phrases in which the first one consists of two phonological phrases and the second one consists of one phonological phrase. Each phonological phrase is marked by a hold, pause or reiterations of the last sign.

(18) Phonological phrases in ISL (Nespor & Sandler 1999:162)
[[CAKE THERE]\_{\phi} [I BAKE]\_{\phi}] [TASTY VERY]\_{\phi}]
“The cake I bakes is very tasty”

The sign BAKE is a two-handed sign. The signer assumes the handshape of the sign BAKE with his non-dominant hand at the beginning of the phonological phrase, while the signer signs “I” with the dominant hand. Because the spreading applies only within a phonological phrase and it does not go further, Nespor & Sandler (1999) propose a rule named Non-dominant Hand Spread (NHS) which has as its domain of application the phonological phrase. In particular, if there is a two-handed sign in a phonological phrase, it is common that the non-dominant hand can stay in stationary position (hold) while the dominant hand produces other signs. This spreading applies to the beginning or end of the phonological phrase. Nespor & Sandler (1999) point out that NHS is an optional process and it does not always occur.
5.1.3 Phonological perseverations in GSL data

In order to define the domain of a phonological phrase in GSL, I follow the definition proposed by Nespor & Vogel (1986):

*Phonological Phrase Domain* (Nespor & Sandler 1999:147)

The domain of a Φ consists of a lexical head (X) and all elements on its non-recursive side up to another head outside of the maxima projection of X.

A lexical head is defined as a word which is important for a particular phrase. For example, the head of a noun phrase is a noun; the head of a verb phrase is a verb etc. Languages differ in the way of recursivity. Thus, in right recursive languages the heads precede their complements, while in left recursive languages the complements precede their head. For that reason, Nespor & Vogel (1986) further propose that in “Head-Complement languages the rightmost node of a Φ is labeled strong; in Complement-Head languages the leftmost node of a Φ is labeled strong” (Nespor & Sandler 1999:139).

GSL data reveal that it is a Complement-Head language, so the lexical head of a phrase is on the right as shown the following examples:

(19) *Phonological Phrases in GSL*

\[
\text{ambulance come}_\text{VP} \\
\text{funny story}_\text{NP} \\
\text{very interesting}_\text{ADJP}
\]

The proposed basic word order for GSL is SOV (Papaspyrou 1994,1998) with place and time adverbs preceding SOV. GSL data reveal that there is a variability in word order and this may be explained in terms of topicalization, which is a very common phenomenon in signed languages. The investigation of GSL syntax is beyond the purpose of this paper, thus for GSL I will follow Papaspyrou (1994,1998) and assume that the GSL word order is SOV.

As I mentioned above the perseveration of an end state of a sign can mark prosodic domains. More specifically, the NHS rule marks a prosodic phrase. Most perseverations constructions found in GSL data can be explained according to this
rule, but this rule does not always apply. I have listed two examples of simultaneous constructions in GSL characterized by holds.

*Figure 15: NHS rule in GSL*

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Figure 15: NHS rule in GSL

In the above example the signer talks about his mother who is deaf and used to try to make hearing people help her when she was alone. As shown above there is a non-dominant hand spreading. Specifically, `PUSH` is a two-handed sign. The signer first signs `PUSH` and then holds the non-dominant hand in stationary position while the other hand continues signing `HEARING`. The spreading of the non-dominant hand stops at the end of a phonological phrase. An example similar to figure (15) is shown in (20). `RELATIONSHIP` is a two-handed sign in which the non-dominant hand stays stationary until the end of the phonological phrase.

(20) dh: [1 WOMAN]Φ [DEAF]Φ [RELATIONSHIP HEARING]Φ
    ndh: [RELATIONSHIP __________]Φ

“One deaf woman has a relationship with a hearing person”
Figure (2) is a clearer instance of the spreading of the non-dominant hand stopping at the end of a phonological phrase. TIME is a two-handed sign which is kept throughout the phonological phrase. After the production of the sign NOON, the hand becomes more relaxing. The next phonological phrase prevents it from continuing.

