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Locative Expressions In Signed Languages: A Cross-Linguistic Comparison

Sarah Elizabeth Eberle

LOCATIVE EXPRESSIONS IN SIGNED LANGUAGES
A CROSS-LINGUISTIC COMPARISON

by

Sarah E. Eberle
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This thesis, submitted by Sarah E. Eberle in partial fulfillment of the requirements for the Degree of Master of Arts from the University of North Dakota, has been read by the Faculty Advisory Committee under whom the work has been done and is hereby approved.

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J. Albert Bickford

_____
Regina Blass

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Mary Heather Yazak Fried

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Sarah E. Eberle

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July 19, 2013

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ACKNOWLEDGEMENTS

In loving memory of my Grandmother Elizabeth Mole.

First, I would like to thank The Creator for His creation of language and all its complexities. Second, I would like to thank my parents for their hard work in raising me to be a completionist. Without this discipline, I'm afraid I never would have finished. A special thanks to Beth Brown for getting me started when I didn't know where to begin and for her, along with many other friends and family members, encouraging me along the way. Most importantly, I would like to thank all five of the participants in this study. Those who gave permission to be named are: Estrella Camacho Moreno, Merle Jarv, Emmanuel Esan, and Siripan Resch. Without their willingness to participate in this study, it would not have been a success. Next, I would like to thank the members of my committee for all the time spent patiently coaching me through the many details of writing this thesis and for their encouragement and desire to see me succeed. Lastly, I would like to thank my husband, Dan, for his patience, love and listening ear. Whenever I had a question he was there to be a sounding board. I wouldn't have made it through these years without him.

ABSTRACT

The primary focus of this paper is to examine whether sign languages organize their locative expressions similarly to spoken languages. Paving the way in the study of spatial relations by focusing on the structuring of ON and IN locatives in spoken languages, Bowerman and colleagues (Bowerman 1980; Melissa Bowerman & Eric Pederson 1992a; Bowerman 1993; 1994; 1996a; 1996b; Bowerman & Levinson 2001) found that spoken languages organize the locative phrases representing the relationships of ON and IN in a continuum which is called the ON-IN continuum.

This thesis shows that sign languages do not linguistically pattern similarly to spoken languages along the ON-IN continuum. One reason for this could be the vast difference in modality between signed and spoken languages. Essentially, locative constructions in sign languages contain visual representations which resemble real world spatial relationships, while spoken languages tend to use arbitrary locative constructions which do not resemble real world spatial relationships.

Locative constructions in sign languages are created by combining representations of ground and figure in various ways. Ground and figure can be represented sequentially or simultaneously by classifiers or lexical items or a combination of the two. In the discourse leading up to a locative construction a noun representing ground is generally introduced first followed by a noun representing the figure. Adpositions can also be used in locative phrases but this was the option least chosen in my data.

CHAPTER 1
INTRODUCTION

The academic study of sign languages is relatively young. Only since the mid-20th century have they been widely recognized as comparable to spoken languages, most notably through the work of William Stokoe. In his book, *Sign Language Structure: An Outline of the Visual Communication Systems of the American Deaf*, he examines American Sign Language in depth. One of Stokoe's conclusions was that "the work so far accomplished seems to us to substantiate the claim that the communicative activity of persons using this language is truly linguistic and susceptible of micro-linguistic analysis of the most rigorous kind" (Stokoe Jr. 1960).

The main goal of this thesis is to illustrate Stokoe's claim by comparing the formation of locative constructions in spoken languages with the formation of locative constructions in sign languages. My work is based on that of Melissa Bowerman and her colleagues (Bowerman 1980; Melissa Bowerman & Eric Pederson 1992a; Bowerman 1993; 1994; 1996a; 1996b; Bowerman & Levinson 2001) on spatial relations, conceptual categories and the ON-IN continuum. I conducted my own linguistic analysis of the relevant grammatical and semantic properties of locative expressions in five different signed languages. This analysis is based on data collected using elicitation prompts created by Bowerman-Pederson referred to as the 'Topological Relations' picture series otherwise known as the BowPed picture series.

Both signed and spoken languages express spatial relationships using constructions which I will refer to as locative constructions. Locative expressions, for the purpose of this study, more broadly include the introduction of ground and figure plus the actual locative construction giving information about how ground and figure relate.

> "A general linguistic theory of spatial relations, and specifically of locative expressions, must take all structures that might arise in both modalities into account before it can generalize over the human language faculty" (Özyürek, Witserlood & Perniss 2010:1111).

In the spirit of this statement, I compare both modalities, spoken and signed, with regards to the formation of locative constructions and the ON-IN continuum.

The aim of this thesis is to answer the following questions:

1. What effect does modality (signed vs. spoken) have on the formation of locative constructions?
2. Do sign languages linguistically pattern as spoken languages do along the ON-IN continuum?
3. How do sign languages express spatial relations?
4. Do ground and figure play a similar role in the formation of locatives in signed and spoken languages?

Chapter 2 is a review of literature on similarities and differences between signed and spoken languages, as well as an introduction to terms such as spatial relations, locative expressions, ground versus figure, and conceptual categories.

Chapter 3 presents the methodology used in my research, including discussions about the BowPed picture series, as well as demographics, informed consent, data collection and data analysis.

Chapter 4 addresses the question, "Do sign languages linguistically pattern as spoken languages do along the ON-IN continuum?" I could not identify any linguistic patterning such as occurs in spoken languages within the ON-IN continuum. A reason for this could be the difference in modality between spoken and sign languages. Fundamentally sign languages can iconically and directly represent objects in articulatory space; while spoken languages largely choose arbitrary devices such as adpositions to represent the relationships themselves. Signers do not need an arbitrary[1] lexical item such as an adposition to say where an object is located; instead they take full advantage of the modality and show iconically where an object is located. Locative constructions in sign languages tend to directly represent what is happening in the real world. Because of this, the locative system in sign languages can depict real world relationships. As result I was not able to find similar linguistic patterning to that of spoken languages on the ON-IN continuum.

Chapter 5 focuses on the mechanisms that sign languages use instead of those used in spoken languages. For example, in signed languages a locative construction normally consists of the simultaneous representations of ground and figure, whereas in spoken languages they must be presented sequentially. The choice of figure and ground in sign

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[1] An arbitrary lexical item in this context is a lexical item of which the etimology has no obvious connection to its meaning.

languages is indicated by handedness, with the figure consistently expressed by the dominant hand; obviously spoken languages have no analogous structure.

5.8 covers my conclusions as a result of this research as well further research suggestions.

CHAPTER 2
FOUNDATIONAL RESEARCH

When studying languages it is important to include both spoken and signed languages. In section 2.1 I begin by examining modality, outlining some of the differences in signed and spoken languages as well as similarities. In section 2.2 I discuss two terms that relate to meaning (spatial relations, ground and figure), and in 2.3 I discuss matters related to form (classifier constructions, and representations of ground and figure). Section 2.4 is an introduction to conceptual categories.

2.1 Modality

People can produce language in two modalities. Richard Meier refers to these modalities as the visual-gestural modality and the oral-aural modality. (Meier, Quinto-Pozos & Cormier 2002:2) The study of modality is the study of differences and similarities between signed and spoken languages.

The most obvious modality difference between spoken and signed languages is their use of very different articulators. Spoken languages use various parts of the mouth and tongue for articulating language, while in signed language the hands are the main articulators with the face, mouth, eyes and body also involved. (Meier, Quinto-Pozos & Cormier 2002)

Another key difference between spoken and signed languages is the number of ways in which sign languages can use multiple articulators simultaneously and independently.

Bouchard (1996:114) notes that "The auditory channel has much stronger limitations about linearization, and hence, much less [sic] possibilities of simultaneity, than the visual-gestural channel." At the phonological level many signs are produced using both the strong and weak hands in combination with facial expressions and mouth morphemes. At the phrasal level classifier constructions can express complicated locative constructions in one simultaneous construction. Of course, at higher levels, grammatically, sign languages are produced in a linear fashion much like that of spoken languages, but at lower levels there is considerably more use of simultaneity than in spoken languages.

The study of modality can also help us to see that signed and spoken languages share many characteristics.

> "Sign languages are different in some ways from spoken languages because of the constraints and possibilities afforded by the visual-gestural modality, yet they remain fundamentally similar to spoken languages in many ways. Sign languages, like spoken ones, have syntactic, semantic, morphological, and phonological levels of [structure], and they are used to accomplish the same communicative functions." (Virginia Swisher 1988)

Meier (2002) lists several such characteristics, as given in Example 1.

Example 1 Non-effects of modality: Some shared properties between signed and spoken languages

Conventional Vocabularies:	Learned pairing of form and meaning
Duality of Patterning:	Meaningful units built of meaningless sublexical units, whether units of sound or of gesture. - Slips of the tongue/slips of the hand demonstrate the importance of sublexical units in adult processing
Productivity:	New vocabulary may be added to signed and spoken languages via: Derivational morphology Compounding Borrowing
Syntactic Structure:	Same parts of speech: nouns, verbs, and adjectives Embedding to form relative and complement clauses Trade-off's between word order and verb agreement in how grammatical relations are marked: rich agreement licenses null arguments and freedom in word order.
Acquisition:	Similar timetables for acquisition
Lateralization:	Aphasia data point to crucial role of left hemisphere.

In short, sign language and spoken language studies have shown that both types of languages have many basic similarities, even though they are very different physically because of modality.

2.2 The meaning of locative expressions: spatial relations and ground versus figure

In discussing locative expressions, it is important to make a distinction between MEANING and FORM. Terms that fall under meaning are SPATIAL RELATIONS, GROUND and FIGURE. Terms that fall under form are LOCATIVE CONSTRUCTION and CLASSIFIER CONSTRUCTIONS. Throughout this thesis, I use the term spatial relation to refer to a

semantic category which is concerned with the relative position of two physical objects. The two objects involved in a spatial relation are commonly referred to as ground and figure, although other terms are sometimes used. As stated in Brala's work, Bowerman-Pederson use ground to refer to the "larger, less moveable" object and figure to refer to the "smaller, more moveable" object.

2.3 The form of locative expressions: classifier constructions and representations of ground and figure

For spoken languages a basic locative construction (BLC) could consist of adpositions, nominal predicates, case inflections or locative verbs(Levinson & Wilkins 2006). A BLC is the most prototypical form of a locative construction in a given language. Levinson and Wilkins discuss BLC's and their hierarchy. According to their theory, when describing something where the "Figure is [sic] inanimate, movable entity in contiguity with Ground" a speaker is more likely to use a BLC (Levinson & Wilkins 2006:16). As a person deviates from describing basic spatial relationships to more abstract spatial relationships then the "likelihood of other constructions" increases(Levinson & Wilkins 2006). This is illustrated in Figure 1.

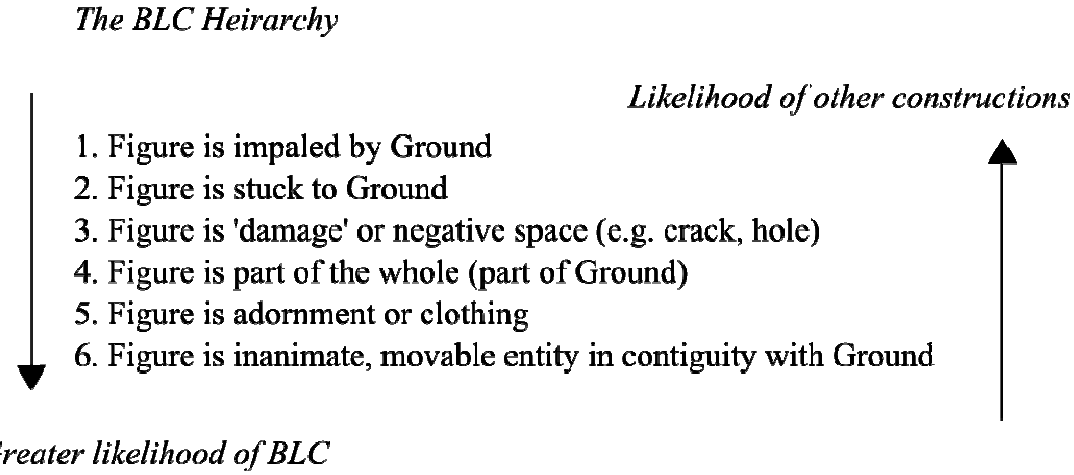


Figure 1 The hierarchy of scenes most likely to be described with basic locative constructions[2]

As shown in Figure 1, number 6 on the hierarchy would have a high likelihood of eliciting a BLC, whereas number 1 would be more likely to elicit a specialized locative construction which deviates from the prototypical BLC.

While extensive research has been done on locative constructions in spoken languages, very little research has been done on locative constructions in signed languages and what research exists is somewhat scattered in coverage. One component of a locative construction in sign language is often a classifier construction. A classifier is a specific handshape that is used to represent some entity or shape, while a classifier construction is one or more classifiers combined with motion to either express motion of one or both entities or to describe the shape of an object.(Valli et al. 2011)

[2] The original title of this figure was modified for clarity of terms. It was previously titled *The hierarchy of scenes most likely to get BLC coding* (Levinson & Wilkins 2006).

Locative expressions in American Sign Language have been shown to be structured first with a noun phrase representing the ground followed by a noun phrase representing the figure and then the classifier construction itself containing classifiers representing the figure and ground expressed simultaneously, with the relative position of the two classifiers in articulatory space expressing the spatial relation. (Valli et al. 2011) Özyürek, Witserlood, and Perniss (2010) illustrate this concept well as in Figure 2.

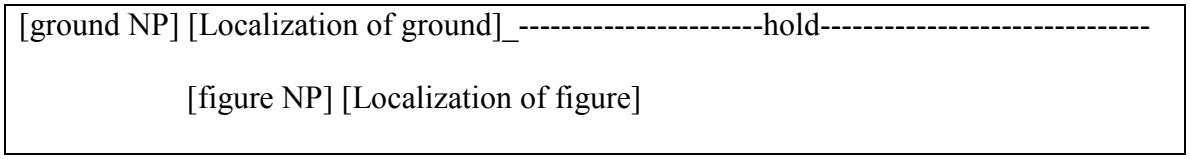


Figure 2 The canonical structure of locative expressions in signed languages

Pamela M. Perniss (2007) conducted a study of German Sign Language (DGS) narratives. She observed that users of GSL use simultaneous classifier constructions to express spatial relationships, and that in general GSL users, as in ASL, precede the classifier construction with nouns in which ground precedes figure.

In classifier constructions the strong hand and weak hand[3] are typically used to represent the figure and ground respectively. Each hand can represent something specific in and of itself.

> "In lexical signs, the non-dominant hand has no
> morphological status, functioning only phonologically,
> either articulating symmetrically with the dominant hand,
> or providing a place of articulation…-in both cases,

[3] Strong hand and weak hand are often referred to in the literature as dominant and non-dominant hand. Their use here is synonymous.

> meaningless. In structures involving classifiers, the dominant and non-dominant hands each have morphological status" (Sandler & Lillo-Martin 2006:78–79).

Researchers have divided up classifier constructions in many different ways. For my purposes I will use three terms when referring to classifiers: entity classifiers, handling classifiers, and size and shape specifiers (SASS). Entity classifiers use a short downward movement to indicate that an object is in a specific location. They can also show motion of the object, typically being used in an intransitive motion verb. (Engberg-Pedersen 1994; Shembri 2003; Sandler & Lillo-Martin 2006) Handling Classifiers use a handshape to show how an object would be handled if it were to be moved, and generally are used to form transitive verbs. (McDonald 1982; Schick 1987; 1990; Sandler & Lillo-Martin 2006) Size and Shape Specifiers use movement to indicate size and shape of a particular object. (Supalla 1982; 1986; Sandler & Lillo-Martin 2006) SASS's were used the least of the three choices to express locative relationships in the responses of the participants in this study.

