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CLASSIFIER CONSTRUCTIONS AS PROCEDURAL REFERRING EXPRESSIONS IN AMERICAN SIGN LANGUAGE

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Abstract
The present paper comments on signs of American Sign Language in the perspective of relevance theory. The main claim is that classifiers encode procedural instructions to help the addressee pick out the intended referent for the procedural referring expressions made with classifier constructions. The author explains how three classes of classifiers differently manipulate concepts to instruct the addressee to create *ad hoc* concepts though the use of inference, narrowing, and broadening. It is also claimed that classifier constructions do not encode a conceptual meaning, but a procedural instruction. The discussion includes illustrations of how the speaker's using classifier constructions instead of lexical signs may increase the number of cognitive effects on the part of the addressee.

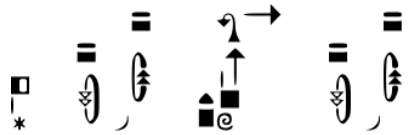
Key words: American Sign Language, classifier constructions, *ad hoc* concepts

1. Introduction

American Sign Language (ASL) contains a highly productive system that denotes spatial relationships, movements, size and shape of objects, and the way objects are handled.[1] This subsystem is typically referred to as classifier constructions and it does not abide by the normal rules of lexical signs (Sandler & Lillo-Martin, 2006).

Movement is one way classifier constructions and lexical signs differ. Movement in classifier constructions can be much more complex, e.g.in (1) the lexical sign 'biking' has one repeated movement that is circular with both hands alternatively moving forward in circles. The movement for the classifier construction 'CC1', on the other hand, is a chain of movements. It starts with a forward movement which represents the movement down the driveway, followed by  which represents going over the curb, followed by a movement to the right, which represents going down the street. Each part of this classifier construction's movement adds to the proposition expressed by the utterance.

[1] This paper is based on my M.A. thesis from the University of North Dakota (Jones, 2013).

(1) 

1SG biking CC1 biking

"I rode my bike down the driveway, over the curb, and down the street." [2]
(Bruce, 2003)

A second way classifiers are different from lexical signs is that each hand can represent a different concept in the classifier construction. In (1) the classifier construction 'CC1' the left hand represents the driveway that was stated earlier in the narrative, while the right hand represents the signer on a bike moving forward down the driveway, over the curb, and down the street to the right. It is interesting how this singular sign can convey the rich proposition.

Classifier constructions have historically been difficult to account for because of these and other differences from lexical signs. They have been variously described as verbs of motion and location, verbal predicates, lexical verbs, noun incorporation, classifier predicates, and depicting verbs (Sandler & Lillo-Martin, 2006; Supalla, 1982; Schick, 1987; Scott Liddell, 2003). For the purposes of this paper, the term "classifier" is used here to refer to the handshape that forms the core of these signs and "classifier construction" to refer to the handshape in combination with movement(s), orientation, location, and facial expression to create well-formed signs. The focus is on the manual aspects of the signs with facial expression left for further study.

While there have been numerous descriptions of classifier constructions, there has been little work on how classifier constructions are understood and why they are used instead of lexical signs. In this paper, I will describe how Relevance Theory (RT) and its application to classifiers and classifier constructions can explain how they function as procedural referring expressions to manipulate or create *ad hoc* concepts through inference on the part of the addressee using less processing effort to convey propositions than using strictly lexical signs to convey the same proposition.

2. Classifiers

Classifiers are the core handshapes used in classifier constructions. There are three types of classifiers commonly called: entity, size and shape specifiers (SaSS), and handling. Entity classifiers represent the whole object or entity with a handshape. Size and shape specifiers represent the size or the extent of an object with the two hands. These are typically produced by moving one hand while holding the other stationary as an anchor. Handling classifiers represent how an object is handled or gripped by mimicking the action

[2] All of the handshape pictures in this paper come from Adam Frost's work with Valerie Sutton (Sutton et al., 2011). The symbols come from her introduction to SignWriting manual (Sutton, 2009). More information about SignWriting can be found at www.signwriting.org.

seen in the real world (Supalla, 1982; Schick, 1987; Scott K. Liddell, 2003; Valli & Valli, 2011).

Classifier handshapes function much like pronouns in that they are chosen based on the concept they represent. Hedley (2005, p. 9) argues that pronouns do not encode concepts; instead they encode instructions to resolve the reference of a pronoun. He explains that the pronoun *he* encodes an instruction something like, "find an individual concept with the feature 'male'." His analysis agrees with Wilson's (2011, p. 6) that, "… pronouns *I* and *he* or the indexicals *now* and *then*, are not plausibly seen as encoding full-fledged concepts, since their referents vary from context to context and have to be pragmatically inferred." I argue that classifier handshapes encode the same type of procedural instruction to pick out referents for the classifier construction, much like pronouns and other indexicals.