The same situation applies to the example (21).

Figure 16: Non-dominant hand spreading

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Figure: Non-dominant hand spreading

dh: TIME                         DAY                                NOON                      ]φ
ndh: TIME__________________________________________________ ]φ

dh: [INDEX-1]φ  [WORK                              FINISH]φ
ndh:                                  [WORK                               FINISH]φ

“I finished my job in the noon”

(21) dh:  [MY HOUSE]φ [STAY   AREA]φ [EKALI]φ
         “My house is in an area called Ekali”

In example (22) the non-dominant hand spreading stops not only because it reaches a phonological phrase boundary, but because there is another two-handed sign.

(22) dh:  [GROUP DEAF]φ [FREE TICKET]φ [COURT ENTER]φ
         ndh: [GROUP       ]φ [FREE TICKET]φ [COURT ENTER]φ
         “A group of deaf people entered to the court without paying ticket”

Nespor & Sandler (1999) claim that the spreading of the non-dominant hand is interrupted by articulating another two-handed sign. However, as shown our examples
the non-dominant hand spreading stops whenever a new phonological phrase occurs. There in no case in our data where the spreading needs to continue but stops because of the articulation of another two-handed sign. Because in all examples presented here the spreading stops at a phonological phrase boundary, I conclude that for GSL, like ISL, the NHS rule has as its domain of application the phonological phrase boundary. Prosody can explain part of the simultaneous constructions found in GSL. However, in GSL data there are cases where the spreading continues beyond the phonological phrase or where it remains in freezing position throughout the entire utterance. In the following example the spreading of the non-dominant hand goes beyond the phonological phrase; it stays throughout the entire utterance.

(23) dh: [INDEX-1]Φ [NEWSPAPER READ]Φ [INDEX-1 SURPRISED]Φ
    ndh:                      [NEWSPAPER____________________________

“I read the newspaper and I was surprised”

Many examples in GSL data are found to present the above structure. In cases like (23) the function of the non-dominant hand is not to mark phonological boundaries but it plays an important role for the discourse.

5.2 Morphological and syntactic or semantic explanation for GSL perseveration signs
Concerning the function of the non-dominant hand in ASL, Friedman (1975) suggests that one type of perseveration is the holding of the topic or focus of discourse on the non-dominant hand, while the dominant hand produces other signs.

(24) Perseveration in ASL (Friedman 1975:953)
    R We look-at INDEX(to car) we look-at INDEX(to car)
    L Car__________________maintained________________

“We looked at the car. We looked at the car”

Another function of this phenomenon that Friedman (1975) gives is the incorporation of the object into the verb. In particular, the verb and the object may be produced simultaneously or the object may be articulated by the non-dominant hand before the verb and then remain stationary while the other hand signs the verb.

46
(25) *Object incorporation into the verb* (Friedman 1975:957)

R cut
L tree
“cut the tree”

Perseverations are also mentioned in Klima & Bellugi (1979:326-330). According to them, the perseveration of a sign is more common in non-spontaneous discourse such as poetry, humor and theoretical production. Moreover, Gee and Kegl (1983) note that the perseveration of a sign is one way in which the discourse topic can be stressed.

Miller (1994) analyzes “non-classifier constructions involving the simultaneous production of distinct signs” (Miller 1994:89) and makes a distinction between full simultaneity and perseveration. Full simultaneity appears when two different signs are articulated simultaneously by the dominant and non-dominant hand. Perseverations, on the other hand, occur when the non-dominant hand maintains the end-state of a sign while the dominant hand produces one or more signs. Miller (1994) suggests that each hand has a different function and distinguishes between *foreground* and *background* information. In his analysis, the non-dominant hand carries background information, and for that reason it stays stationary while the dominant hand, which moves, conveys foreground information. Miller (1994) notes that the notions foreground and background correspond to what is central or peripheral to the discourse. In other words, the non-dominant hand conveys information that is peripheral or old information while the dominant hand carries central or primary information. Miller (1994) gives some examples in which the non-dominant hand indicates the topic while the dominant hand signs the comment. Thus, the non-dominant hand makes signs “whose function is the management of the discourse situation rather than the communication of propositional content” (Miller 1994:103). Except for background and foreground information, perseveration can be used in order to modify information produced on the dominant hand, to establish contrast and to express a direct conditional relationship between two propositions.