An exception to the way in which locative constructions are most commonly formed is claimed to be found in Turkish Sign Language (Türk İşaret Dili abbreviated TİD) Özyürek, Witserlood, and Perniss (2010) compared locative constructions in TİD to various locative constructions found in spoken and signed languages. Surprisingly, unlike other signed languages studied up to that point, they found a "lack of simultaneous classifier constructions" in TİD. Instead they found the majority of the time, classifiers were used in a linear fashion rather than simultaneously. Possible reasons they list for this

are threefold: 1. Characteristics of the pictures shown to gather the data could have been considered “unmarked”. 2. Articulation reasons (ex. They were two handed signs). 3.“Intervening (two handed) signs occurred between the classifier predicates for ground and figure.” This finding matches up with the data I discuss in section 5.5.

In summary, locative expressions in signed languages can be formed in various ways. The most common way is a noun representing the ground, a noun representing the figure, and finally a classifier construction that includes a classifier for both figure and ground. As shown later, and as illustrated by TİD, there are variations on this pattern in the data in this study.

2.4 Conceptual categories

Conceptual categories are organizational units in the human mind consisting of related ideas or objects, situations, etc. which are perceived as being similar. Examples include taxonomies, continua, and other organizational schemes. Bowerman along with several colleagues showed that people form conceptual categories in correlation with spatial relationships.(Bowerman 1980; 1989; Melissa Bowerman & Eric Pederson 1992a; Bowerman, de Leo’n & Choi 1995; Bowerman 1996a; 1996b; Bowerman & Levinson 2001)

Bowerman states that:

> “one of the most basic properties of language is that it carves up the world into… *classes* of things that can all be referred to with the same expression , such as *dog*, *pet*, *fall*, *open* and *kindness*. These classes, or categories, are composed of entities that can be treated as alike with

> respect to some equivalence metric" (Bowerman 1996a:393).

Bowerman and her colleagues specifically looked at how children and adults form conceptual categories(Bowerman 1973; 1980; 1994; 1996b; Bowerman & Choi 2003). Their work with respect to the locative relationships of ON and IN has two main foci. The first focus of their study is that languages vary in how they categorize spatial relations related to ON and IN. Bowerman (1996a) discusses spatial relations and how they compare cross-linguistically by going into more detail about how languages vary in their classification of static spatial relations. Bowerman found that while languages have similar spatial relation categories, they have varying boundaries for the use of spatial relation terms (Bowerman 1996a:394). This is shown in Figure 3. Each drawing represents a spatial relation category. The lines around the various drawings represent the boundaries for which each language can use a specific spatial relation term.

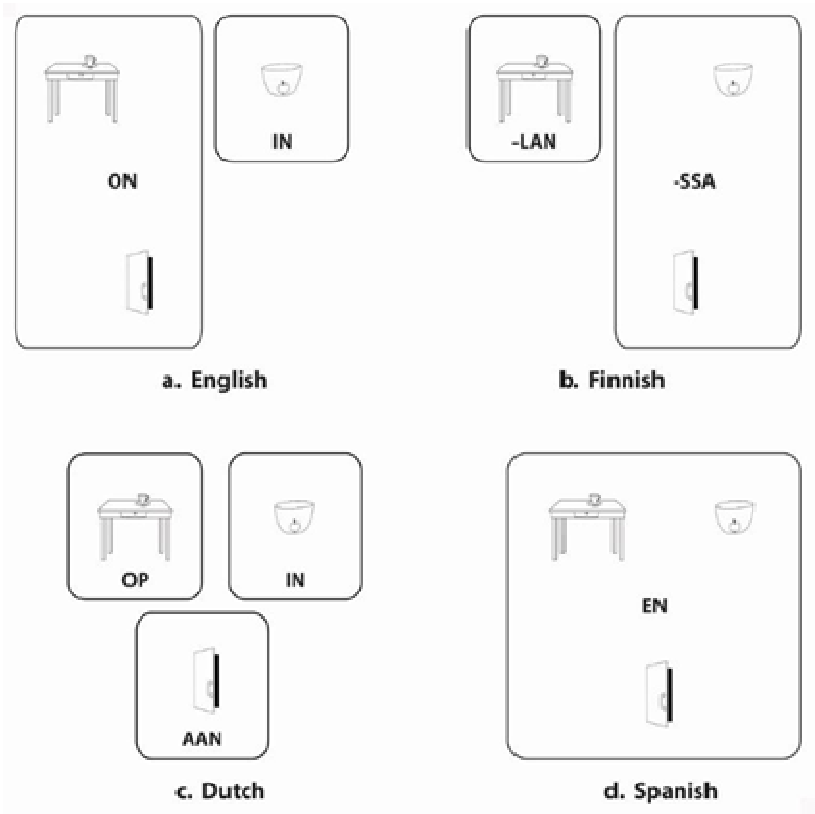


Figure 3 Classification of three static spatial situations in English, Finnish, Dutch, and Spanish

In the case of English we have two terms when discussing the three relationships illustrated in Figure 3a.

1. The cup is ON the table.

2. The handle is ON the door.

3. The apple is IN the bowl.

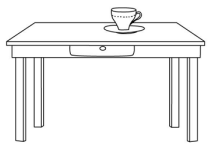
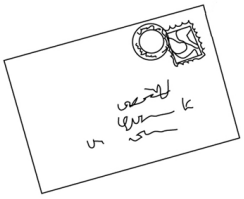
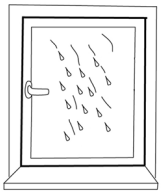
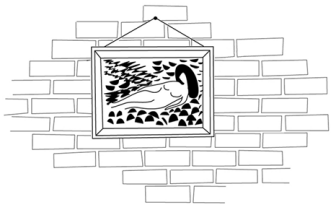
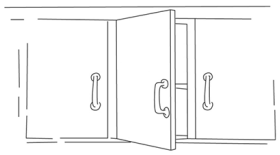
As seen in Figure 3b, Finnish also has two words, but the boundaries for their use differs from English which is shown through the following English free translations.

1. The case ending -lla is used while describing where the cup is in relation to the table (-lla would be translated as “ON”).
2. The case ending –ssa is used while describing where the handle is in relation to the door (-ssa would be translated as “IN”).
3. case ending –ssa is used while describing where the apple is in relation to the bowl (-ssa would be translated as “IN”).

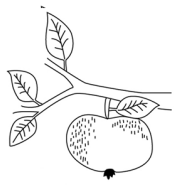
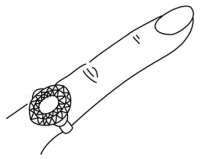
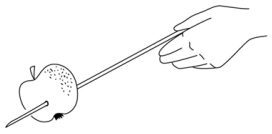
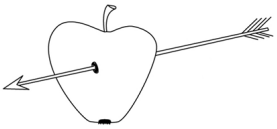
Figure 3c demonstrates that Dutch has a separate word for each of the three relationships, whereas in Figure 3d the boundary line indicates that Spanish has only one word for all three relationships.

As Bowerman -Pederson analyzed their data, they noticed that because of the varying boundaries there appeared to be eleven different “spatial meaning categories”. These eleven categories are listed in full by (Brala 2002:135) and in part by (Bowerman & Levinson 2001). In Example 2, the left column contains the eleven “spatial meaning categories”. The middle column includes what Bowerman-Pederson used as examples of these eleven categories in their research. Each one of these examples has a picture which was used at various times as a stimulus in gathering their data. These stimuli are shown in the column to the right.

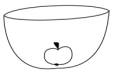
Example 2 The ON-IN scale of spatial meaning categories

Conceptual Category	**Ex. Slide name**	**Slide**
Support from below	Cup on table	
Marks on a surface	Writing on paper	
Clingy attachment	Raindrops on a window	
Hanging over/against	Picture on a wall	
Fixed attachment	Handle on a cupboard	

Example 2 Continued

Conceptual Category	**Ex. Slide name**	**Slide**
Point-to-point attachment	Apple on a twig	
Encircle with contact	Ring on a finger	
Impaled/ spitted on	Apple on a stick	
Pierces through	Arrow in/through apple	
Partial Inclusion	Cigarette in mouth	

Example 2 Continued

Conceptual Category	**Ex. Slide name**	**Slide**
Inclusion	Apple in bowl	

The second focus of Bowerman and her colleague's work was the discovery of a continuum, which is shown in Table 2 from top to bottom. They refer to this as the ON-IN continuum. In a later description of what occurs along this continuum, Gentner and Bowerman say that, "languages vary in the number of distinctions they make along this continuum and in where one spatial word leaves off and the next begins, but if a word is used for more than one segment of the continuum, it covers adjacent segments". (Gentner & Bowerman 2009:470) As can be seen in Example 2, the middle column, English can use two prepositions to describe all eleven categories. The first eight categories are expressed with the word 'ON'. For categories nine through eleven the word 'IN' is used. A small sampling of languages and their use of spatial relation terms relating to ON and IN can be seen in Figure 4.

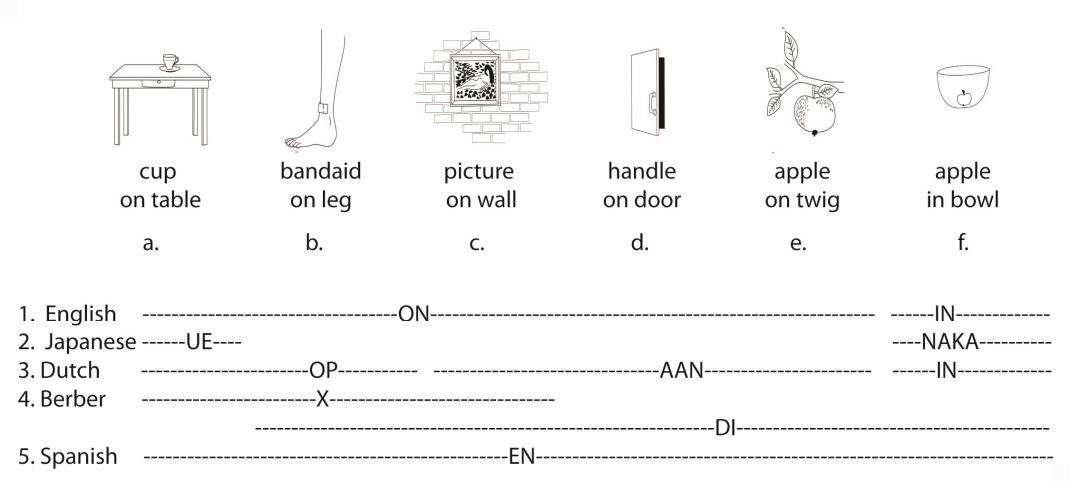


Figure 4 Samples from continuum of support and containment situations as lexicalized crosslinguistically (Melissa Bowerman & Eric Pederson 1992a) with support from below on the left and containment or incorporation into another object on the right. (Gentner & Bowerman 2009:469)

Gentner and Bowerman claim that no matter how the boundaries are drawn for various languages, these categories will always be adjacent to each other and not split up.

2.5 Other work by Bowerman and colleagues

Bowerman and her colleagues developed methods to test the broad question of whether conceptual categories are innate or acquired. All of these methods used a set of 71 slides that they developed which depict a variety of static spatial relationships. The following three paragraphs summarize their research.

In a conference presentation on a study of spatial relations from thirty three different languages Bowerman-Pederson compared the use of spatial relation terms cross-linguistically (1992a). Several works have been published on spatial relations since that time. In Bowerman (1996b) she examines whether "non- linguistic spatial perception" is innate or whether it is shaped by language. To study this Bowerman compared several languages including English, Dutch, Finnish, Mixtec, Tzeltal and Korean, focusing on young children from these languages and their use of locative phrases. Even though there

is much to support innate categorization of spatial relations, Bowerman argues "that children's semantic categories for spatial terms may be already profoundly language-specific even before the age of two" (Bowerman 1996b:146).

Other work on spatial relations has come about as a result of this study as well. Bowerman & Choi (2003) present views on the subject of whether spatial categories are innate or formed by language. Previously, they argued that "there is robust evidence for the influence of both nonlinguistic spatial conceptualization and the semantic categories of the input language on spatial semantic development." (Bowerman & Choi 2003) That is, they advance the hypothesis that the development of conceptual categories is both innate and acquired. At the end of the same article they conclude "Nonlinguistic perceptual and conceptual predispositions for space do not, then, shape children's semantic categories directly, but only in interaction with the semantic structure of the language being acquired" (Bowerman & Choi 2003).

In studying spatial relations through examining locative constructions in signed languages I show that sign languages, in contrast to spoken languages, are much more precise in the expression of locative relationships, causing them to have a larger variety of locative expressions which are directly related to the real world relationships themselves, instead of abstract categories.

CHAPTER 3
METHODOLOGY

In this study, I gathered information regarding spatial relations and locative phrases in five signed languages, using the BowPed picture series discussed in section 3.1. The process of gathering data (informed consent, actual data collection, and the demographics of the participants) is explained in section 3.2. The data analysis process, including how the data was grouped in empirical categories, is explained in section 3.3.

3.1 The BowPed picture series

In order to systematically gather samples of spatial relations in these five languages, I used the BowPed picture series developed by Melissa Bowerman and Eric Pederson (1992b).

This series contains seventy-one pictures depicting various objects in relation to other objects. It was originally created to study what conceptual categories children have as they progress in learning their language, the order in which children acquire spatial relations, and how the acquiring of spatial relations compares cross-linguistically. Eric Pederson and several of his colleagues broadened the scope of the spatial relation study to include adults (Nuyts & Pederson 1997; Danziger & Pederson 1998; Pederson et al. 1998; Pederson 2006).

The original series of pictures, such as the example in Figure 5, includes arrows pointing to various objects in each picture. (See Appendix A for the complete series.)

I modified the original series by taking all the arrows out of the pictures, as shown in Figure 6. I did this because I suspected that the presence of the arrow in the picture might somehow elicit unnatural data. To control for this possibility, I used both series, with arrows and without arrows, so I could determine whether the participants changed their signing because of the presence of an arrow in the picture and if so, how.

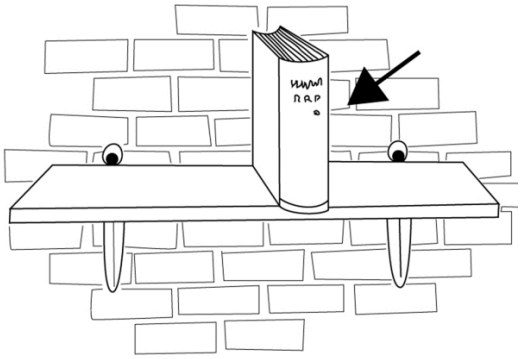


Figure 5: Original BowPed picture series

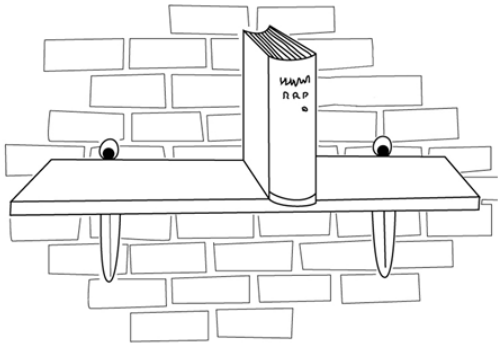


Figure 6: Modified Version of BowPed picture series (without arrows)

3.2 Data gathering process

In the following sections I explain the process of gathering my data: the demographics of the participants, informed consent, actual data collection, and the data analysis process.

3.2.1 Demographics

I gathered all of the data in Spain at a conference for deaf people, therefore the choice of languages for the study was determined by the languages represented at the conference. The participants were from the following countries: Austria, Estonia, Nigeria, Spain, and Thailand. Descriptions of the participants are listed in Figure 7. Two men and three women participated in the study, all of them between the ages of 32 and 45. The

men identified themselves as hard of hearing (HH) and the women identified themselves as deaf. The primary language of each participant was a signed language. The age at which each participant started to use sign language varied greatly, from age 7 to 36. Two of the participants began signing as adults. Only two participants said they had deaf family members. Four of the five participants were right hand dominant.