In Table 1, I provide a short list of some classifiers and their possible encoded instructions in American Sign Language (ASL).

SignWriting	Handshapes (Sutton et al., 2011)	Instruction
		'Pick out a referent with the characteristics of wide and flat.'
		'Pick out a referent with the characteristic of long, thin, vertical and multiple.'
		'Pick out a referent with the characteristic of long, thin, and vertical.'
		'Pick out a referent with the characteristic of being animate or perceived animacy.'
		'Pick out a referent that is vertical long thin and two in number.'
		'Pick out a referent that is gripped in this way, or of the same round shape.'
		'Pick out a referent that can be gripped in this way.'
		'Pick out a referent that is long, thin, vertical and three in number.'

Table 1. Handshapes and instructions

3. Classifier construction and underdeterminancy

In ASL, the handshape in a classifier construction typically represents a person or object, but it can also represent abstract concepts. Movement, orientation, and facial expression happen simultaneously with the classifier to create a classifier construction which is a well formed sign.[3] Classifier constructions typically mirror the real world in their representation of people or objects through movement, orientation, handshape, and location. Unlike lexical signs, classifiers can represent different objects simultaneously with the two hands to show interaction and spatial relationships in constructions such as the 'driveway' and 'bicycle' in (1) 'CC1'.

However, a satisfactory account of how concepts are linked to classifier constructions and relayed to the addressee has yet to be offered. I will show that classifier constructions are underdetermined, meaning they can represent several things until a context is given from which to interpret them from. This leads to the conclusion that they do not encode a concept, but a set of instructions to manipulate a concept that needs to be known before an interpretation can be made. Classifiers then provide instructions to the addressee on how to fill out the fully propositional form of an utterance.

Looking at classifier constructions in isolation allows us to determine what the construction encodes and what is left to inference. In this section, I will discuss the three main types of classifier constructions: entity, size and shape specifiers (SaSS), and handling; looking at what is encoded in the classifier construction and what is left to inference.

The construction described below in Figure 1 is an example of an entity classifier construction. This construction is made with only the left hand starting with the index finger in a vertical position and ending with it in a horizontal position.

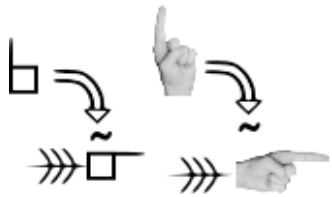


Figure 1. Entity classifier construction

In the case of Figure 1, the left hand encodes an instruction to 'pick out a referent that is long, thin, and vertical.' There are two movements in this construction. The first is represented by the arrow encoding the instruction to 'manipulate a concept from point A to point B' with a simultaneous change of orientation from vertical to horizontal. The second is a tense, quick back and forth movement when the hand reaches the horizontal position. This secondary movement instructs the addressee to form an

[3] This paper has focused on the manual aspects of classifier constructions, but further research could be to investigate how facial expressions function in conveying meaning during classifier constructions, and whether they are conceptual or procedural in nature.

interpretation that it is not a typical movement from point A to point B, but something out of the ordinary. This classifier construction could be used to represent concepts such as the gate at a parking garage closing or a tree falling, though neither of these interpretations are lexically encoded in the construction. This entity classifier construction encodes three instructions, but what the 'long, thin, vertical' object being 'manipulated from point A to point B' in an 'out of the ordinary' way is left to inference on the part of the addressee.

In Figure 2 a Size and Shape Specifier (SaSS) classifier construction is presented. The right hand moves upward as indicated by the arrow while the left hand remains stationary.

Figure 2. SaSS

The two handshapes each encode the instruction to 'pick out a referent that has the characteristic of being round.' The right hand moves straight up in space from a point A to a higher point B while the left hand stays stationary. The movement encodes the instruction to 'manipulate a concept from point A to point B.' In this case, because the left hand is stationary, this movement of the hand represents the extent of the object rather than movement of an object. The object is still being manipulated from point A to point B, but since this is a SaSS it shows the size and extent rather than motion. So to sum up the encoded information in Figure 2, the addressee should 'pick out a referent that has the characteristic of being round along its length from point A to point B.' In this case, no conceptual information is relayed. It would be easy to apply it to a referent such as a pipe, pole or a tube of some sort, but this would be an act of inference based on the instructions encoded, not the information in the classifier construction itself.

Figure 3 is a handling classifier construction. The right and left hand move together as one unit up and to the left, while at the same time changing their orientation and relative position from horizontal to vertical.