Miller (1994) prefers a functional explanation for perseveration rather than a phonological analysis for confining movement to the dominant hand. In order to support his analysis, he gives an example in which the dominant hand holds the sign SUN while the non-dominant hand produces a whole clause of four signs, each of which involves movement. According to Miller (1994) a phonological explanation to
the above example would be inadequate while a functional analysis can explain it. However, Miller (1994) raises the question of why it is the dominant hand that remains stationary while the non-dominant hand produces other signs. This case is similar to what Frishberg (1985) calls *dominance reversal*. According to Frishberg, dominance reversals are “instances in which a signer switches the expected dominance relations between the hands for a stretch of one or more signs” (Frishberg 1985:81). Thus, the dominant hand can suddenly become inactive while the non-dominant hand continues signing. Examples of dominance reversal are not found in GSL data. However, Miller solves this problem by suggesting that since the perseveration is produced by the dominant hand as part of the current discourse, it is more economical to keep it on the same hand than to change it. According to Leeson & Saeed (2007a:59-60) “the features foregrounded, animacy and activity typically map into articulation on the dominant hand while the features backgrounded, inanimacy and inactivity map into articulation on the non-dominant hand”, but “discourse related factors can influence the assignment of the most active element on the non-dominant hand”. Thus, besides economy reasons, there are also discourse factors that influence the activity of the dominant hand. For example, topographical reasons may play a role in assigning activity to the dominant or the non-dominant hand. For instance, if the signer wants to mention that the sun or a car is on his right or on his left side, he will most likely assign that entity to his dominant or non-dominant hand depending on which is the appropriate side.

Miller (1994) mentions that perseverations may have an ambiguous status. In particular, he raises the question of how we should analyze complex signs consisting of parts that can be independent of other signs. For example, a LSQ signer first produces a B-classifier handshape which stays in place across two sentences and is involved in the production of the sign WRITE, a sign for which a B-classifier handshape is part of the citation form. Also, the same handshape is used as the complement of a deictic pronoun. According to Miller (1994), the index sign does not refer to the sign WRITE but it refers to a piece of paper. Thus, the B-classifier is an obligatory argument for the sign WRITE but it is also used for syntax and discourse structure. He also proposes a distinction between signs whose components are also accessible to the syntax and discourse, and signs whose components do not offer any role to the syntax, e.g. the classifiers are an integral part of the verbs.
Engberg-Pedersen (1994) describes classifier constructions in DSL and makes a distinction between central and non-central types of simultaneity. In the central type of simultaneity, two polymorphemic verbs articulated on the dominant and non-dominant hand participate in a classifier construction and express a locative relationship between two elements. The non-central type includes all types of simultaneity which do not present a locative relationship between the elements. She focuses on perseverations in classifier constructions that show a locative relationship and analyzes the hold sign as a hold-morpheme. The hold-morpheme usually occurs on the non-dominant hand and remains stationary while the other hand predicates something related to it or expresses a certain relationship with it. Like Miller (1994), she proposed that the function of the hold-morpheme is to carry background information. For instance, Engberg-Pedersen (1994) gives an example which shows the interaction of two basketball players, where both players are moving and one is overtaken by the other. The hand representing the overtaken player remains in place, while the hand showing the overtaking player moves in space. The action of overtaking is represented by the movement of the hand in space, thus it is foregrounded. The player who is overtaken is represented with a hold-morpheme on the non-dominant hand and functions as background. In other words, the signer keeps her non-dominant hand motionless because she focuses on what the player represented by the dominant hand is doing in relation to the player represented by her non-dominant hand.