	M/F	Age	Deaf/HH	Deaf Family	City/Country of birth	Age began signing	Dominant Hand
Austria	M	43	HH	No	Vienna, Austria	20	R
Estonia	F	40	Deaf	No	Estonia	36	L
Nigeria	M	32	HH	No	Nigeria	7	R
Spain	F	33	Deaf	Yes	Barcelona, Spain	8	R
Thailand	F	45	Deaf	Yes	Bangkok, Thialand	9	R

Figure 7 Participant Demographics

3.2.2 Informed consent

The purpose of the study was explained to each participant in American Sign Language. If ASL could not be understood by a participant, a person who knew both ASL and their native sign language explained the directions. Each participant was given the option of not participating in the study or stopping participation at any time during the data gathering. Consent was documented both on video and with a written consent form.

3.2.3 Data collection

In this study each participant was shown the two versions of the BowPed picture series. First, the participants were asked to describe the modified version of the BowPed picture series without arrows (as in Figure 6), in as much detail as possible. Once the participants had completed describing each of the 71 pictures, they were asked to repeat the same procedure with the original BowPed pictures including arrows (as in Figure 5). For this version, the participants were asked to describe where the object was, indicated by the arrow, in relation to the other objects in each picture. It took approximately 45

minutes per participant to describe both sets of pictures. All data was collected using a video recorder.

Bowerman-Pederson asked their participants questions during the process such as, “Where is the shoe?” expecting to get an answer similar to ”The shoe is on the woman’s foot”, containing the desired locative expression. I used a different approach with the goal of gathering natural data. When face-to-face interactions occur between two signers some negotiation of meaning can occur, and this can result in unnatural data, particularly when the investigator is hearing. It is commonly known that when deaf people interact in situations where there is a wide variety of sign language skill levels deaf people change the way they sign to accommodate people with lower skill levels. Because of this, I wanted to have as little interaction with the participants as possible. I asked each participant at the beginning of the session to describe each picture in as much detail as possible. I tried not to interrupt the participants during the data collection process. During data collection, because I didn’t ask specific questions, sometimes the participants did not sign a locative expression but rather just indicated what items were in the pictures without indicating their locative relationships. Despite these occasional gaps, enough examples were gathered from each language to lead to fruitful analysis, so this was a small loss in light of the need to get natural data.

3.3 Data analysis process

It is well established that sign languages have five basic contrastive parameters. “ASL signs have five basic parts—handshape, movement, location, orientation, and nonmanual signals (facial expression)” (Valli et al. 2011:19).

I coded for components of movement, location and orientation. (Handshape was not coded because I wasn't looking for phonetic production but rather the relationship shown between the figure and the ground. Facial expressions and other non-manual markers are generally used for grammatical purposes such as intonation and agreement. Since I was not looking at any of these features I did not include facial expression in the coding.)

In analyzing the data, I coded for several different formal factors that varied from one example to another. First, I examined the use of ground and figure for patterns in each signed language. I was looking to see, for example, whether figure or ground was typically expressed first in the discourse preceding the simultaneous locative construction or not. In order to distinguish between ground and figure I looked at the results from the original set of BowPed slides which included arrows. The arrows were meant to indicate which object was the figure. To determine which sign the participant meant as figure I looked for which object was represented by the strong hand. The item represented by the strong hand in the locative expression was thus assumed to be the figure. Likewise the figure represented by the weak hand was assumed to be the ground. Based on this assumption, I examined all the examples in each sign language to look for patterns in that language, then compared examples across all five sign languages to look for cross-linguistic similarities and differences.

Second, I examined how the figure and ground were expressed. Every response was coded according to 7 factors, described in the following sections.

3.3.1 Lexical signs vs. classifier constructions

The majority of the time classifier constructions were used, but not always. With regard to the use of classifier constructions, I noted four different patterns.

- Use of two separate lexical signs placing them in space relative to each other without the use of classifiers.
- Use of only classifier constructions to show the relationship between objects.
- Use of one or more lexical items first and then a classifier construction to show the relationship between objects.
- Use of lexical items with an adposition to show the location of an object in relation to another object.

I then summarized this factor by coding each locative construction as being "lexical" or "non-lexical"; patterns a and d were considered "lexical", and the classifier constructions of b and c were considered "non-lexical".

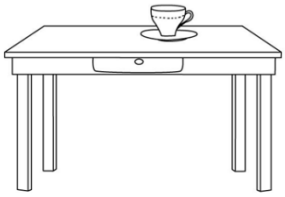
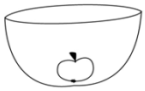
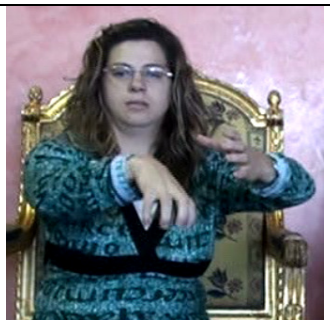
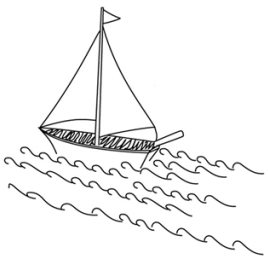
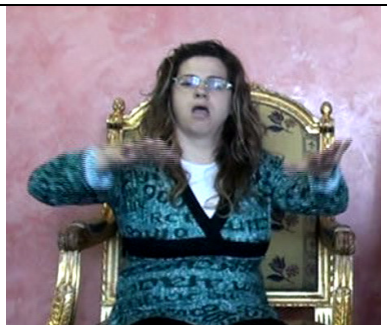
3.3.2 What represents the ground

For each locative construction I observed what articulator(s) the participants used to represent the ground. Five different options were represented in this body of data.

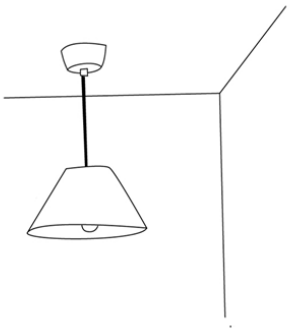
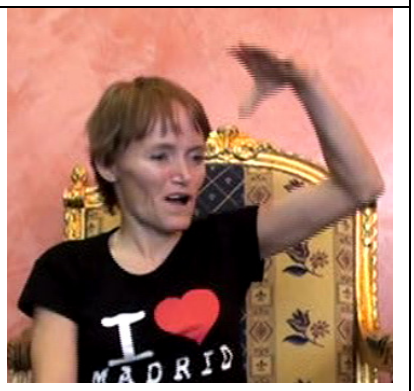
- The ground could be represented by the weak hand as a fragment buoy (GWB). (A fragment buoy occurs when a noun is signed and the signer leaves one hand in place in order to refer to it later in comparison with the other hand) (Liddell 2003, 248).
- The ground could be represented by the weak hand as a classifier that was not a fragment buoy (GWC).
- The ground could be some part of the signer's body representing itself (or the analogous part of a body in the picture) (GB).
- The ground could be a two-handed sign including two-handed classifiers (G2H) or

- The ground could be not signed at all but rather implied (G0).

Example 3 What represents ground

What represents ground	Slide	Example
Weak hand is classifier (GWC) (Nigeria)		
Weak hand is a fragment buoy (GWB) (Spain)		
Ground is the signer's body (GB) (Austria)		
Ground is a two handed sign (G2H) (Spain)		

Example 3 Continued

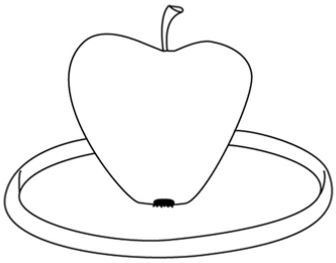
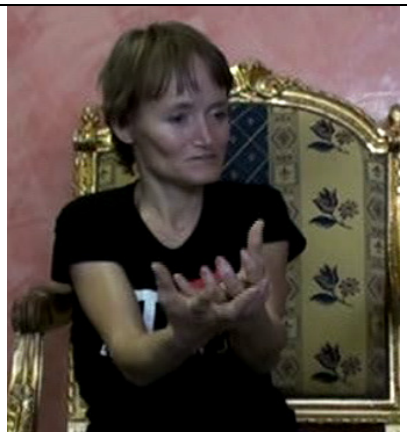
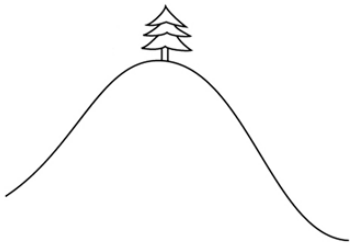
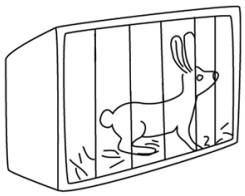
What represents ground	**Slide**	**Example**
Ground is not signed (G0) (Estonia)		

3.3.3 What represents the figure

For each locative construction I observed what the participants used to represent the figure. Four different options were represented in this body of data.

- The figure could be represented by the strong hand alone (F1SH).
- The figure's location could be indicated by an INDEX handshape, i.e. pointing at the location (FLI).
- The figure might be represented by the signer's body as a whole (FB).
- The figure could be signed with both hands (F2H).

Example 4 What represents figure

What represents figure	Slide	Example
Figure is one handed (F1SH) (Estonia)		
Figure location indicated by index finger (FLI) (Austria)		
Figure is the signer's body (FB) (Nigeria)		

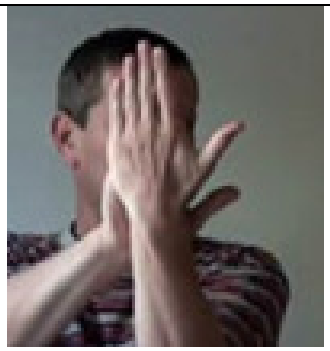
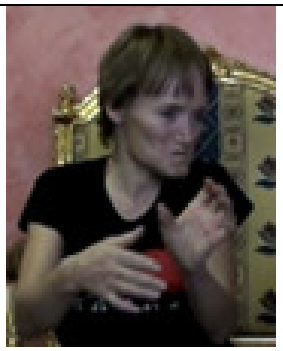
Example 4 Continued

What represents figure	**Slide**	**Example**
Figure is two handed (F2H) (Spain)		

3.3.4 Contact

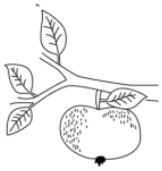
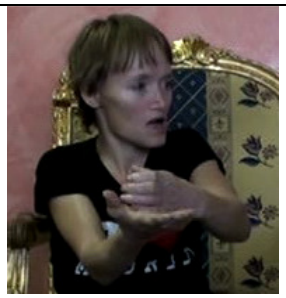
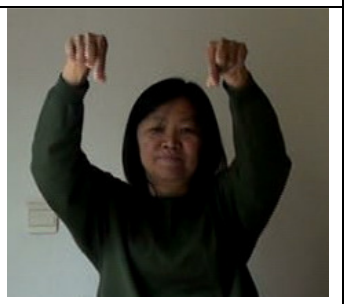
I determined whether the articulators were in contact with each other. I analyzed each locative construction to see if the hands representing the figure was or was not touching the articulator that represented the ground, which could be either the opposite hand or some other part the body.

Example 5 Contact versus no contact

	Contact	**No Contact**
Slide		
(Austria; Estonia)		

I analyzed each of the locative constructions for the relative placement of the two hands. The options represented in the data are: strong hand above weak hand, strong hand under weak hand, strong hand in front of weak hand (farther from the body), strong hand behind weak hand (closer to the body), strong hand next to weak hand, or only the strong hand was used.

Example 6 Relationship of strong hand to weak hand

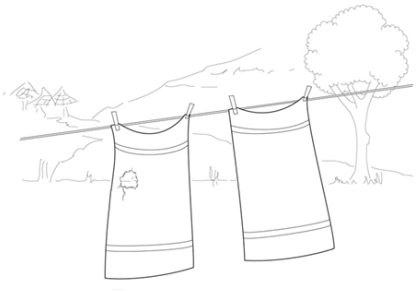
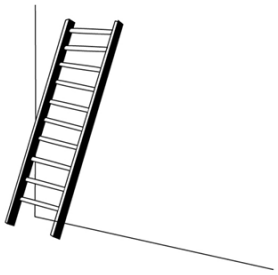
	Strong hand above weak hand (SAW)	**Strong hand under weak hand (SUW)**	**Strong hand next to weak hand (SNW)**
Slide			
(Estonia; Nigeria; Thailand)			

3.3.5 Movement

Movement leading up to or within classifier constructions often involves phonetic movement of the hands, but this does not necessarily represent actual movement (i.e. in terms of meaning). Indeed, since the pictures presented to the subjects represented static locative situations, actual movement in general was not part of the meaning of the constructions produced. I therefore classified the movement in the locative construction as one of four types of movement: resultant state (MR), potential movement (MP), tracing movement (MT), or short movement (MS).

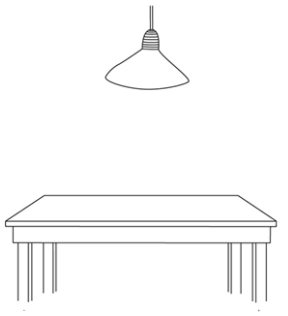
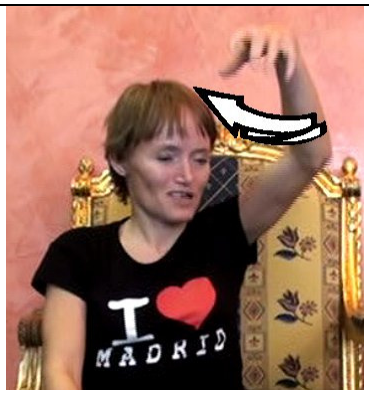
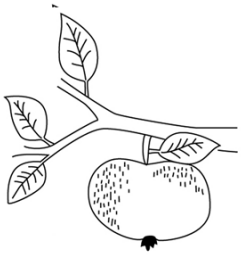
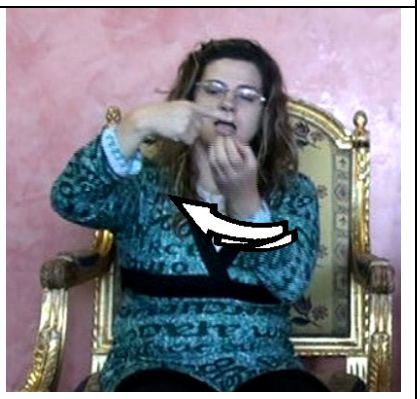
Resultant state movement is used to show how an object got to its location. Movement occurs within a sign showing how an object got into the position it is currently, whether it was put there or is being held there by gravity or some other force. Potential examples of signs with resultant state movement are: clothespins on a clothesline or a ladder against a wall.

Example 7 Resultant Movement

Resultant Movement (MR) (Estonia)		
Resultant Movement (MR) (Spain)		

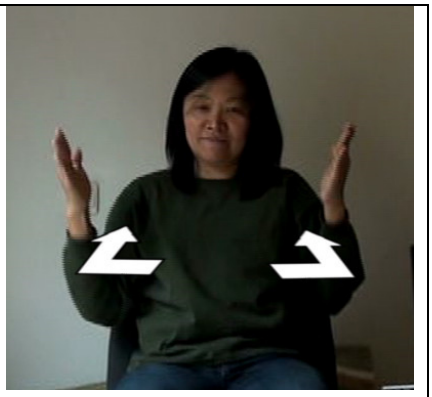
An example of a sign that would describe potential movement is a light, or an apple hanging from a tree. For these two examples a signer will sometimes include a side to side movement in the sign when the item isn't actually moving. The movement does not mean that the light or the apple are actually swaying, but that they are suspended in such a way that such swaying is possible.