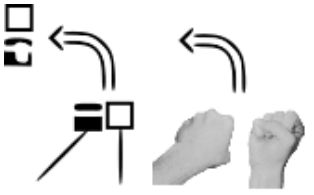


Figure 3. Handling classifier construction

In the case of Figure 3, the left and right hand have the same handshape. The handshape encodes an instruction to 'pick out a referent that can be gripped with the full hand.' The movement starts with both hands horizontal to each other and ends with the right hand above the left at the end of the movement. Thus, the movement encodes an instruction to 'manipulate a concept from point A to point B.' So this construction gives the instruction to 'pick out a referent that can be gripped with the full hand and goes from point A to point B.' This classifier construction could refer to pushing a lever or prying something with a crowbar, though it does not lexically encode either of these concepts.

Regardless of the type of classifier construction, instructions are provided to pick out and manipulate a referent with no conceptual information encoded in the utterance. Actually, all three of these examples occur in the same text and refer to the same referent: a broom being stuck under a dresser in a closet as a prank. Figure 2 refers to the handle. Figure 3 shows how the signer lifted the handle from a horizontal position to a vertical one after the bristles of the broom were stuck under the dresser. In the story the signer then closes the closet door and the broom is held in place and is under tension by the door. When the door is pulled open, Figure 1 represents the broom handle coming down with great speed back into the horizontal position. It is the presence of an explicit, or highly accessible noun phrase, like "broom", that makes these constructions understandable. When the context for these examples is supplied, this is clear, but without context each classifier construction is too schematic to be useful. These constructions are able to instruct the addressee to form and manipulate a very specific concept in their mind.

Overall, the productivity of classifier constructions is due to the fact that they do not encode conceptual content, but instructions. Since classifiers are underdetermined they have the flexibility to combine to refer to almost any type of referent.

4. Movement

There are three types of movement in classifier constructions: path movements, stylistic imitation of real world movements, and point-in-space movements (Schick, 1987, p. 9). I will be using these three categories of movement to outline how RT can add to the understanding of how movement conveys meaning in classifier constructions using these three groups.

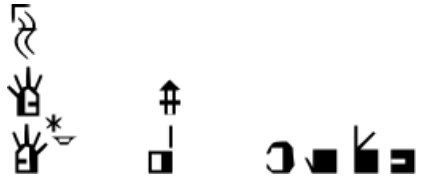
It is important to note that, compared to lexical signs, classifiers are less constrained in their movements and in how the movements can be combined (Sandler & Lillo-Martin, 2006, p. 196). The particular movement categories discussed in this section can combine to convey more meaning without having to add another lexical sign, as is apparent in the more detailed descriptions below.

Just like the handshapes in classifier constructions, the movement does not encode concepts, but instructions to the addressee to manipulate concepts or create *ad hoc* concepts through inference.

4.1 Movement Through Space

Path movements indicate the path an object has taken or the extent of a referent (Schick, 1987, p. 9). Taking a look at (2), we see in 'CC1' a path movement represented by an arrow. In this example we have the two hands moving together in a forward winding motion with a slight upward movement.

(2)



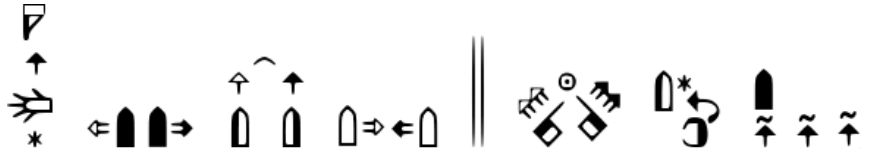
CC1 IX C-A-V-E

"The eight of us wound our way up the hill in single file up to the cave."
(DawnSignPress, 1992)

The path movement in (2) 'CC1' instructs the addressees to manipulate a concept in their mental representation. In the case of an entity classifier, like the classifier in 'CC1', it tells the addressees to move the concept associated with it in their mental representation from point A to point B. Given that the context is understood and referent assignment has already been made (as the two hands together represent the eight friends) it is possible to infer how the people moved from point A to point B (walking, hiking, climbing, etc.). This particular path movement has a winding motion that indicates a non-typical path from point A to point B as well.

Path movements can also indicate extent when paired with SaSSes. In (3), focusing on 'CC1', 'CC2' and 'CC3', these three constructions work together to create an *ad hoc* concept of a specific white room.