Engberg-Pedersen (1994) also mentions two examples of the non-central type of simultaneity. In the first example, the non-dominant hand produces a polymorphemic verb with a hold-morpheme, while the dominant hand produces signs that are not polymorphemic verbs. Such constructions do not express a locative relationship between two elements. One example that Engberg-Pedersen (1994:81) gives is the description of a ferry collision in which the non-dominant hand produces a polymorphemic verb with a handshape referring to a boat and the dominant hand explains how many people were onboard the ferry. This example corresponds to the topic-comment type of perseverations discussed by Miller (1994a,b). The second example refers to the constructions in which the weak hand is held motionless and represents the stem of the polymorphemic verb and the other hand moves in relation to the weak hand. She mentions an example in which the signer describes a row of cars and “holds one hand motionless and moves the other hand with the same
handshape in a line away from the motionless hand” (Engberg-Pedersen 1994:82). She treats such examples as simultaneous constructions at the morphological level which show a special kind of *modification for distribution*.

To conclude, in the literature there is a distinction between perseverations involving classifiers and those that do not involving classifiers. For example, Sandler (1999a) points out that the spreading of the non-dominant hand is limited to certain prosodic domains, i.e. the phonological phrase, but this constraint does not apply in cases where the non-dominant hand is interpreted as a classifier. Miller (1994a,b) and Engberg-Pedersen (1994) seem to agree that the function of the hold sign or hold morpheme is to convey background information while the active hand presents foreground information. This function applies to both classifier and non-classifier perseverations. Also, perseveration in both cases may present a topic-comment structure in which the topic is produced by the non-dominant hand, which remains stationary while the dominant hand signs a comment related to the topic. From the above, we can infer that there is a specific kind of relationship between the hold sign and the active hand, which has to do with the information structure. Three types of perseverations have been found in GSL:

a) the simultaneous production of two classifiers, each on a different hand, expressing a locative relationship between two referents
b) the production of a classifier in one hand while the other hand articulates other signs
c) the perseveration of a sign on one hand while the other hand produces other signs (this category refers to Liddell’s fragment signs)

It is worth mentioning that the most common types of perseverations in my GSL data are those involving classifiers. Section 5.2.1 discusses simultaneous constructions involving classifiers in GSL and section 5.2.2 discusses meaningful perseverations.

### 5.2.1 Simultaneity in classifier constructions in GSL

Classifier constructions have been documented in all signed languages studied to date. These constructions “express events of motion and location, spatial relations among concrete referents, or the holding of objects (Supalla 1982, 1986)” (Sandler

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8 It is worth noting that different terms have been reported in the literature for classifier constructions. They are *verbs of motion and location* (Supalla 1986,1990), *classifier predicates* (Schick 1990), *spatial- locative predicates* (Liddell & Johnson 1987), *polymorphic verbs* (Engberg-Pedersen 1993), *polysynthetic signs* (Wallin 1998) and *polycomponential signs* (Slobin et al. 2001).
Classifiers consist of a set of handshapes that are classified in terms of semantic categories (for example PERSON, ANIMAL, CAR etc), size and shape (such as SMALL-ROUND-OBJECT, FLAT-OBJECT etc) or holding handshapes (like the handle of a cup or suitcase, a two dimensional entity such as a piece of paper or the handle of a potato or lump). Holding classifiers have been described in more detail for DSL by Engberg-Pedersen (1993). The above handshapes are combined with different paths of movements and locations. In classifier constructions, each component, i.e. the handshape, location and movement, has a meaningful morphological status. For that reason classifier structures are considered to be morphemes. Classifiers present expressions that translate as full sentences, such as “a person walks” or “an airplane landed” and can be produced by both the dominant and the non-dominant hand.

According to Engberg-Pedersen (1993), in the central type of simultaneity, two polymorphemic verbs, i.e. verbs of motion and location including a stem expressed by a classifier handshape, are produced simultaneously and express the locative relationship between two elements. An example of such a classifier construction is shown in figure (17) and (18).