Example 8 Potential Movement (Estonia, Spain)

Potential Movement (MP) (Estonia)		
Potential Movement (MP) (Spain)		

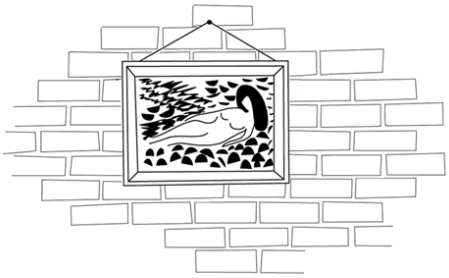
A tracing movement is typically used in a size and shape specifier. For instance when describing a fence around a house, the participants all did a tracing motion to show the size and shape of the fence.

Example 9 Tracing Movement

Tracing Movement (MT) (Thailand)		

A short motion with an abrupt stop, often downward, is typically used in sign languages as the default motion in a classifier construction that expresses a static locative relationship. For instance when describing a picture on a wall, some of the participants used a short motion to mean the picture is on the wall “there”.

Example 10 Short Movement

Short Movement (MS) (Austria)		

There is a fine line between MR and MS. It was not always clear as to which to use. I tended to use MR when there was a little bit longer movement involved and MS when a short downward movement was clear.

3.3.6 No locative produced/Incorrect locative produced

Sometimes a slide was shown to a participant and they did not sign a locative expression or they signed an unexpected locative expression. This occurred, for example, for the slide showing raindrops on a window, which Bowerman-Pederson intended to represent ‘clingy attachment’.

Example 11 No locative/ Incorrect locative produced

Slide # 49 window-rain	

None of the participants signed a locative indicating "clingy attachment" for this picture description. Instead they gave statements which did not include location, as in Example 12, or gave statements which included the location not intended by the picture, as in Example 13.

Example 12 (Free Translation) There is a window. It is raining.

Two participants indicated a location that was not intended by Bowerman-Pederson.

Example 13 (Free Translation) It is raining outside the window.

The statements which did not contain a location had no locative to analyze and therefore were not included in the coding. The statements which included an adposition are covered in the adposition description in section 5.4.

Based on this coding system, I grouped examples into empirical categories, so that each category represented one of the logical combinations of the factors I coded for. I then compared these empirical categories with the categories that Bowerman-Pederson posited in their ON-IN continuum to see if there was any correlation, i.e., to see if the ON-IN continuum had any applicability to sign languages. The results of this comparison are given in chapter 4.

Besides the careful coding of the data described above, I examined all of the data and made a list of qualitative observations about how signers form locative constructions. These observations form the basis of the analysis given in chapter 5.

3.4 Limitations

Five sign languages were sampled for the data analysis: Catalan Sign Language (csc), Estonian Sign Language (eso), Nigerian Sign Language (nsi), Thai Sign Language (tsq), and Austrian Sign Language (asq). All five of these sign languages have been influenced strongly by some European national sign languages, meaning that the conclusions from this study are limited to this set of languages. In order to draw conclusions that the results from this data is the same in all sign languages one would, at a minimum, need to sample and test South and East Asian sign languages, as well as village sign languages.

Within the original BowPed picture series, most of the relationships shown had to do with the ON-IN continuum, and other locative relationships were under-represented. If a study were to include a broader range of data, i.e. better representation of more types of spatial relationships, perhaps additional discoveries about locative constructions in sign languages could be made.

As noted in section 3.3.6 sometimes the participants gave answers that were unexpected which may have been as a result of my elicitation method. Although this could have been avoided by asking direct questions about where an object was located in any given picture, I feel that the benefits of letting the participants describe each picture as desired outweighed the minimal restriction of data.

CHAPTER 4
THE ON-IN CONTINUUM

4.1 Spatial relations and the ON-IN continuum

Spatial relationships are an example of an external, measurable, physical reality, which can be expressed in all languages, but languages express them using different structures. Spoken languages have categories represented by spatial relationships which are grouped, meaning that several different relationships represented by the BowPed slides can be expressed linguistically the same way, such as EN in Spanish and ON/IN in English.

> "All languages make categorical distinctions among spatial configurations for the purpose of referring to them with relatively few expressions, such as the prepositions of English. However, they do not all do so in the same way; that is, what "counts" as an instance of a particular spatial relationship varies from one language to another" (Gumperz 149–150).

According to the various studies of Bowerman and colleagues, these categories exist in a continuum called the ON-IN continuum. One goal of this study is to see if sign languages linguistically pattern as spoken languages do along the ON-IN continuum.

4.2 The lack of linguistic patterning along the ON-IN continuum in sign languages: Evidence

When analyzing the data, I found no evidence that sign languages linguistically pattern as spoken languages do along the ON-IN continuum. According to the parameters described in Chapter 2, I coded the participants' responses and then grouped them into responses that were coded exactly the same. This coding, in effect, identified empirical categories that were used in each sign language, categories that were defined by the clusters of parameters for which I was coding. Since this multi-parameter analysis was extremely detailed, it is possible that the ON-IN continuum (if it were present) would be missed because of all the detailed requirements to fit into one category. Therefore, I also broadened the search to look at sets of responses defined by only a single parameter at a time to see if the ON-IN continuum was evident in these broader empirical categories.

In both ways of grouping the data, slides from several different Bowerman-Pederson categories were grouped together and expressed with the same sign language structures. The slides in each empirical category, however, were drawn from all over the continuum. There was no significant correlation between the structures used in sign languages for producing locative constructions and the linguistic patterning shown by spoken languages along the ON-IN continuum. This section presents this analysis in more detail.

If signed languages were to fall on the ON-IN continuum, then the items that each language grouped together as empirical categories would be ones that are adjacent along the ON-IN continuum. In order to demonstrate this, I have created a hypothetical chart of what sign language data might look like if it were to linguistically pattern along the ON-IN continuum as spoken languages do. The conceptual categories from the ON-IN

continuum are listed down the left side of Table 1, and the (hypothetical) empirical categories are listed across the top. Category 21 is used to represent how a sign language might linguistically express the first three ON-IN conceptual categories. Note how the linguistic constructions are adjacent along the continuum; Categories 3, 17, and 43 follow a similar pattern. Also, there is no overlapping of categories; each ON-IN category is expressed by one and only one linguistic construction.

Table 1 Hypothetical chart of sign language linguistic data along the ON-IN continuum

Bowerman & Pederson 11 Categories	Cat 3	Cat 17	Cat 21	Cat 43
Support from Below			x	
Marks on a Surface			x	
Clingy Attachment			x	
Hanging Over/Against		x		
Fixed Attachment				
Point-to-Point Attachement	x			
Encircle with Contact	x			
Impaled/spitted on				
Pierces Through				
Partial Inclusion				x
Inclusion				x

In the actual data collected, nothing like this occurs. Table 2 shows four multi-parameter conceptual categories that the participant from Spain signed.

Table 2 Catalan Sign Language multi-parameter linguistic patterning categories

Bowerman & Pederson 11 Categories	Cat 2	Cat 17	Cat 23	Cat 26
Support from Below	x			xxx
Marks on a Surface				
Clingy Attachment		x		xx
Hanging Over/Against		x	x	
Fixed Attachment		x		
Point-to-Point Attachement			x	
Encircle with Contact				
Impaled/spitted on				
Pierces Through				x
Partial Inclusion	x			x
Inclusion	xx	x	x	

The locative expressions that correlate with the conceptual categories of the ON-IN continuum are discontinuous, with considerable overlap among them. For example, in Category 2, each locative expression had six characteristics in common.

- They each contained entity classifiers.
- There was no contact between figure and ground.
- The ground was represented by the weak hand as a fragment buoy.
- The figure was represented by one strong hand.
- The strong hand was next to the weak hand.
- A short motion was involved in the production of the locative expression.

As can be seen from Table 2, this category was used to express several ON-IN conceptual categories(Support from Below, Partial Inclusion, and Inclusion). These categories are at the opposite ends of the ON-IN continuum. Category 23 was used to express some of the same conceptual categories as other empirical categories, or for conceptual categories that come in between those expressed by other empirical categories. These results vary from how locative expressions in spoken languages express the conceptual categories of

the ON-IN continuum. Other columns in Table 2 show this same pattern—overlapping and interspersing with other columns—as did all the other empirical categories I identified. There is no relationship between the empirical categories and the way spoken languages linguistically pattern the ON-IN continuum. This sample of Catalan Sign Language does not show evidence of following the ON-IN continuum.

Estonian Sign Language exhibits the same type of evidence as Catalan Sign language. As can be seen in Table 3, Category 22 includes descriptions of two Bowerman-Pederson categories that are from opposite ends of the continuum.

Table 3 Estonian Sign Language multi-parameter linguistic patterning categories

Bowerman & Pederson 11 Categories	Cat 22	Cat 23	Cat 26	Cat 34
Support from Below	x		x	
Marks on a Surface				
Clingy Attachment			xx	x
Hanging Over/Against			x	
Fixed Attachment				
Point-to-Point Attachement		x		x
Encircle with Contact			x	
Impaled/spitted on				
Pierces Through				
Partial Inclusion			xx	
Inclusion	x	x		

Categories 23, 26, and 34 all include descriptions of Bowerman-Pederson categories that either overlap or aren't adjacent with those of category 22, which supports the idea that Estonian Sign Language doesn't pattern similarly to that of spoken languages along the ON-IN continuum.

In the sample from Nigerian Sign Language I found several cases of overlapping meaning—what Bowerman-Pederson would categorize as the same, the participant from Nigeria described differently. You can see this by looking at the Support from Below, Clingy Attachment and Point-to-Point Attachment Categories in Table 4. Nigeria signed

two or three slides from each of these Bowerman-Pederson categories differently, placing them in different empirical categories from each other. The empirical categories derived from the data have no significant relationship to the categories Bowerman-Pederson found relevant for spoken languages.

Table 4 Nigerian Sign Language multi-parameter linguistic patterning categories

Bowerman & Pederson 11 Categories	Cat 23	Cat 26	Cat 34	Cat 46
Support from Below		x	x	
Marks on a Surface				
Clingy Attachment		x	x	x
Hanging Over/Against			x	
Fixed Attachment				
Point-to-Point Attachement	x		x	x
Encircle with Contact				
Impaled/spitted on		x		
Pierces Through				
Partial Inclusion		x		
Inclusion	x			

As is seen in Table 5, the empirical categories for Thai Sign Language 15, 17, 26, and 51 are also discontinuous and have no similarity to how spoken languages linguistically pattern on the ON-IN continuum.

Table 5 Thai Sign Language multi-parameter linguistic patterning categories

Bowerman & Pederson 11 Categories	Cat 15	Cat 17	Cat 26	Cat 51
Support from Below				x
Marks on a Surface				
Clingy Attachment			x	x
Hanging Over/Against			x	x
Fixed Attachment				
Point-to-Point Attachement		xx		x
Encircle with Contact	x	x		
Impaled/spitted on			x	
Pierces Through				
Partial Inclusion			x	
Inclusion	x			x

The last example comes from Austrian Sign Language. As can be seen from Table 6 the results look very similar to the data collected from all four other sign languages and show no relation to that of how spoken languages linguistically pattern along the ON-IN continuum.

Table 6 Austrian Sign Language multi-parameter linguistic patterning categories

Bowerman & Pederson 11 Categories	Cat 15	Cat 26	Cat 34	Cat 51
Support from Below		xx	x	
Marks on a Surface				
Clingy Attachment		x	x	xx
Hanging Over/Against			x	x
Fixed Attachment				
Point-to-Point Attachement		xx		
Encircle with Contact	x			
Impaled/spitted on			x	
Pierces Through				
Partial Inclusion			xxx	
Inclusion	x			

In addition to examining multi-parameter empirical categories in comparison to the Bowerman-Pederson categories, I also examined empirical categories that were defined by a single parameter to see if linguistic patterning along the ON-IN continuum was evident on a broader level. These broader categories included an examination of contact with ground, and the relationship of the strong hand to the weak hand. Table 7 is a hypothetical chart of how the single-parameter might look if sign languages linguistically patterned similarly to that of spoken languages along the ON-IN continuum. To the far left of Table 7 are Bowerman-Pederson categories with their corresponding numbers, one through eleven. The second column contains the name of each slide that was described. The following ten columns list each country and the possible results for each particular category, in this case contact versus no contact.

Table 7 Hypothetical chart of sign language single-parameter following the ON-IN continuum

BowPed Cat.		Slide name	Spain-Contact	Spain-No Contact	Estonia-Contact	Estonia-No Contact	Nigeria-Contact	Nigeria-No Contact	Thialand-Contact	Thailand-No Contact	Austria-Contact	Austria-No Contact
Support from Below	1	table-cup	X		X		X		X		X	
	1	man-hat	X		X		X		X		X	
	1	wall-shelf-book	X		X		X		X		X	
	1	water-boat	X		X		X		X		X	
	1	mountain-tree side	X		X		X		X		X	
	1	tree-hose-on	X		X		X		X		X	
	1	table-table cloth	X		X		X		X		X	
	1	house-man	X		X		X		X		X	
	1	cat-rug	X		X		X		X		X	
	1	tree-hose on ground	X		X		X		X		X	
	1	desk-drawers-pencil	X		X		X		X		X	
	1	mountain-tree top	X		X		X		X		X	
Marks on a Surface	2	stamp-woman	X		X		X		X			X
	2	boy-UCLA shirt	X		X		X		X			X
Clingy attachment	3	letter-stamp	X			X	X		X			X
	3	ceiling-light-spider	X			X	X		X			X
	3	knife-dirt	X			X	X		X			X

Table 7 Continued

BowPed Cat.		Slide name	Spain-Contact	Spain-No Contact	Estonia-Contact	Estonia-No Contact	Nigeria-Contact	Nigeria-No Contact	Thialand-Contact	Thailand-No Contact	Austria-Contact	Austria-No Contact
	3	ankle-bandaid	X			X	X		X			X
	3	window-rain	X			X	X		X			X
	3	wall-3 insects-light	X			X	X		X			X
Hanging over/Against	4	hooks-coat	X			X	X			X		X
	4	wall-picture	X			X	X			X		X
Fixed Attachment	5	wall-phone	X			X	X			X		X
	5	cupboard-3 doors	X			X	X			X		X
Point-to-Point Attachment	6	stick-balloon		X		X	X			X		X
	6	branch-fruit		X		X	X			X		X
	6	tree-clothesline		X		X	X			X		X
	6	clothesline-3 clothes		X		X	X			X		X
	6	branch-leaves		X		X	X			X		X
	6	tree-fruit		X		X	X			X		X
	6	house-flag		X		X	X			X		X
	6	necklace-pendant		X		X	X			X		X

Table 7 Continued

BowPed Cat.	Slide name	Spain-Contact	Spain-No Contact	Estonia-Contact	Estonia-No Contact	Nigeria-Contact	Nigeria-No Contact	Thialand-Contact	Thailand-No Contact	Austria-Contact	Austria-No Contact
6	room-ceiling lamp		X		X	X			X		X
6	purse-box 2		X		X	X			X		X
6	ear-earing		X		X	X			X		X
Encircle with Contact 7	candle-bow		X		X	X			X		X
7	finger-ring		X		X	X			X		X
7	shoe-foot		X		X	X			X		X
7	woman-dress-belt		X		X	X			X		X
7	man-bandana		X		X	X			X		X
7	woman-necklace		X		X	X			X		X
7	tree-hose-around		X		X	X			X		X
Impaled/Spitted On 8	spike-paper		X		X	X			X		X
8	apple-stick through		X		X	X			X		X
Pierces Through 9	arrow-apple		X		X	X			X		X
Partial Inclusion 10	circle-apple		X		X	X			X		X
10	man-cigarette		X		X	X			X		X

Table 7 Continued

BowPed Cat.	Slide name	Spain-Contact	Spain-No Contact	Estonia-Contact	Estonia-No Contact	Nigeria-Contact	Nigeria-No Contact	Thialand-Contact	Thailand-No Contact	Austria-Contact	Austria-No Contact
10	dogbed-dog		X		X	X			X		X
10	bottle-cork		X		X	X			X		X
Inclusion 11	bowl-apple		X		X	X			X		X
11	purse-box		X		X	X			X		X
11	fishbowl-fish		X		X	X			X		X
11	cage-rabbit		X		X	X			X		X
11	tree-hole-owl		X		X	X			X		X
11	dog inside doghouse		X		X	X			X		X

In order for this broader empirical category to show linguistic patterning along the ON-IN Continuum each of the signed languages would have needed to have contact in the upper conceptual categories and then switched to not having contact in the lower categories or vice versa. In the actual data collected, this was not the case. In each of the ON-IN categories that had more than one slide representing that particular category, the signers went back and forth between touching and not touching even within one single category, with the exception of category 10, Partial Inclusion. This is evident in Table 8.