(3)



white CC1 CC2 CC3 different picture CC4

"On the large white walls hung many pictures."
(Christie & Durr, 2009)

The hands in 'CC1' move apart symmetrically and continue into 'CC2' followed by 'CC3', which shows the extent of the walls of this particular room in abstract space. The hands are moving with a path movement and would be considered the extent of an object because the hands are moving symmetrically and the classifiers are being used as a SaSS to pick out the referent of walls from context. If a path movement encodes the instruction to manipulate a concept from point A to point B in an addressee's mental representation with that referent being a wall, it would be most reasonable to assume that

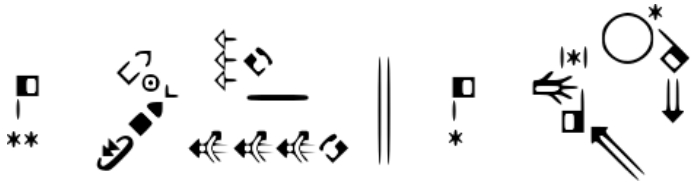
the wall would be stationary. The movement from point A to point B would then show where the wall starts and stops. The walls do indeed go from where the hands are close together at point A in 'CC1' and move outward to the ending of the wall at point B. The symmetrical movement and the wall being the most accessible referent for the instruction from the handshape to 'pick out a referent with the characteristics of being vertical, wide and flat' bring to mind that walls do not move and indicate to the addressee that the movement is representing the points where the object starts and stops in space, not that the wall is moving.

4.2 Imitation of real-world action

The second type of movement introduced in classifier constructions is a stylistic imitation of real-world movement (Schick, 1987, p. 9). This means that imitation movements are not gestural representations that are completely mimetic in nature, but conform to the rules of American Sign Language in their representations of real-world movement while also depicting real-world movement in an idealized way (Klima & Bellugi, 1979, p. 11).

An example of this type of an imitation movement can be seen in (4). The movement in 'CC1' is a depiction of the action of sweeping a room, mimicking real-world motion.

(4)



1sg broom CC1 1sg thought.appear

"As I was sweeping my room, a thought came to mind."
(ASLTA Conference, American Sign Language Teachers Association & CSD-TV, 2007)

The handshape in 'CC1' functions as a handling classifier, which becomes a full classifier construction with the imitation movement added. This is not a full mimic of real world motion as the right hand is the only hand to change orientation. The left hand moves to the left, but keeps its starting orientation and does not have the same wrist rotation as the right. This gives the addressee enough information to know what is said without having to completely copy real world movement precisely. The imitation movement category has some of the most complex movements in the classifier system as can be seen with the two co-occurring movement in (4) 'CC1' with the right hand undergoing a twisting movement while the left remains stable with a slight movement to the left. The emphasis for the imitation movement category is typically on the motion itself and does not relate to two points in space as a path movement does (Schick, 1987, p. 11).

As a depiction, the imitation movement is understood to be a representation of a real world action or calling attention to a specific part of the concept as important. In (4), once the referent 'broom' has been assigned to the classifier in 'CC1' the movement is easily

understood to be a sweeping motion as it is the only interpretation that satisfies the addressees' expectation of relevance. As a depiction of a real world action, the movement shows how a referent was manipulated by the signer, in this case the broom. The movement conveys a procedural indication to the addressee to manipulate a referent in their cognitive environment and puts emphasis on the depiction as important.

4.3 Single point in space

The third type of movement establishes a concept at a specific point-in-space in a person's mental representation (Schick, 1987, p. 12). This is characterized by a small downward movement in space or the existence of the hand stationary in the signing space (Schick, 1987, p. 12; Supalla, 1982, p. 14). This small downward movement represents a procedural instruction to activate a concept at a specific point in space. Looking at (5), we see this point-in-space movement in both 'CC1' and 'CC2'.

(5)

my dorm IX room have bed three CC1 with table CC2

"My dorm room had three beds with a table at the end of each."
(ASLTA Conference, American Sign Language Teachers Association & CSD-TV, 2007)

Each time in 'CC1' and 'CC2' when the hand moves down, it indicates a bed or table is located at that position. This has a discourse function of drawing attention to the specific location of the items being described, and instructs the addressee on how to set up their mental representation of the dorm room.

In (6), 'CC1' shows the left hand existing in space representing the location of the supervisor with the right hand approaching the left hand.

(6)

1sg CC1 supervisor 1sg write

"I approached my supervisor and began to write furiously."
(ASLTA Conference, American Sign Language Teachers Association & CSD-TV, 2007)

The left hand is an instance of the point-in-space movement showing existence at a specific location which is then approached by the right hand. The left hand just exists in the signing space and the right hand does all of the movement. This existence in space provides the instruction to activate a concept in a specific location of the mental representation of the event without the small downward movement.