Figure 17: Central simultaneity  Figure 18: Central simultaneity

Car-motorcycle classifier  Person classifiers

“The car and motorcycle move together” “Many people run”

In the first picture the two classifiers, car and motorcycle, move together, showing that they go to the same direction next to each other. In the second picture, four person classifiers, each on a different hand, move at the same direction and represent people in a row running in the same direction. Thus, in the above examples, there is a locative relationship between the classifiers. Because in the above constructions, both hands move simultaneously, I cannot say that the information presented in the non-dominant hand is background and the information on the dominant hand is
foreground. The examples in Figure (17-18) correspond to what Miller (1994a,b) calls full simultaneity in which the dominant and non-dominant hand sign two distinct signs.

Figure (19) shows that in GSL, central and non-central simultaneity can appear within a single utterance. In this example, the person-classifier on the non-dominant hand at the beginning of the utterance is a hold-morpheme, functioning as a topic, since the dominant hand signs information related to that person, i.e. BLIND. Then, another person-classifier appears on the dominant hand, so the person classifier on the non-dominant hand becomes a hold-morpheme, functioning as background information. The person-classifier on the non-dominant does not express a locative relationship between two referents because the signs BLIND, HEARING, SEE, NORMAL are not classifiers. However, at the end of the utterance when both persons, placed next to each other, run at the same direction, a locative relationship between them is indicated.

*Figure 19: Central and non-central simultaneity combined together*
There is a person who is blind, and another person who can see, both are placed next to each other and run…"

Another example similar to figure (19) is shown in (26). In this example the signer talks about a motorcycle that crashed with a car. In this example the motorcycle and the car are classifiers and express a locative relationship, but TWO, MAN and DIE do not show a locative relationship, since they are not classifiers. Thus, in GSL, the central and non-central types of simultaneity can be combined within a single utterance.

(26) dh: CL: CAR TWO MAN DIE
    ndh: CL:VEHICLE

“The motorcycle crashed into the tree and the two men (drivers of motorcycle) died”

There are also simultaneous constructions in which one hand holds a classifier while the other hand produces signs that are not classifiers, as shown in figure (20).

*Figure (20): Perseveration in classifier constructions*
“I opened the newspaper and I was shocked, the person in newspaper is the same as me but she was more beautiful than me and I was 30 while she was 40”

In the first picture, the signer produces the same classifiers, in both the dominant and the non-dominant hand. These two classifiers are translates as “I open a newspaper and then I held it open”. In the remaining pictures, the non-dominant hand remains stationary while the dominant hand produces non-classifier signs. It is clear from the above sentence that the non-dominant hand functions as the topic of the sentence, since the other hand produces information that is related to the newspaper.

Another example, presenting a classifier in stationary position on the non-dominant hand while the dominant hand produces other signs, is shown in example (27). In the example below, the signer talks about a woman who was holding a bag
while a thief appeared suddenly. The hold sign functions as background information while the dominant hand signs information that is new.

(27) dh: WOMAN WALK CORNER MAN THIEF

ndh: @holding a bag on her shoulder

“One woman with a bag, was walking when a thief appeared on the corner (of the street)”

Another type of classifier construction that I would like to discuss is B-classifiers. Most of the classifier perseverations occurring in my data involve this type of classifiers. In the following example, the signer was at the airport and he was looking at the flight information table to find his flight. The signer first produces the sign SCHEDULE, a sign for which a B-classifier is part of the citation form. After the production of SCHEDULE, the B-classifier remains in place throughout the utterance. The signer also makes a deictic pronoun which has a B-classifier as its complement. The index sign does not refer to the sign SCHEDULE, but the B-classifier becomes the representation of the flight information table.