Table 8 Single-parameter Empirical Category- Contact/No Contact

BowPed Cat.		Slide name	Spain - Contact	Spain -No Contact	Estonia -Contact	Estonia -No Contact	Nigeria - Contact	Nigeria -No Contact	Thailand - Contact	Thailand - No Contact	Austria - Contact	Austria -No Contact
Support from Below	1	table-cup	X		X		x		x		x	
	1	man-hat		X		x		x		x		x
	1	wall-shelf-book	X		x			x	x			x
	1	water-boat	X		x							
	1	mountain-tree side		X								x
	1	tree-hose-on		X			x			x		x
	1	table-tablecloth		X		x		x		x		x
	1	house-man		X		x		x		x	x	
	1	cat-rug	x								x	
	1	tree-hose on ground										
	1	desk-drawers-pencil		x								x
	1	mountain-tree top	x				x			x	x	
Marks on a Surface	2	stamp-woman	X					x				x
	2	boy-UCLA shirt	x								x	
Clingy Attachment	3	letter-stamp	X		x		x		x		x	
	3	ceiling-light-spider		X		x		x		x		x
	3	knife-dirt		X								x
	3	ankle-bandaid	x		x		x		x		x	
	3	window-rain										x
	3	wall-3 insects-light	x									x
Hanging Over/Against	4	hooks-coat		X	x			x	x		x	
	4	wall-picture		x	x					x		x

Table 8 Continued

BowPed Cat.		Slide name	Spain-Contact	Spain-No Contact	Estonia-Contact	Estonia-No Contact	Nigeria-Contact	Nigeria-No Contact	Thialand-Contact	Thailand-No Contact	Austria-Contact	Austria-No Contact
Fixed Attachment	5	wall-phone	X			x		x		x	x	
	5	cupboard-3 doors										
Point-to-Point Attachment	6	stick-balloon										
	6	branch-fruit		X		x	x			x		x
	6	tree-clothesline		X		x				x		x
	6	clothesline-3 clothes		x		x		x		x		x
	6	branch-leaves		x		x		x		x		x
	6	tree-fruit		x		x	x			x		x
	6	house-flag										
	6	necklace-pendant		x		x		x		x		x
	6	room-ceiling lamp		x		x		x		x		x
	6	purse-box 2		x	x		x			x	x	
	6	ear-earing	x		x		x		x		x	
Encircle with Contact	7	candle-bow	X				x		x		x	
	7	finger-ring	X		x		x		x		x	
	7	shoe-foot	X		x		x		x		x	
	7	woman-dress-belt	x				x				x	
	7	man-bandana	x			x	x		x		x	
	7	woman-necklace	x			x	x		x		x	
	7	tree-hose-around		x		x	x			x		x
Impaled/ Spitted On	8	spike-paper	X			x	x		x		x	

Table 8 Continued

BowPed Cat.		Slide name	Spain-Contact	Spain-No Contact	Estonia-Contact	Estonia-No Contact	Nigeria-Contact	Nigeria-No Contact	Thialand-Contact	Thailand-No Contact	Austria-Contact	Austria-No Contact
	8	apple-stick through	x		x		x		x			x
Pierces Through	9	arrow-apple	X				x		x			x
Partial Inclusion	10	circle-apple		X	x		x		x		x	
	10	man-cigarette										
	10	dogbed-dog	x								x	
	10	bottle-cork	x		x						x	
Inclusion	11	bowl-apple		X		x	x			x		x
	11	purse-box	X		x		x			x		x
	11	fishbowl-fish		X		x		x		x		x
	11	cage-rabbit		x		x		x		x		x
	11	tree-hole-owl	x			x		x	x		x	
	11	dog inside doghouse	x			x			x		x	

The only data coming close to patterning linguistically similar to that of the Bowerman-Pederson categories was the Partial Inclusion category. In order for this broader empirical category to show linguistic patterning along the ON-IN Continuum each of the signed languages would have needed to have contact in the upper conceptual categories and then switched to not having contact in the lower categories or vice versa. In the actual data actual data collected, this was not the case. In each of the ON-IN categories that had more than one slide representing that particular category, the signers

went back and forth between contact and no contact even within one single category, with the exception of category 10, Partial Inclusion. This is evident in Table 8.

Except for Spain, all the countries had contact or no-contact marked consistently in category 10. This category had cases in which no locative or an incorrect locative was signed and therefore wasn't analyzed, thus explaining the blank boxes for some of the data. In other words, the apparent correlation may be due just to lack of data. Further, this is only one of Bowerman-Pederson's categories and in order to show similar linguistic patterning as that of spoken languages this pattern would have had to show up in all categories. That was not the case.

In addition to the single-parameter of touching versus not touching I also tested the empirical category of relationship of strong hand to the weak hand. In testing that single-parameter I found similar results. There was no evidence of similar linguistic patterning as that of spoken languages on the ON-IN Continuum. This could be tested with many single-parameter categories and it is possible that a correlation could exist in one of them. The most likely possibility would be whether or not an adposition was signed and which adposition was used. It is possible that a correlation exists in this empirical category, as it does in spoken languages. However, since this phenomenon occurred so rarely in my data, I was not able to examine a sufficient enough quantity of data (specific signs for adpositions) to draw conclusions on this point.

In conclusion, if signed languages were to linguistically pattern similarly to that of spoken languages along the ON-IN Continuum, then the items that each country grouped together by using the same linguistic devices would be adjacent along the ON-IN Continuum and there would be no overlapping. The five examples of sign languages from

Spain, Estonia, Nigeria, Thailand and Austria all had examples of overlapping and non-adjacency. The multi-parameter as well as the single- parameter empirical categories grouped together slides from several different Bowerman-Pederson categories, with relationships from all over the continuum represented. From these examples we can conclude that the linguistic patterning of locative expressions in spoken languages as it relates to the ON-IN continuum does not hold for sign languages.

CHAPTER 5
HOW DO SIGN LANGUAGES ORGANIZE THEIR LOCATIVE EXPRESSIONS?

Locative expressions in signed languages generally do not use adpositions or a separate lexical item that represents the spatial relationship. Instead, locative expressions in signed languages tend to represent the spatial relationship by placing articulators iconically in the same relationship as the objects described. Because of this, locative expressions are organized more according to real-world relationships than spoken-language conceptual categories. This is a reason why sign languages do not linguistically pattern similarly to spoken languages along the ON-IN Continuum. The linguistic patterning of spoken languages along the ON-IN Continuum concerns, in part, the meanings of adpositions, which are only rarely used in sign languages. Instead, signed languages express spatial relations primarily using classifier constructions, lexical items, fragment buoys, and pronominal indices, in various combinations.

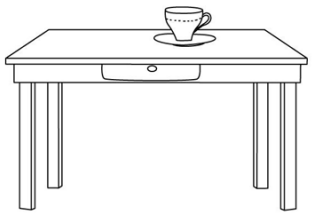
During the research process I observed two basic ways in which locative expressions are formed in signed languages. The first way is to form Locative expressions from classifier constructions and the second is to use lexical items. All five sign languages in the corpus for this study makes use of both of these methods separately, as well as various combinations. Sections 5.1 and 5.2 discuss these two main ways of forming Locative Expressions. The rest of the sections in this chapter discuss variations on these two patterns. Section 5.3 covers Fragment Buoys and their role in Locative Constructions. A brief discussion of the use of Adpositions is in Section 5.4, and then an

explanation of the various combinations of these devices in section 5.5. A separate discussion of both indices and the effect of the ordering of ground and figure on Locative Expressions is in section 5.6 and 5.7 respectively followed by a brief discussion of the Levinson-Wilkins' basic locative construction hierarchy and how it applies to sign languages in section 5.8.

5.1 Locative expressions with classifier constructions

Locative relationships in signed languages most commonly are expressed with classifier constructions. For example in Example 14, when showing the location of the cup on the table, classifier handshapes were used to represent both the table and the cup and their spatial relationship: the cup above the table and in contact with it.

Example 14 The cup is on the table (Estonia)

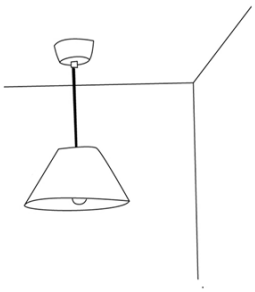
Table-cup		

Classifiers are not normally used unless a referent noun has been introduced previously, much like a pronoun. Typically nouns are introduced in the discourse preceding the classifier. The order in which the nouns which represent ground and figure are introduced is further explained in section 5.7.

5.2 Locative expressions with lexical items

Locative Expressions can also be made up purely of lexical items. The expression may contain only lexical items but these lexical items will be set up in space relative to each other, i.e. using lexical items as if they were classifier handshapes. Participants showed three combinations in which this can be done. The first is shown in Example 15. The signer can choose to use a one-handed lexical sign and have the ground implied. In this case the participant signed 'lamp' high in neutral space, implying its location near the ceiling.

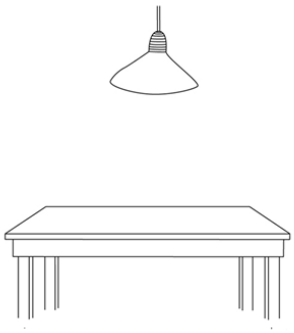
Example 15 The lamp is hanging from the ceiling (Estonia)

Room-ceiling-lamp	
Lamp	

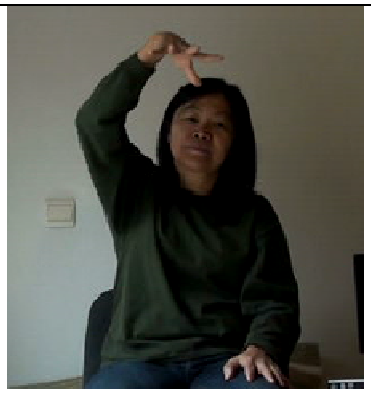
Another combination is to have a two-handed lexical item followed by a one-handed lexical item, both placed in signer's space relative to each other. Example 16 shows the

participant signing the lexical item for table first placing it low in the signer's space followed by the lexical sign for lamp which is placed high in the signer's space.

Example 16 The table is below the light. (Thailand)

Table-light	
Table (part 1)	
Table (part 2)	

Example 16 Continued

Light	

The third combination found in the data contains two-handed signs which cannot be signed simultaneously, as shown in Example 17. The participant describes the location of the mountain and the cloud in relation to each other. In this particular example the participant chose to sign MOUNTAIN first and then CLOUD followed by MOUNTAIN again. The signer's use of space, placing CLOUD above MOUNTAIN shows the location of the cloud in relation to the mountain.

Example 17 A mountain is here. A cloud is here. The cloud is above the mountain. (Spain)

Mountain-cloud (part 1)	
Mountain (lexical)	
Cloud (lexical)	

Example 17 Continued

Cloud (with additional locative information)	
Mountain (with additional locative information)	

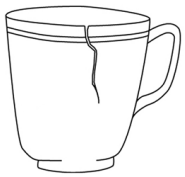
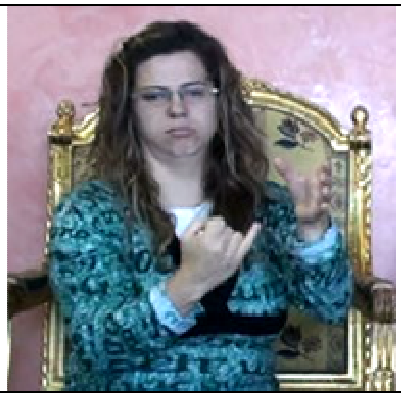
In some examples from my data, it was not always clear as to whether some of the signs produced by participants were lexical items or classifier constructions because the classifier used was very similar to the lexical citation format of the sign.

5.3 Fragment buoys in Locative Expressions

Fragment buoys also can occur in locative expressions. A fragment buoy occurs when, after a sign is pronounced, the signer leaves one hand (usually the weak hand) in place while proceeding with other signs. (Liddell 2003, 248) Fragment buoys can be formed from either classifier constructions or a combination of a classifier handshape and

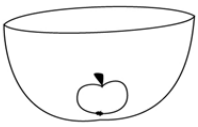
a lexical item. In Example 18 both handshapes are classifier handshapes. The fragment buoy is the classifier for a cup in the left-hand.

Example 18 Fragment buoy with both hands as classifier handshapes (Spain)

Cup-crack	
Cup	
Crack in cup	

In Example 19 the fragment buoy is made up of a fragment of the noun ‘bowl’ and a classifier handshape representing the ‘apple’.

Example 19 Fragment buoy with combination of classifier handshape and fragment of a lexical item (Estonia)

Bowl-apple	
Bowl	
apple	

Example 19 Continued

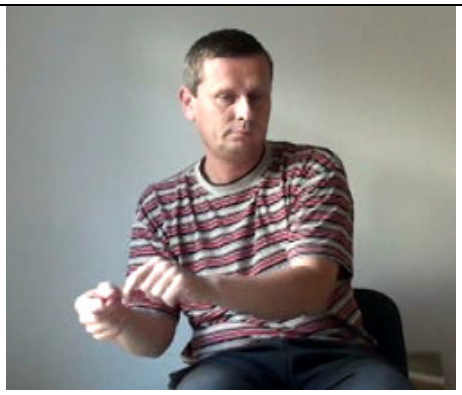
Apple-in-bowl	

The use of classifier constructions, lexical items and fragment buoys shown in sections 5.1, 5.2, and 5.3 can also have several variations. These variations will be discussed in section 5.5.

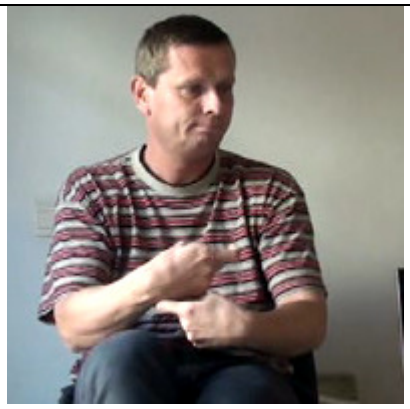
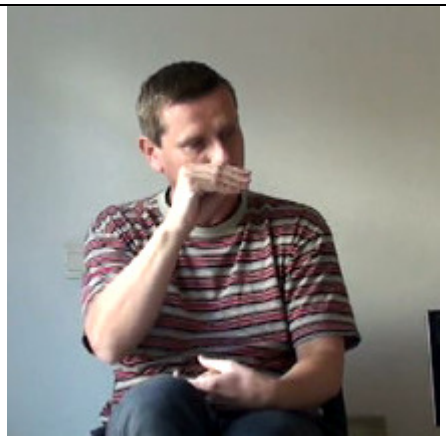
5.4 Locative expressions with adpositions

In some cases some of the participants chose to use adpositions. One key difference in the use of an adposition as opposed to a classifier construction to show location is sequentiality versus simultaneity. When using classifier constructions the location of one or more object in relation to other objects is shown simultaneously inside the classifier construction. When using an adposition the location is revealed sequentially. The use of adpositions was mainly done by the participant from Austria.