5. Explicature and weak explicature

The propositional form of an utterance is developed through enrichment of the logical form using reference assignment and disambiguation of the conceptual meaning. It will yield the fully propositional form known as the explicature through this type of pragmatic inference (Wilson & Sperber, 2012, p. 12).

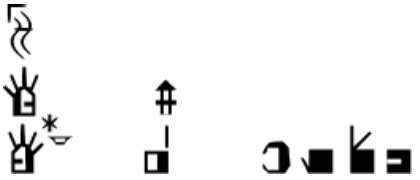
Classifier constructions function in a range of explicature from strong to weak. It is important to understand the range of how strong or weak these explicatures can be.

> The less explicit the meaning, the more responsibility the hearer must take for the interpretation he constructs: in relevance-theoretic terms, explicatures may be stronger or weaker, depending on the degree of indeterminacy introduced by the inferential aspect of comprehension. (Wilson & Sperber, 2012, p. 13)

This states that indeterminacy in the original utterance creates the possibilities for weak explicatures, which are selected by the addressee through the relevance-theoretic comprehension heuristic.

Looking at (2) again, we will see how the classifier construction 'CC1' can convey several weak explicatures due to its indeterminacy.

(2)



CC1 IX C-A-V-E

"The eight of us wound our way up the hill in single file up to the cave."
(DawnSignPress, 1992)

The movement of 'CC1' gives an instruction to move a concept in the addressees' mental representations from a point A to a higher point B. This particular path movement also incorporates a winding imitation movement indicating to the addressees that more went on than simply going from a point A to a point B. The conceptual meaning in this utterance comes from the fingerspelling of the word "cave". This utterance would then require online comprehension processes to assign referents to the classifiers in 'CC1' as well as what the locations are at the beginning and end of the path movement.

These comprehension sub-tasks used are:

> (a) Constructing an appropriate hypothesis about explicatures by developing the linguistically encoded logical form.
> (b) Constructing an appropriate hypothesis about the intended contextual assumptions (implicated premises).
> (c) Constructing an appropriate hypothesis about the intended contextual implications (implicated conclusions)." (Wilson & Sperber, 2012, p. 13)

By online, I mean that these three parts of the comprehension process happen simultaneously and function even while an utterance is being expressed (Wilson & Sperber, 2012, p. 13). This comprehension process applies in relation to (2) as follows. The logical form of (2) is "multiple long thin vertical things going upward from point A to a higher point B and at point B is a cave in a non-typical way." This would be the output of linguistic decoding and the instructions to build a mental representation. The addressees would assume this expression is optimally relevant to the story, and it has already been said that eight friends are planning on exploring a cave. Through referent assignment, the addressees understand that the two handshapes help to pick out the referent of eight friends since they are the only possible referent in this case and are the most accessible.

The movement of 'CC1' combines the path movement of going from point A to point B with a winding motion that could be considered a stylistic imitation of real world movement. Previously, the signer mentioned the cave was located in the mountains. Thus the upward movement of the path movement would be inferred to refer to the mountain. The addressees would apply (b) from the subtasks above and would probably have an assumption like: "going up a mountain would be difficult," or "going up a mountain would have trees and other obstacles," or "mountains can have switch backs on trails." Assumptions like these would be accessible from context. The fact that the signer added the winding movement to the path movement would strengthen these assumptions because without the winding movement it would be a straight movement and would not indicate to the addressees anything but moving from one place to another. When the addressees apply (c) they would come to the implicated conclusion that they probably had to walk through trees or rocks and up a trail to arrive at the cave, which was difficult.

Thus, the fact that the utterance is indeterminate at the encoded concept level requires more pragmatic inference on the part of the addressees as they assign meaning to the utterance and specifically to 'CC1'. In this case the added imitation movement in 'CC1' makes accessible several possible weak explicatures:

- "We hiked through trees up to the cave."
- "We hiked through rocks up to the cave"
- "We hiked on a trail up to the cave."
- "We hiked in single file up the trail."

Based on these possible explicatures, the meaning of 'CC1' is variable depending on the addressee. It is arguable that 'CC1' conveys several weak explicatures at the same time based on the implicated assumptions that are available to the addressees from context and their own background knowledge of mountains and caves. Once the addressees pick an interpretation that fits their expectation of relevance this will lead to the possible implicatures that, "We had difficulty in arriving at the cave," or "We had to take breaks as we walked up to the cave."

Overall, the amount of pragmatic inference needed on the part of the addressees depends on the type of movements used in an utterance and how the movements combine. The use of a movement that is a stylized imitation of real world movement will require more inference on the part of the addressee than the more straight forward path and point-in-space movements.

6. Referents and interpretation

Classifier constructions provide instructions to the addressee to make reference assignment. These concepts can be overtly stated or highly accessible.