(28) dh: SCHEDULE INDEX-1 LOOK INDEX (pointing at the classifier)

mouth: DUBAI

ndh: SCHEDULE (B-classifier)______________________________

dh: INDEX-1 NOT_UNDERSTAND ASK

ndh: SCHEDULE (B-classifier)______________________________

“I looked at the schedule for the flight to DUBAI but I could not understand so I asked”

The B-classifier functions as the topic of the discourse while the dominant hand signs information related to that topic. This classifiers belong to what Miller (1994a,b) calls compound signs in which an obligatory argument in the form of a classifier is incorporated into the citation form. Moreover, Sandler (2006) points out that “a considerable number of words in any sign language lexicon are believed to have originated as classifier constructions and to have become lexicalized” (Sandler 2006:195).

To conclude, most of the perseverations involving classifier constructions in my GSL data carry background or foreground information or present a topic-comment structure. Thus, the function of the hold sign in GSL is similar to what has been
proposed for other signed languages such as QSL and DSL. However, the central and non-central type of simultaneity can be combined within a single utterance in GSL. Engberg-Pedersen (1994) does not mention that the central and non-central type of simultaneity can appear in a single utterance, but more investigation in classifier constructions from other signed languages is needed in order to examine if this is a unique phenomenon to GSL or if applies to other signed languages as well.

5.2.2 Meaningful perseverations in GSL

As I stated above, many perseverations do not serve any semantic function, but they can mark prosodic domains (Nespor & Sandler 1999). However, Liddell distinguishes between perseverations whose function is not significant for the discourse and perseverations which are meaningful with a syntactic or discursive function. In GSL, perseveration may be formed either by a one-handed sign or by one hand of a two-handed sign.

In figure (21) the signer talks about her pregnancy. She first signs PREGNANCY, which is a two-handed sign, and then the non-dominant hand remains stationary in its configuration while the other hand produces other signs. The non-dominant hand functions as the topic of the discourse, since the other hand signs information related to the pregnancy. The two-handed sign PREGNANCY is dropped for a while and later it is produced again.

*Figure 21: Fragment sign in GSL*
Example (29) shows that the one-handed sign PHONE is produced by the dominant hand and then it is held, while the dominant hand signs what is on the message. The sign PHONE carries background information while the active sign produces information that it is new.

dh: MY INSURER ASK COME
ndh: PHONE

“I sent a message to my insurer and I ask him to come”

Apart from carrying background information, meaningful perseveration in GSL may denote two events that happen at the same time. In the example below, the signer talks about his trip in Spain via Belgium. Because he was afraid of loosing his flight, he asked the people at the airport to help him. In this case, the signer signs WATCH with his non-dominant hand while the other hand produces other signs. The signer wants to denote that the people were watching him while he was doing other things as shown in figure (22).

Figure 22: Fragment signs

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dh: INDEX-1 WALK
ndh: WATCH
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An example similar to the example above is presented in (30). In this sentence, the signer talks about two things that happen at the same time.

(30) dh: MY CHILD LEAVE
    ndh: LOOK_AT_______
“I was looking at my child who was leaving”

To sum up, meaningful perseveration in GSL can be one-handed sins or one hand of a two-handed sign. The function of these simultaneous constructions is to carry background and foreground information or to present a topic-comment structure. The same function has been observed by Miller (1994a,b) for QSL. Moreover, in GSL perseverations can also denote two events that happen at the same time.

5.3 Perseverations Summary
This chapter has presented several examples of perseveration in GSL. The examples illustrate that perseveration signs, either meaningful or not, play an important role in the grammar of GSL at the level of prosody and discourse. Regarding the prosody, the spreading of the non-dominant hand can mark a phonological phrase. In the discourse level, the non-dominant hand may represent a classifier construction, where it has morphemic status, i.e. the hold morpheme, and it is phonologically independent from the dominant hand. Classifier constructions can function as carriers of background and foreground information or present a topic-comment structure. On the other hand, meaningful perseverations in GSL can be one-handed or one hand of a two-handed sign and they also background some information that is important for the discourse. Moreover, fragment signs in GSL may show two events or actions that happen at the same time. Note that this function has not been observed in other signed languages.