Example 20 The boy is sitting crossed-legged next to the fire. (Austria)

Boy-fire	
Fire	
Next to (part 1)	

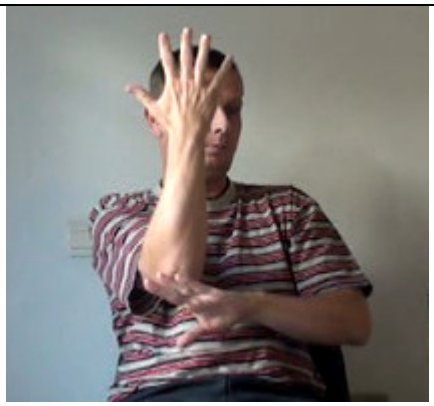
Example 20 Continued

Next to (part 2)	
CL boy-sitting-with-legs-crossed	
Boy	

An adposition can also be used in conjunction with a fragment buoy. Example 21 shows the participant signing first the lexical sign CHURCH, the adposition IN-FRONT-

OF, and then another lexical sign TREE. The use of the adposition IN-FRONT-OF indicates the location of the tree in relation to the church.

Example 21 The tree is in front of the church (Austria)

Church-tree	
Church	
Adposition-IN-FRONT-OF (in combination with fragment of the noun for CHURCH)	
Tree	

This participant self-identified as hard-of-hearing. The use of adpositions by this participant may reflect influence from Spoken German.

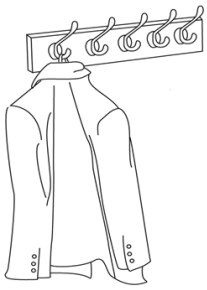
5.5 Variations in the ways of forming locative expressions

Sections 5.5.1 through 5.5.8 illustrate eight variations in forming locative expressions that were found during the data analysis process.

5.5.1 Expressions with one hand representing the ground and one hand representing the figure.

This is the most common of all locative constructions in my data. Typically the strong hand represents the figure and the weak hand represents the ground. Both hands are classifier handshapes which together form a classifier construction as can be seen in Example 22.

Example 22 The coat is on the hook. (Thailand)

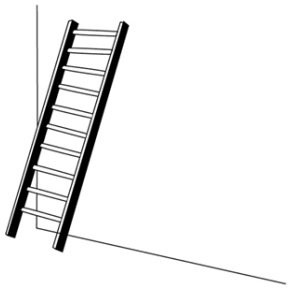
Hooks-coat		

The combination of these two handshapes, their movement and placement in the signer's space, express the information of where the objects are located.

5.5.2 Expressions with one hand representing the figure and the ground implied.

Locative expressions can have one hand as a classifier construction representing the figure, with the ground implied as in Example 23.

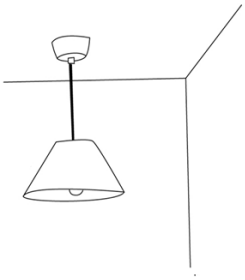
Example 23 The ladder is against the wall. (Spain)

Wall-ladder		

In this case the strong hand represents the ladder and the wall is implied. There was a second ground in this example which was the floor. This is represented by the weak hand connecting to the elbow.

A second way similar to this example is to have one hand as a lexical item placed in a certain location within the signer's space to indicate location, with the ground implied. This is illustrated in Example 24.

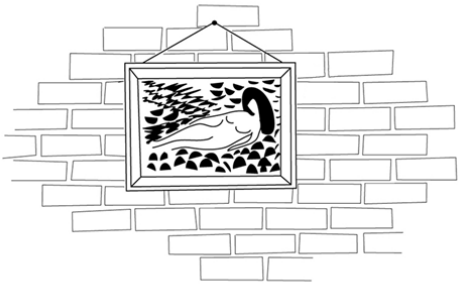
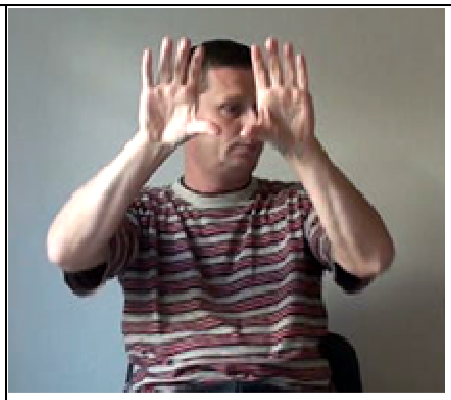
Example 24 The lamp is hanging from the ceiling. (Nigeria)

Ceiling-lamp		

5.5.3 Expressions with two hands representing the figure and the ground implied.

At times signers can use two hands to represent the figure and leaving the ground implied. There are two ways in which this can be done. One uses both hands as classifier handshapes representing the figure. An example of this is in Example 25.

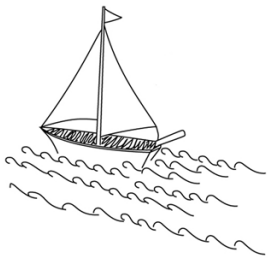
Example 25 The picture is on the wall. (Austria)

Wall-picture		

When describing a picture against a wall a signer may set up a room with walls in signer's space and then place a picture (two-handed sign) in the air. Because the viewer has a shared context with the signer it will be clear that the picture is on the wall in a specific location.

The second way represents the figure with both hands being a lexical item. This is demonstrated in Example 26.

Example 26 The boat is on the water. (Estonia)

Water-boat		

In this example the participant signed a two-handed lexical sign for boat combined with a movement indicating that the object is on water but never gives the lexical sign for water.

5.5.4 Expressions with one hand representing the figure and the signer's body representing the ground

Another option is to use a one-handed lexical sign representing the figure and to use the body to represent the ground. This is seen in Example 27.

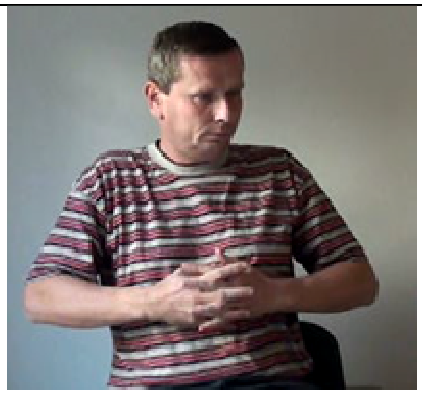
Example 27 The earring is on the ear. (Estonia)

Ear-earing		

5.5.5 Expressions with two hands representing the figure and the body representing the ground

It is a unique aspect of sign languages to be able to utilize the body as part of the language. I observed this method being used when discussing things coming in contact with or in close proximity to the body from the waist up. This can be done with a two-handed sign representing the figure and the body representing the ground as seen in Example 28.

Example 28 The belt is around the waist. (Austria)

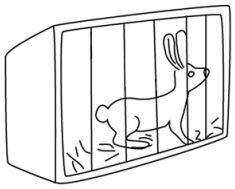
Woman-dress-belt		

The participant used a two-handed sign made up of classifier handshapes to represent the belt with the body to represent the woman with the dress on.

5.5.6 Expressions with two hands representing the ground and the body representing the figure.

In sign languages the figure can also be represented by the body, although this is rare in my data. Example 29 shows the participant using a two-handed classifier construction to represent the cage and his own body to represent the rabbit.

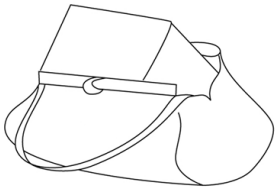
Example 29 The rabbit is in the cage. (Nigeria)

Cage-rabbit		

5.5.7 Fragment buoys with both hands as classifier handshapes.

Fragment buoys as mentioned in section 5.3 can also have variation. They can be formed with two handed classifier, leaving a fragment of the classifier while forming a new classifier handshape to show the location of an object in close proximity to the original object. This is shown in Example 30.

Example 30 The box is in the purse. (Thailand)

Thailand-Purse-box-1	
Purse	
Purse (HC) (part 1)	

Example 30 Continued

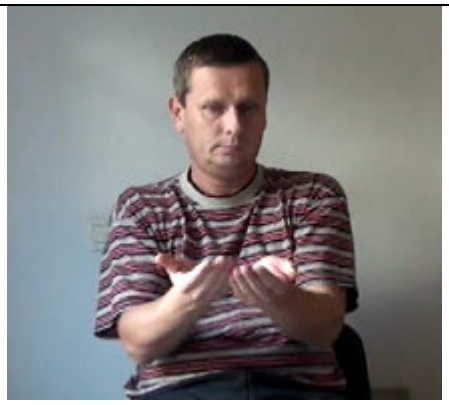
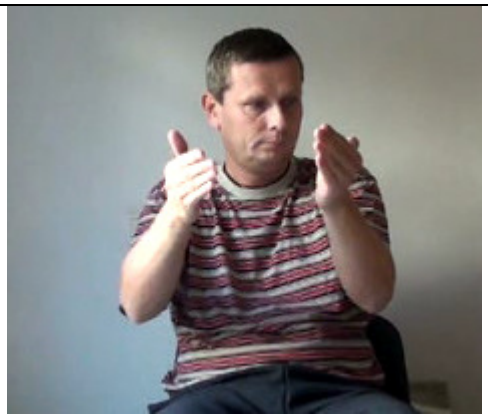
Purse (HC) (part 2)	
Box in Purse	

In this example the noun PURSE is signed first. Then the purse is represented by a handling classifier. A fragment of this classifier remains while another classifier is signed for the box.

5.5.8 Fragment buoys with one hand as a classifier handshape and one hand as a fragment of a lexical item.

Fragment buoys can also be formed by signing a two-handed lexical sign, leaving a fragment of the sign while forming a classifier handshape to show an object in close proximity to the original lexical item. This is demonstrated in Example 31.

Example 31 The fish is in the bowl. (Austria)

Austria-Fishbowl-fish-1	
Bowl (part 1)	
Bowl (part 2)	
Fish-in-Bowl	

In conclusion, there are two main ways in which Locative expressions in sign languages are formed. The first is with classifier constructions and the second is with

lexical items. There are several variations in how locative expressions may be formed but they all must include either classifier constructions, lexical items, indices or various combinations of the three. Fragment buoys may be used in the formation of locative expressions, in which case both handshapes can be classifier handshapes or one hand can be a classifier handshape and the other can be a fragment of a lexical sign. The signer's body can be used in a locative expression to represent either the ground or occasionally even the figure. The ground of a locative construction can be either implicit or explicit. All of the signed languages represented by the data had examples of all of these combinations.

5.6 Indices

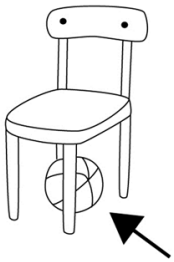
As described in Chapter 3, Methodology, the data I collected was largely composed of short descriptions of slides shown to the participants. I had the participants all describe two sets of slides. The first set had no arrows and the second set included arrows. When describing the second set of slides which included arrows three results occurred varying from the results of the first set of slides. First, one of the participants did not change how they described the second set of slides. Second, some of the participants changed the order in which they introduced the ground and figure prior to indicating their locative relationship. Third, some of the participants used indices to show the location of objects in relation to other objects. Some of the participants changed their description. I can see two possible reasons for this: either they changed their description because of the presence of an arrow or because it was their second time seeing the slide and they assumed it would need less description because they had described it before. The original BowPed slides were used as a control for identifying to the signer what was meant to be

figure and ground. In this section I describe the effects of the addition of indices to a locative phrase in sign languages and in section 5.7 I describe the non-effects of changing the introduction order of ground and figure.

Indexing is the practice of using pointing to show the location of an object. “This location can be a ‘real-life’ location…or, its location may be understood in relation to other things that have been given locations in the signing space…” (Baker-Shenk & Cokely 1980:344) When used in this way the indexing has the meaning “It’s there”. Indexing can also be used to represent pronouns; this is known as pronominal indexing. For my purposes of demonstrating the use of indices within locative constructions, it is the first use that is relevant.

There were two ways in which indexing was used as part of a locative expression in my data. First, a locative construction could be signed followed by the addition of indexing to replace the figure. This first type included fragment buoy constructions. The example in Example 32 shows the participant using indexing within the context of his current environment to indicate the location of the figure. Since he is sitting in a chair, he points to the space under his chair to show that the ball is located under a chair in the picture.

Example 32 The ball is under the chair.(Nigeria)

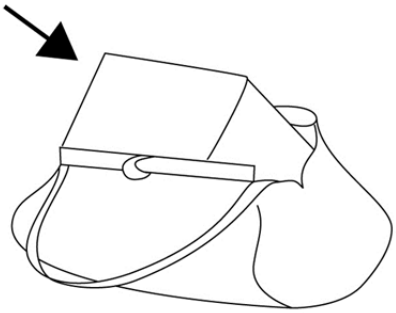
Nigeria-Chair-ball-under 1A	
Chair	
Ball	

Example 32

Ball (CL)	
Index	

Example 33 shows an example of the use of indexing in combination with a fragment buoy. This example is also evidence of participants underspecifying relationships. In the following example the participant signed a noun followed by a handling classifier to indicate the verb TO OPEN and then uses indexing to show the location of the box without actually signing a lexical sign for box. See Example 33.

Example 33 The box is there in the purse. (Thailand)

Thailand- Purse- box1A	
Purse	
Open	

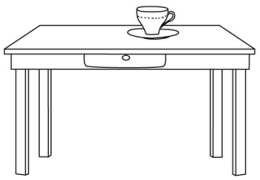
Example 33 Continued

There	

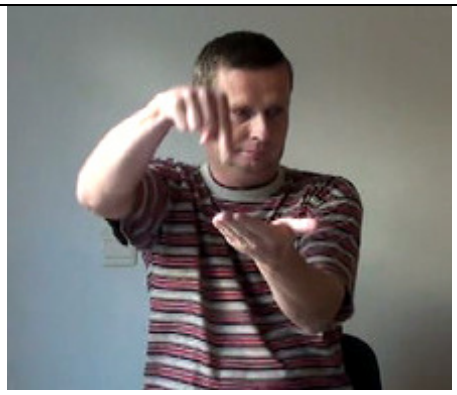
In this case indexing replaces the signing of the figure and is used with a fragment buoy. Indexing provides information of where the box is located but not information that it is actually a box. Because the box was mentioned previously the concept is still fresh in the mind of the viewer and the signer. The signer can keep part of the conept in the air and introduce something new. As shown in Example 33,the lexical item for purse was signed followed by a classifier construction which is used to show how a person might open a purse. Inference is used by the viewer to reach the conclusion that a purse is being opened. Indexing is used to point into what has just been opened so the viewer would then infer that what has just opened was in the purse. Since the picture was considered shared context, the box was never signed.

Second, the figure can be first signed then replaced by the index. In Example 34 the indexing replaces the figure and the ground remains present as a fragment buoy.

Example 34 The cup is on the table. (Austria)

Austria-Table-cup1	
Table part 1	
Table part 2	
Cup	

Example 34 Continued

Index	

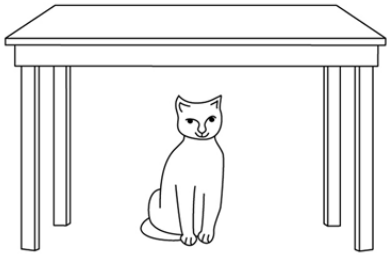
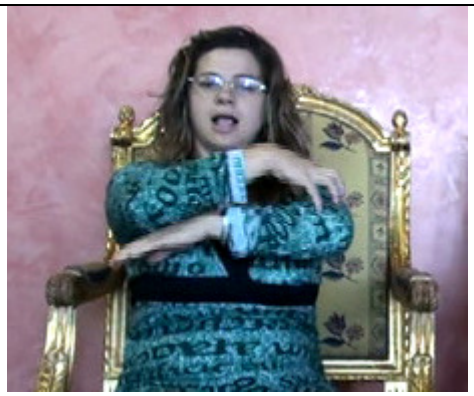
All of the languages represented in the data used indexing. The participants from Thailand and Austria seemed to use more indexing than the others. Since there was only one participant per country, it is impossible to know if this is characteristic of the language as a whole or only due to personal preference.

5.7 Order of ground and figure

One of the original intentions of my thesis was to analyze the order of ground and figure in the discourse leading up to the locative constructions in the descriptions of slides both with and without arrows. I found that only one participant switched the order of ground and figure consistently while describing the second set of slides. However, all of the participants had examples of switching the order of ground and figure within the data.

There are two main ways in which Sign Languages can introduce ground and figure in the discourse leading up to a locative construction. The most common way is through introducing ground first and figure second, as illustrated in Example 35.