6.1 Classifiers referring to overt nominal referent

Classifiers can refer to a previously established noun phrase in the discourse through referent assignment.

In (7) the referent 'bed' comes before the classifier construction 'CC1', which indicates the location of the beds in relation to each other. In 'CC1' the palm is facing down and moves away from the body with three distinct downward movements. The referent 'table' comes before 'CC2' as well. The left hand of 'CC2' refers back to 'CC1' which has picked out the noun phrase 'bed', while the right hand refers to 'table'; 'CC2' then shows the location of the tables at the end of the beds. The tilde under the left hand of 'CC2' represents it being a reestablishment of the left hand from 'CC1' to mean the beds.

(7)

my dorm IX room have bed three CC1 with table CC2

"My dorm room had three beds with a table at the end of each."
(ASLTA Conference, American Sign Language Teachers Association & CSD-TV, 2007)

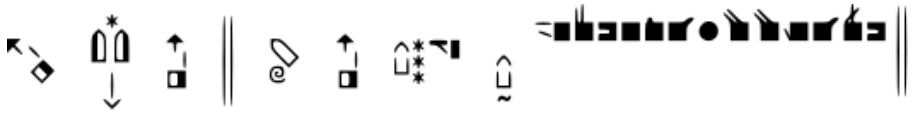
Explaining the interpretation of (7) in more detail, 'CC1' only has one potential referent, that of the bed. This referent assignment is made by using the encoded procedural instruction of the left hand to 'find a referent that is wide and flat'. The only thing that fits that instruction in this context is the 'bed'. Following the RT comprehension heuristic, the use of 'CC1' is motivated by being optimally relevant to the hearer and bringing about more cognitive effects than the sentence would without it. The movement of the left hand in 'CC1' indicates the spatial relationship of the three beds and thus manipulates the concept of 'bed' to show where the beds were placed in the room, as well as repeating the sense of multiplicity previously expressed by the numeral 'three'. This adds the implicated assumption that "the beds were in a row," which would be new information to the addressee. This could strengthen or weaken other possible assumptions the addressee may have had about the setup of the room.

The use of 'CC2' is more complicated as there are two potential referents for the right hand . Like the left hand of 'CC1' it encodes the instruction to 'find a referent that is wide and flat'. To resolve this referent assignment conflict, the signer re-establishes the left hand in the signing space in the same position as it appeared as the active articulator in 'CC1'. The left hand then remains stationary as the right hand moves. Through relevance the left hand is understood to be the 'bed', as it is stationary (hence a reference to old information) in the same position as it had in 'CC1'. Then 'table' is the

only referent left for the right hand to refer to. Another factor is that since 'table' is the most recent possible referent it requires less effort to establish the right hand as referring to the table instead of the bed. Taking 'bed' as the referent would require understanding the bed to have changed orientation from what was described in 'CC1' and would therefore not be optimally relevant. By using 'CC2' the addressee is able to gain cognitive effects through the implicated assumption that "the tables were at the end of the three beds" by the addition of the one construction. Through the use of the two constructions 'CC1' ("The beds were in a row horizontal to each other") and 'CC2' ("There was a table perpendicular to the end of the three beds") the signer was able to convey two entire propositions in two constructions. This would have taken several lexical items to explain. Using classifier constructions thus reduces the processing effort required for the addressee than producing the same utterance with only lexical signs.

Once the referent is established, the classifier construction then indicates how to enrich and fully develop the explicature, allowing the classifier construction to be used without the referent being restated later in the discourse as show in the next example which come from an academic lecture where the referent 'questionnaire' is indicated in the beginning and is then never mentioned again throughout the discourse. Instead it is only referred to with classifier constructions. The introduction of the referent is shown in (8).

(8)



IX ask IX please IX CC1 CL1 Q-U-E-S-T-I-O-N-N-A-I-R-E

"He asked him, please fill out this questionnaire."
(Padden, 1988)

In (8), 'CC1' represents the action filling something out, which is then specified to be a questionnaire by leaving the left hand from 'CC1' in the signing space (as a classifier 'CL1') while the right hand simultaneously fingerspells 'questionnaire'. This establishes the referent to the classifier 'CL1' at the same time the noun phrase is articulated. The questionnaire is the only possible referent for 'CL1'. 'CL1' encodes the instruction to 'find a referent that is wide and flat', and in context of the questionnaire, is something that can be filled out.

In (9), which comes later in the same lecture as (8), the questionnaire is continually referred to with  'CL2' which has changed direction from 'CL1' in (8) above.

(9)

CC1 CL2 your CL2 parents CL2 deaf

"Your parents are deaf."