Examples of full simultaneity, in which both hands moving independently at the same time, do not appear in GSL data. However, it is possible for two distinct signs to be produced simultaneously, each on a different hand, but both hands make the same movement. I have not observed examples in which one hand makes an up-and-down movement while the other hand makes a side-to-side movement. Thus, full simultaneity in GSL is rare and it takes place only when there are two distinct signs which make a symmetrical movement. This is similar to what Crasborn (2006) observes for NGT. In particular, he mentions that full simultaneity is rare but the perseveration of the non-dominant hand is very common. Moreover, in the literature
there is no clear distinction in function between perseveration and full simultaneity. More research in this area is needed in order to examine whether such distinction is necessary.
Chapter 6: Conclusions

Simultaneity seems to be a typical phenomenon of signed languages, since they can use several articulators, e.g. the hands, head, eyes, mouth, body etc., while spoken languages have only one articulator, i.e. the vocal tract. However, simultaneity may occur in spoken languages as well, for example in the simultaneous production of phonological and prosodic segments. Miller (1994) points out that in spoken languages, simultaneity is limited to the sound or word level, i.e. phonology and morphology. In this thesis, I described simultaneous constructions above the word level: prosodic, syntactic and discourse constructions. These kinds of simultaneous constructions are not found in spoken languages. However, simultaneous constructions above the word level could be compared to co-speech gestures that people make while they speak (McNeill 1992; Kendon 2004), which is a fruitful area for further research. Signed languages make use of simultaneous constructions more often than spoken languages do. Modality differences, i.e. articulatory-perceptual vs. manual-visual, are an important factor in that, because modality may have an effect on the language. The manual-visual modality is a more likely candidate for expressing simultaneous constructions in order to express linguistic messages than the articulatory-perceptual modality is.

This thesis has shown several examples of manual simultaneity in GSL. The examples illustrate that manual simultaneity in GSL occurs in various types of constructions, such as pointing signs, numeral signs, classifiers and perseverations. Simultaneous constructions in GSL share many similarities with other signed languages in both form and function, but there are also constructions that have not been observed in other signed languages studied to date.

Most of the simultaneous constructions involving pointing signs found in GSL make use of the POINT-G sign, which has also been observed in NSL and SSL. (Vogt-Svendsen & Bergman 2007a). Instances of POINTER and THEME buoys (Liddell 2003; Liddell et.al. 2007a) have not been observed in my GSL data. However, because of the limited amount of data, a definite answer about the existence of these two kinds of buoys in GSL can not be given. An interesting point found in GSL regarding pointing signs produced by the non-dominant hand is that they can occur with pronouns produced by the dominant hand, and they can be used for emphatic or contrastive reasons. This function has not been observed for other signed
languages, or rather, it has not been well studied. I analyzed these pointing signs as pointing gestures based on a study done by Zwets (2009), who examines the interaction between pointing gestures and personal pronouns, and she observes that pointing gestures occurring simultaneously with personal pronouns may have a more powerful or contrastive reading. However, we need more data from GSL as well as from co-speech gestures in Greek in order to investigate the role of pointing signs on the non-dominant hand and whether there is a parallelism between pointing signs and pointing gestures.

Simultaneous constructions involving numeral signs have been observed in GSL as well. The most common type is what Liddell (2003; Liddell et.al. 2007a) calls list buoys. List buoys in GSL are always produced by the non-dominant hand and they are used for making associations with ONE to FIVE entities. In GSL, the hand configuration found in numeral signs and the one found in list buoys could be the same. This is contradictory to what has been observed in other signed languages, such as ASL, SSL and NSL, in which the form of the numeral signs produced by the dominant hand is different from the one produced by the non-dominant hand (Liddell 2003; Liddell et al. 2007a). However, list buoys are not the only type of simultaneous constructions involving numerals that appear in GSL data. Numeral signs produced by the non-dominant hand can be used to modify a noun or a verb. Because of the limited cross-linguistic data, the distinction in function between list buoys and numeral signs articulated by the weak hand is not well defined. Moreover, there are examples of simultaneous constructions involving numerals in co-speech gestures (Vermeerbergen & Demey 2007a). In particular, Vermeerbergen and Demey (2007a) show that the speakers use list buoys in order to remember a list of items. Thus, there is a parallelism between numeral signs and co-speech gestures, because these constructions are not limited to signed languages. Further experimental investigation in the area of numeral signs and gestures is needed in order to provide a basis for comparison with spoken languages and to help us better understand these constructions.