Example 35 The cat is sitting under the table. (Spain)

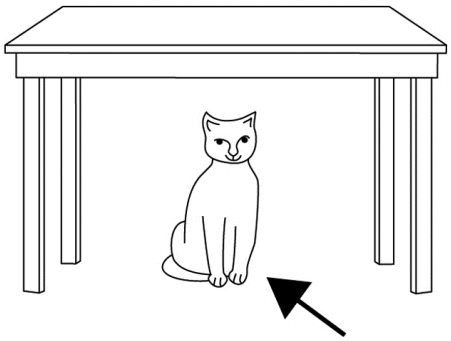
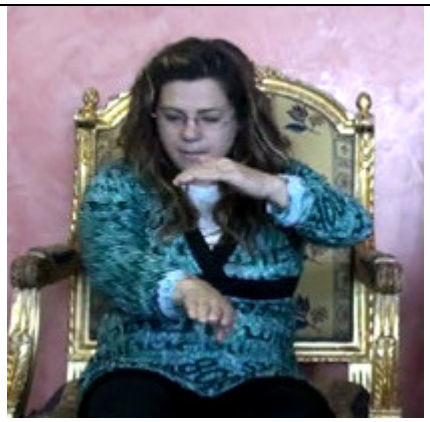
Spain-Table-cat-under 1	
Table	
Cat	
ANIMAL-UNDER-FLAT SURFACE	

Example 35 Continued

Sit	

The second way is to introduce figure first and then the ground, which is illustrated in Example 36.

Example 36 The cat is under the table. (Spain)

Spain-Table-cat-under 1A	
Cat	
Under a flat surface	

Example 36 Continued

ANIMAL-UNDER- FLAT SURFACE-	
Table	
ANIMAL-UNDER- FLAT SURFACE-	

It could be argued that in Example 35 and in Example 36 ground and figure are switched when the order of introduction changes. However, I would argue that the figure in both Table 35 and Table 36 is the cat. Using the original BowPed picture series as the

control I looked at what object was indicated by the arrow. In this case it was the cat. The cat is also represented by a classifier handshape using the strong hand. This is the case in both examples which indicates that even though the order in which the nouns for table and cat are introduced is different, the figure remains the same in both of them. All of the countries had a pattern of introducing the nouns for ground first followed by figure more often than figure first followed by ground.

Figure 8 shows the percentage of times that each country introduces ground first before figure for both series of pictures.

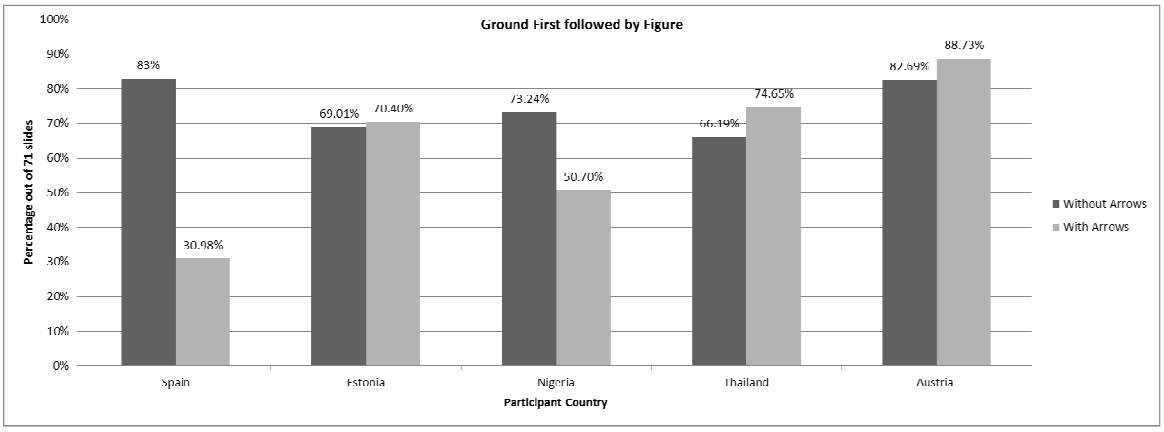


Figure 8 Pattern of introduction of ground versus figure in 5 sample sign languages

The average percentage of time that all five countries introduced ground first before figure while describing slides without arrows was 74.8%. The only country to introduce figure before ground less than 50% of the time while describing slides with arrows was Spain.

In summary, I noticed two ways in which participants described the slides that included arrows differently than the ones that didn't include arrows. One type of description included the use of indices to show the location of an object in relation to other objects in the slide. The use of indices changed the locative phrase by emphasizing the figure or completely replacing the figure within the locative construction. The second

was the changing of the order of ground and figure when initially introduced in the discourse. Spain changed the order of ground and figure and did not use indexing when describing the slides which contained arrows explaining the vast difference in the percentage of constructions in which ground was signed first as seen in

Figure 8. This second method, changing the order of ground and figure, did not change the locative construction produced.

5.8 Levinson & Wilkins' basic locative construction hierarchy

The locative constructions for spoken languages are said to exist in a hierarchy as stated in section 2.5 (Levinson & Wilkins 2006). Levinson and Wilkins claim that in spoken languages, while describing a scene which involves an inanimate moveable object in relation to the ground a speaker will be most likely to use a BLC. In Table 9, the left column represents the likelihood of a speaker producing a BLC. From top to bottom the likelihood of a speaker producing a BLC to describe the particular scene increases (Levinson & Wilkins 2006:16)

Table 9 Levinson-Wilkins' Basic Locative Construction Heirarchy

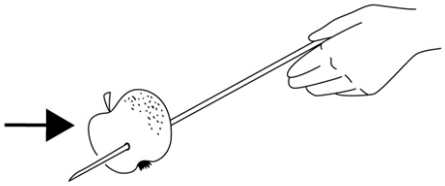
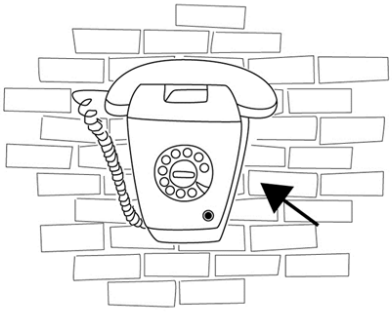
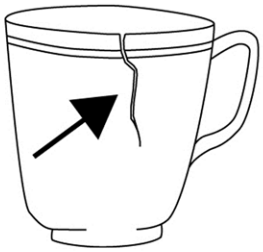
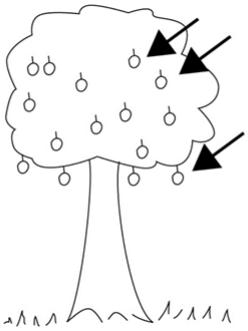
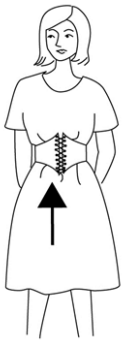
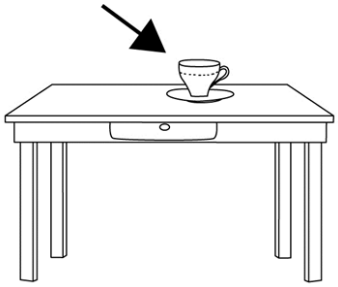
	Levinson-Wilkins BLC Heirarchy	**BowPed Picture Series**
Likelihood of a speaker producing a BLC is low.	1. Figure is impaled by Ground	
	2. Figure is stuck to Ground	
	3. Figure is 'damage' or negative space (e.g. crack, hole)	

Table 9 Continued

	Levinson-Wilkins BLC Heirarchy	**BowPed Picture Series**
	4. Figure is part of whole (part of Ground)	
	5. Figure is adornment or clothing	
Likelihood of speaker producing a BLC is high.	6. Figure is inanimate, movable entity in contiguity with Ground	

When Levinson and Wilkins proposed this hierarchy they did not take sign languages into account. According to the hierarchy, as one moves away from describing an inanimate movable object which is in contact with the ground the likelihood of the use of specialized locative constructions becomes greater. In sign languages this does not

appear to be the case. In the data analyzed, I found no evidence of correlation between how specialized a locative construction was and the Levinson-Wilkins hierarchy. The BLC in sign languages contains more components, making most locative constructions specialized. Each articulator can represent separate concepts simultaneously and how these articulators interact represent the locative relationship itself. Because of this, the basic locative construction in sign languages gives more detailed information about the location, making each locative construction specific to each relationship. If sign languages were to follow this hierarchy, a researcher would expect to find a difference in the specialization of the locative sign for something being impaled versus an inanimate movable object which is in contact with the ground. This is not the case in my data. Both an object being impaled and an inanimate movable object which is in contact with the ground were described using locative constructions that were equally specialized.

CHAPTER 6
CONCLUSION AND FURTHER RESEARCH

In conclusion I offer an overall comparison of spoken and signed languages in the area of locative expressions, including thoughts on conceptual categories, The ON-IN continuum, modality effects, and the actual formation of locative expressions .

6.1 Conclusion

The primary focus of this paper has been to examine whether sign languages group their locative expressions linguistically in a similar way to spoken languages, that then correlate to the conceptual categories of the ON-IN continuum, in keeping with the cross-linguistic analysis of spoken languages. I found no linguistic evidence to suggest that sign languages' locative expressions pattern in a similar way to spoken languages according to Bowerman-Pederson's ON-IN continuum or Levinson-Wilkins'. This result brings out a significant modality difference between spoken and sign languages. Most spoken languages make use of arbitrary adpositions, nominal predicates, case inflections, or locative verbs within locative expressions to represent relationships[4] which, at least within the scope of the relationships ON and IN, pattern with a continuum. Signed languages are visual languages and therefore can physically represent what the real world

[4] Brown (1994) discusses Tzeltal, a Mayan language, which appears to encode detailed information about shape, position, and configuration in locatives.

looks like. In other words, sign languages do not need to use arbitrary representations of locatives, but instead they have the ability to produce locative constructions that directly represent the locative relationships. These locative constructions are created by combining representations of ground and figure in various ways. Ground and figure can be represented sequentially or simultaneously by classifiers or lexical items or a combination of the two. In the discourse leading up to a locative construction a noun representing ground is generally introduced first followed by a noun representing the figure. Adpositions can also be used in locative phrases but this was the option least chosen in my data.

There is, however, still a possibility of sign languages linguistically patterning after the ON-IN continuum. Leonard Talmy (2003) compares spoken languages and sign languages in terms of how they describe spatial relations. He concludes that sign languages make much finer distinctions when describing location. Taking this into consideration, it may be the BowPed slides are too course a measure for any patterning of fine distinctions to be made evident.

As to the discussion of whether the structure of locative expressions is innate or acquired (see section 2.5), it is evident from the data shown in this thesis that modality does have a profound effect. This would seem to support the claim that locative expressions are acquired. On the other hand, all of the participants in this study showed a remarkably similar pattern in how they form their locative expressions. This would suggest that there is something about the signed modality, possibly innate human cognition, that would cause each language to have been formed similarly. One can only

conclude from both of these results that locative expressions must be in part both innate and acquired.

6.2 Further research

I was unable to find linguistic evidence that sign languages pattern with the ON-IN Continuum. If Talmy is correct in his suggestion that signed languages make finer distinctions than spoken languages, the problem could be with my research tool. It is possible that the slides chosen by Bowerman-Pederson do not contain spatial relationships that are similar enough to show the fine distinctions Talmy proposes. One avenue for future research would be to keep the original BowPed picture series and add additional slides for each conceptual category, making finer distinctions between the relationships taking place.

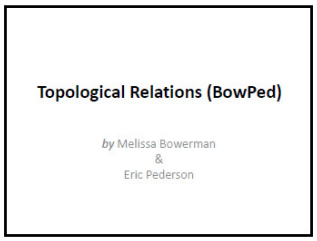
My research did not include a cognitive study on how signers themselves group these relationships. From my observations and experience working with sign languages I would hypothesize that cognitively signers do not organize these relationships in a similar way to speakers (i.e. that there would be a lack of evidence in non-linguistic tasks also) along the ON-IN Continuum. This would need to be tested through redesigning the Bowerman-Pederson stimulus task and performing grouping tasks with signers of many different sign languages. Such a task would provide non-linguistic data to prove the ON-IN continuum is relevant cross-linguistically for spoken languages only and doesn't capture the cognition of spatial relations for sign languages.

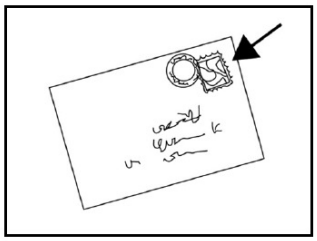
Sign languages may have conceptual categories in corresponding to the linguistic categories of classifier handshapes instead. In my data it was clear that the participants chose classifiers representing specific classifications of objects. Sandler and Lillo-Martin

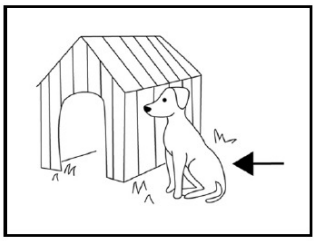
name some of these categories such as “FLAT & ROUND”, “THIN & STRAIGHT”, “WIDE & STRAIGHT” and “SMALL ANIMAL”.(2006:78) In my research there was not enough range in data samples to be able to tell what the boundaries of use were for each of these classifiers. An in-depth study of one language would be illuminating.

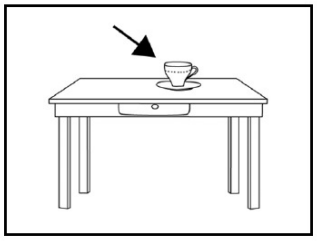
APPENDIX A

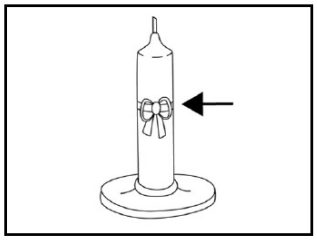
Topological Relations (BowPed) Picture Series (Melissa Bowerman & Eric Pederson 1992b)