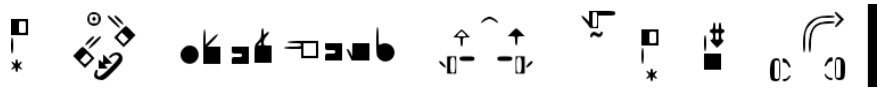
"You also have deaf friends. Pick those on the questionnaire."
(Padden, 1988)

In 'CC1' the left hand represents the referent "questionnaire", which was set up at the beginning of the discourse, while the right hand makes a sweeping motion across the left palm pointing to the questionnaire as the source of the question represented in the next three signs. 'CL2' is then held throughout the first part of (9), continuing to represent the full nominal referent "questionnaire". The next three lexical signs are produced as the left hand representing the questionnaire is held. This indicates the connection of the signs to the questionnaire, and the lexical signs are understood to be a question related to deaf parents.

In the second half of (9) 'CL2' is produced with the left hand while the right hand simultaneously signs the lexical sign 'pick'. This is also a case of inferentially associating 'CL2' to the questionnaire established at the beginning of the discourse through reference assignment. The questionnaire is the only referent that satisfies the handshape procedural instruction to 'find a referent that is wide and flat.'

The significance of this section is made clearer when looking at the possible cognitive effects of the use of the left hand to represent the questionnaire. In the first part of (9) we see that the signer uses the left hand as a type of anchor in the discourse. The addressees assume that whatever is active in the signing space is relevant according to the presumption of optimal relevance and thus that the questionnaire continues to be relevant. This allows a link to be established between what is said and the questionnaire without there being an overt statement that it is a question on the questionnaire. The signing of the word 'pick' at the end while pointing to the questionnaire leads the addressees to the implicated conclusion that they should fill out the questionnaire and indicate that they have deaf friends. This also leads the addressees to the cognitive effect of strengthening the assumption that what the speaker is saying is related to the questionnaire; even though at the beginning that would not be clear without the left hand remaining active in the signing space.

In (10), which is from the same text, the signer fingerspells 'overhead' and then points to an overhead projector in front of her, which indicates the use of real space, instead of her abstract space, for 'CC1' (Supalla, 1982; Schick, 1987). This allows the addressee to include the real environment in the signer's use of 'CC1' as a handling classifier, which indicates handling the overhead and moving it up and to the right. The table in real space is to her right and contains the surface on which she is planning to put the overhead. Thus, even though the table is not overtly mentioned, it is inferred as the surface on which she plans to place the overhead.

(10) 

1sg use O-V-E-R-H-E-A-D go.ahead 1sg IX CC1

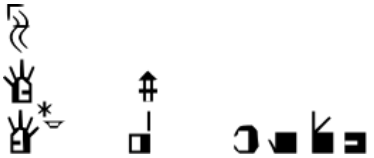
"I need to use the overhead. Is it alright if I lift it onto the table at my right?"
(Padden, 1988)

Taking a closer look at 'CC1' we understand it to be an object of some girth since the handshapes of both the left and right hand are being used together as a handling classifier that also specifies the girth of the intended object. The procedural instruction of these two hands working together would be 'find a referent with the indicated girth, as specified by the distance between both hands that can be gripped'. We are then able to narrow the possible referents in the environment. This is made even more explicit by the use of an indexical point at an overhead nearby. Thus, the overhead is the only clear referent that 'CC1' can refer to. Looking at the possible gain by using 'CC1', the addressees can fill out the full explicature of 'CC1' as the proposition "Lift the overhead onto the table to my right." The benefit of using 'CC1' as opposed to lexical signs to express the full proposition, is once again to reduce the processing effort by using one sign to convey a full proposition instead of numerous lexical signs for the same cognitive effects.

6.2 Classifiers referring to highly accessible nominal referent

Classifiers can also pick out referents that are highly accessible in the cognitive environment if the context is activated in the addressee's mind.

In (11) we see that there is no overt referent for 'CC1' in this sentence.

(11) 

CC1 IX C-A-V-E

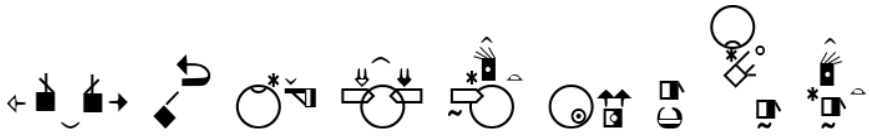
"The eight of us wound our way up the hill in single file up to the cave."
(DawnSignPress, 1992)

The referent for this classifier construction comes from the beginning of the text when the speaker mentioned going on a trip with seven of her friends. It is only through a search for relevance that 'CC1' is understood to be the seven friends and the signer, making eight total. This is done by first assuming that the speaker is trying to be optimally relevant, so the addressees will try to connect 'CC1' to something in the discourse that satisfies their expectation of the message being relevant.