Perseveration signs, either meaningful or not, play an important role in the grammar of signed languages at the level of prosody and discourse. On the level of prosody, the spreading of the non-dominant hand can mark a phonological phrase. In the discourse level, the non-dominant hand may represent a classifier construction which has a morphemic role and is independent from the dominant hand (Sandler &
Lillo-Martin 2006). This classifier construction can function as carrier of background information while the other hand produces foreground information. Moreover, central and non-central simultaneity, according to the distinction proposed by Engberg-Pedersen (1994), can be combined within a single utterance in GSL. Thus, this distinction does not hold for GSL. On the other hand, meaningful perseverations can be produced by one-handed signs or by one hand of a two-handed sign and they also background some information that is important for the discourse. An interesting construction found in GSL is that the meaningful perseverations may show events or actions that happen at the same time. To my knowledge, this function has not been observed in other signed languages.

Signed languages can make use of two manual articulators, i.e. two hands used simultaneously. However, the form of the two-handed lexical signs in signed languages is subject to phonological constraints: the Dominance Condition and the Symmetry Condition (see Chapter 1 p.4). These rules were first proposed by Battison (1978) for ASL and seem to apply to GSL and to other signed languages as well. The Dominance Condition is relevant for two-handed signs in which only the dominant hand moves and the non-dominant hand functions as a place of articulation. The form of the possible handshapes produced by the non-dominant hand is restricted to a small set, which, for GSL, consists of: B, O, S⁹. The symmetry condition refers to two-handed signs in which the non-dominant hand functions as a copy of the dominant hand.

I propose here that the two conditions mentioned above apply to GSL perseverations signs as well. GSL perseverations appear only on the non-dominant hand and may have different syntactic, prosodic or discursive function. However, perseverations are restricted to phonological criteria. Thus, perseverations only take place when the non-dominant hand remains stationary while the dominant hand articulates other signs. Even though the non-dominant hand does not function as a place of articulation in perseverations, it obeys to the Dominance Condition, which states that “one hand must be passive while the active hand articulates the movement” (Battison 1978 [1973]: 34-35). On the other hand, examples of full simultaneity in which both hands making different movements at the same time, do not occur in GSL.

⁹ Because there is no research in GSL possible handshapes, I am not sure what are the possible handshapes occurring as a place of articulation. Here, I have provided only a small set which is found more often in GSL.
data. However, it is possible for two distinct signs to be produced, each on a different hand, but both hands have to make the same movement. I have not observed examples in which one hand makes an up-and-down movement while the other hand makes a side-to-side movement. Thus, full simultaneity in GSL obeys to the Symmetry Condition which states that the non-dominant hand must be specified for the same movement as the dominant hand (Battison 1978 [1973]:34-35). It is worth mentioning that Battison’s Symmetry Condition requires a restriction on the handshapes and the orientation of two-handed signs. This restriction does not apply to perseveration signs and this is because perseverations are syntactically and morphologically more complex constructions than a simple two-handed lexical sign.

Both rules, the Dominance and Symmetry Condition, are not simply phonological rules, but they are governed by articulatory constraints as well (Crasborn 2006). Further research is needed not only on perseverations signs, but also on other simultaneous constructions in GSL as well as in other signed languages, in order to investigate whether there are phonological rules similar to Battisson’s conditions that shape these constructions.
References