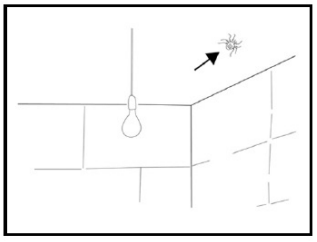


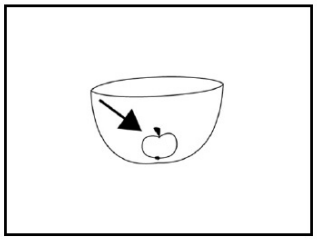


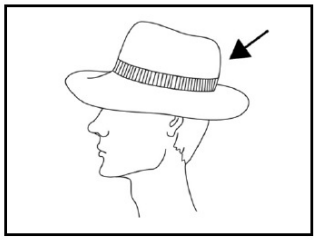


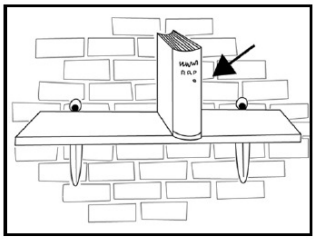


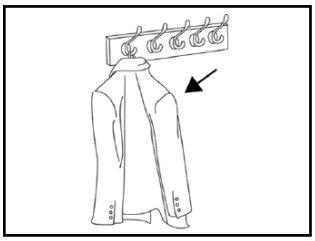


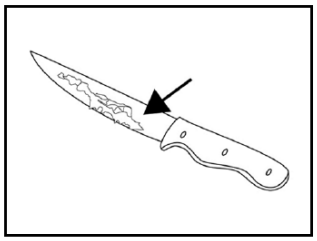


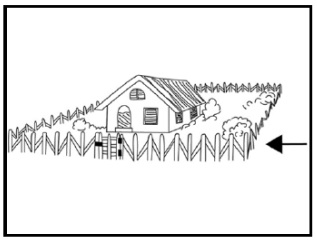


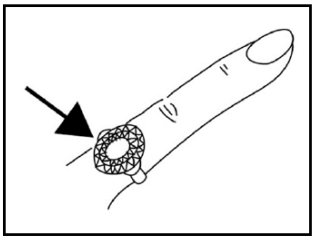


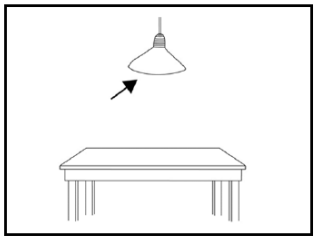


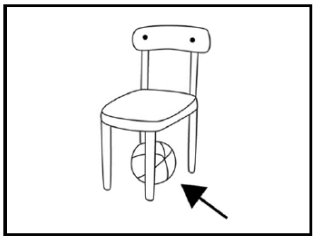


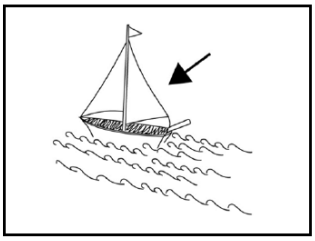


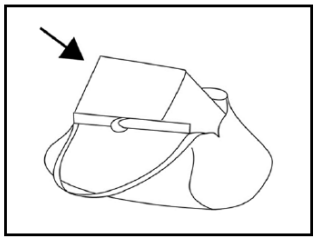


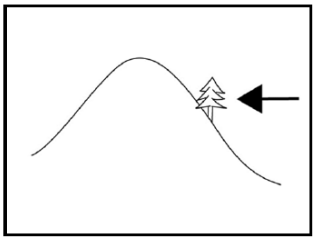


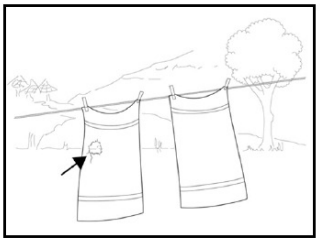
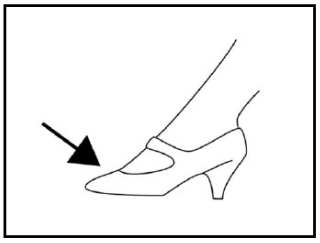
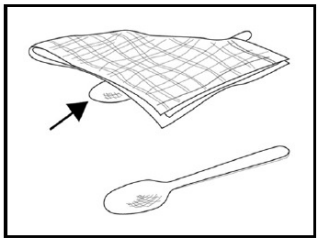
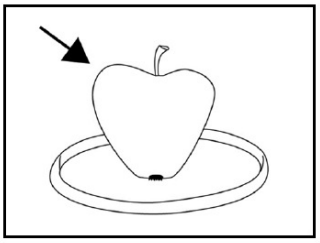
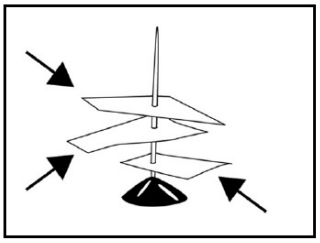
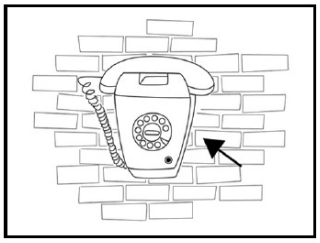
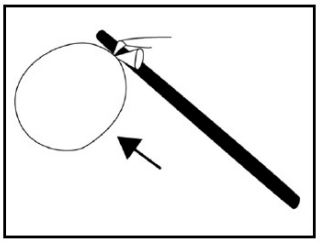
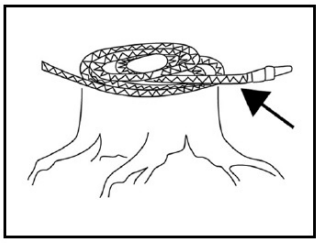
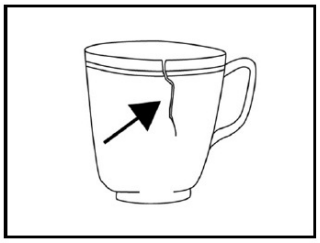


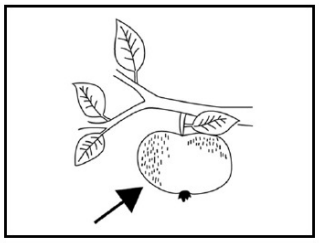


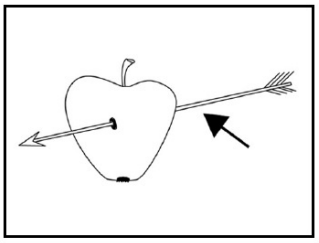


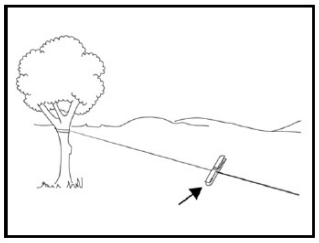


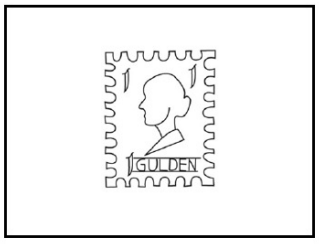






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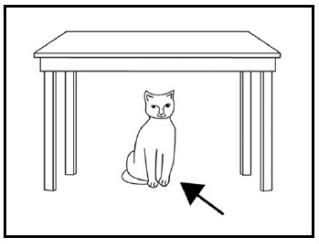

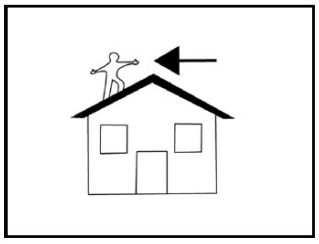

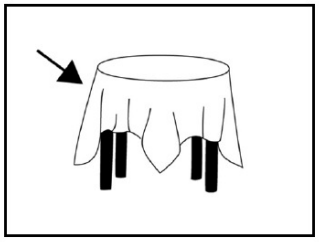

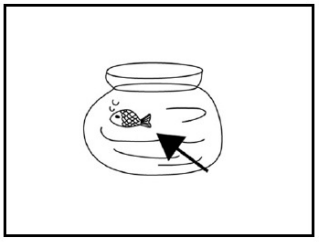

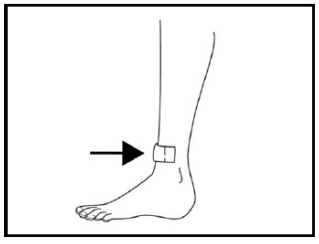

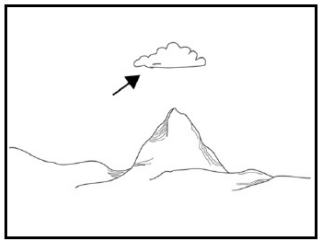

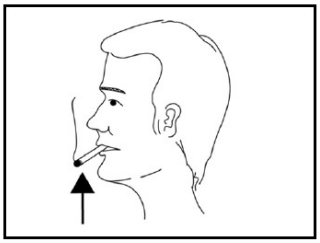

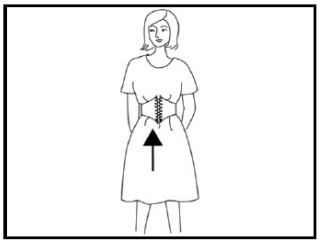

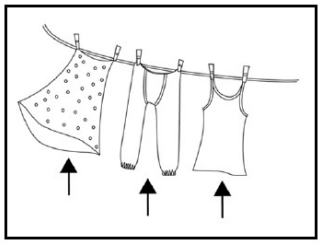

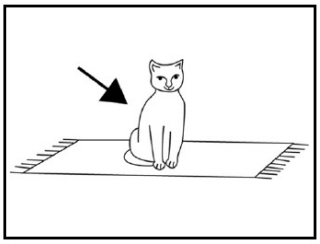

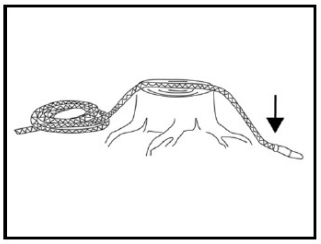

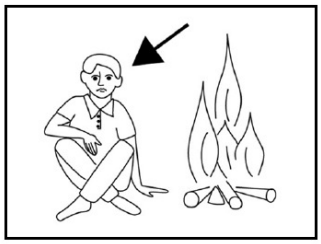

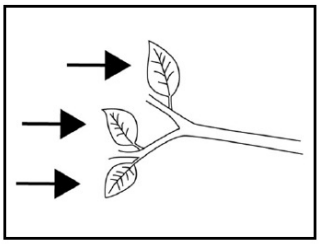

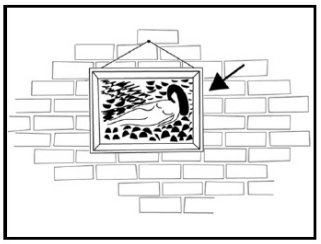

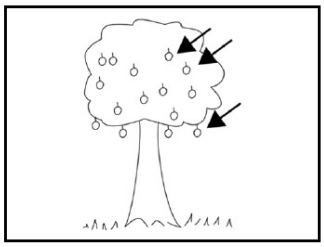

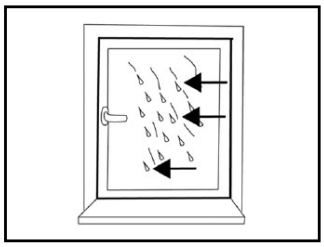

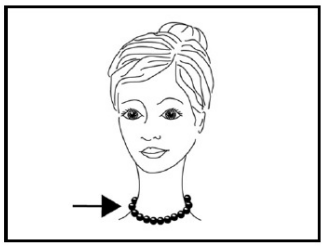

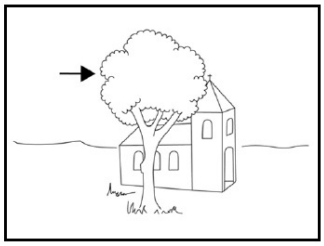

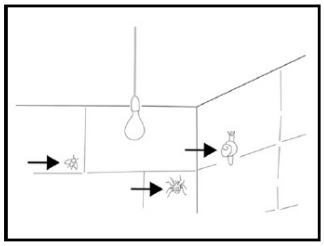

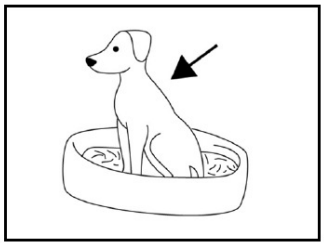

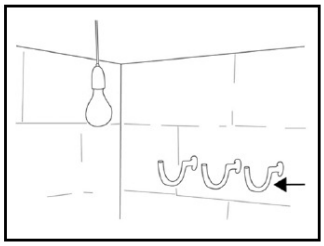

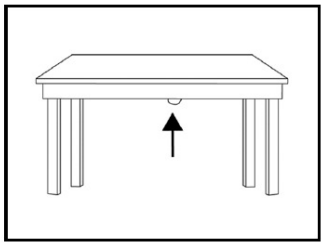

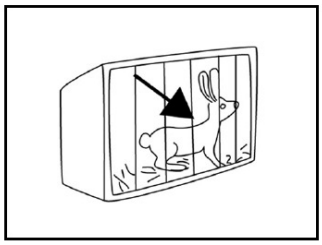
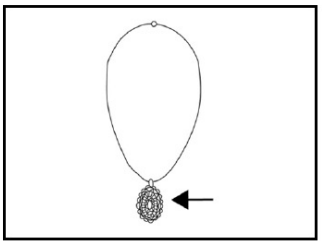
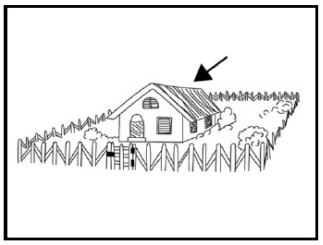
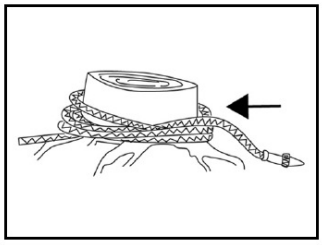
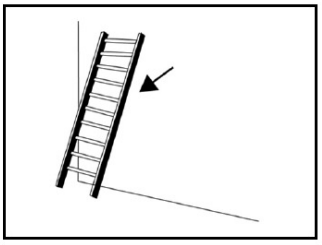
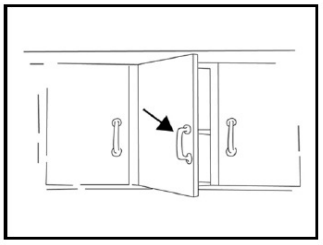
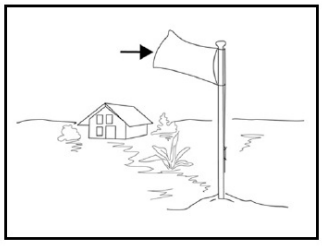
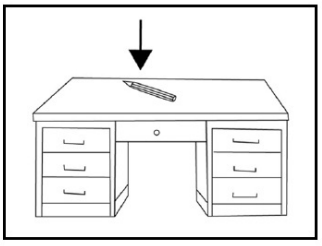
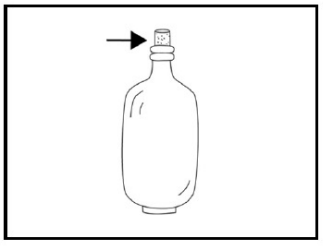

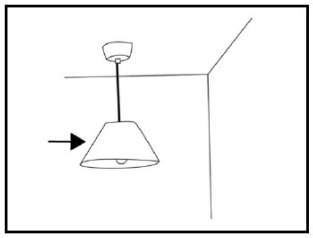

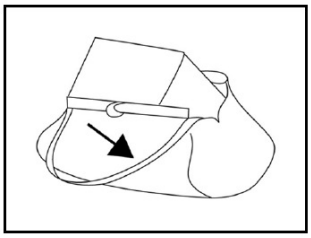

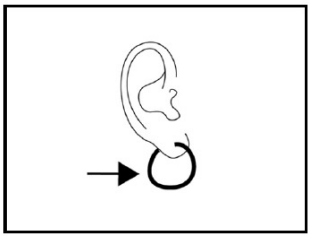

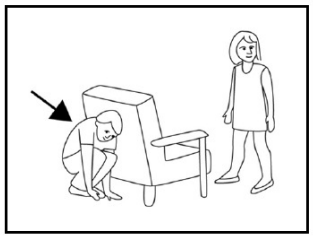

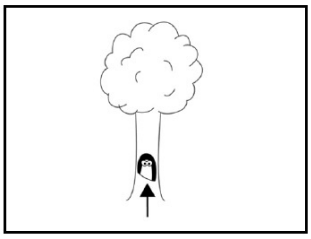

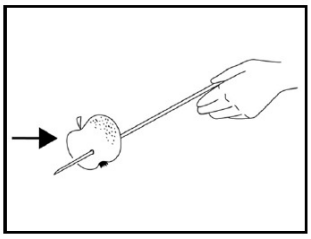

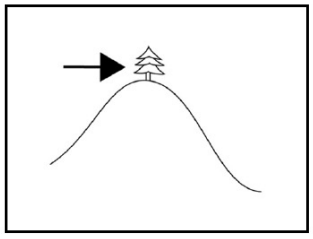

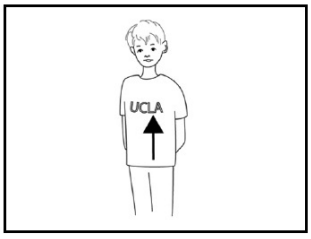
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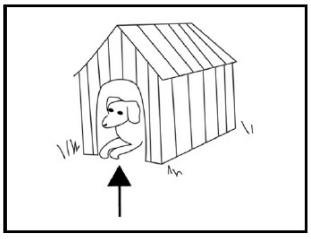

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