'CC1' encodes several instructions. First, the handshapes encode the instruction to 'Pick out a referent with the characteristic of long, thin, vertical and multiple.' In this case, the number of both hands together actually matches that of eight people, but the four or five fingers typically indicates a more general instruction to pick out multiple objects. In the context the only highly accessible referent would be the eight people and so this would be the easiest interpretation that satisfies the addressee expectation of relevance. Second, the movement in this construction includes two different movements. The first is a path movement that encodes an instruction to manipulate the referent from point A to point B. The second is a winding motion co-occurring as a stylistic imitation of real world movement upward that indicates to the addressee to search for more meaning in the utterance than a simple movement of the referent from point A to point B. This implicates the proposition, "We had to walk single file and wind our way up the hill." The use of 'CC1' reduces the processing effort in conveying that proposition than using lexical signs. This proposition can only be filled out through reference assignment and an expectation of relevance to the story of going up to a cave.

Another example of the referent being picked out from a highly accessible context can be seen in (12) from the same story. The context for this sentence is the same: four boys and four girls going up to explore a cave. In this example the first two classifier constructions work together to form the *ad hoc* concept headlamp, pulling the referent "headlamp" from the highly accessible context of eight people entering a cave. The third and fourth classifier constructions establish the *ad hoc* concept of a flashlight with a large lower hanging battery. There is no overt referent anywhere in the discourse for the first two classifier constructions (unlike in (11)) and 'light' is only an approximate overt referent for the third and fourth classifier constructions.

(12)



ready IX boy CC1 CC2 girl CC3 light.CL1 CC4

"We were ready to go. The boys had headlamps and the girls had large flashlights." (DawnSignPress, 1992)

The speaker introduced the context of the story as eight friends going to explore a cave. She then signs, "We were ready to go." followed by 'boy', 'CC1' and 'CC2'. The construction 'CC1' encodes an instruction to 'pick out an object that is wide and flat on the head,' a search for relevance could probably result in any type of hat. But the speaker narrows the possible referents by leaving the left hand  as an anchor and adding the right hand  which encodes something close to 'pick out an object that is emitting.' The context of being ready to go to a cave leads the addressee to the implicated premise that the boys were wearing headlamps as one item that would be helpful in a cave, whereas other types of headgear would not be. In addition, by signing 'boy' before these constructions it is possible for the addressees to assign the classifier constructions to the noun 'boy', leading the hearer to connect 'boy' with the headlamp construction.

The signer goes on to sign ‘girl’ then proceeds with another construction ‘CC3’ which encodes ‘pick out an object that can be gripped’ with the right hand and ‘pick out an object with this specific girth’ with the left hand. She then maintains the right hand as an anchor while articulating the lexical sign for ‘light’ with the left hand. The right hand continues as the anchor while the left hand signs the classifier , which encodes ‘pick out an object that emits.’ The classifier, takes on the only possible referent in the sentence, ‘light’, and connects it to the right hand anchor , which is gripping the handled object from ‘CC3’. Looking at the context, it is possible for the addressees, expecting optimal relevance from the speaker, to narrow their search of a referent from the constraints of the encoded instructions in the handshapes. The addressee will find that the only possible referent in context would be a “flashlight with a handle and a large lower hanging battery with the light bulb near the top at the handle.”

In the case of ‘CC3’ and ‘CC4’, it would take more processing effort to assign referents to the classifier constructions than to use the lexical sign ‘flashlight’. Following the comprehension heuristic, the speaker should not make an utterance that is overly taxing when it comes to processing effort. To explain this seemingly contradiction we need to look at cognitive effects.

The cognitive effects gained by ‘CC1’, ’CC2’ and ‘CC3’, ‘CC4’ justifies the increased processing effort by the implicated premises they introduce. With ‘CC1’ and ‘CC2’ the implicated premise is that “the boys were wearing a headlamp” and with ‘CC3’ and ‘CC4’ that “the girls had large flashlights with a lower hanging battery.” This is acceptable from a processing effort standpoint because of the specificity given by the two *ad hoc* concepts that were narrowed from the general concept of light. The justification of the processing effort is the more detailed information conveyed with the classifier constructions compared to what would be conveyed by the simple lexical sign ‘flashlight’.

7. Lexical pragmatics and *ad hoc* concepts

Classifiers and classifier constructions also instruct the addressee to create new concepts from the encoded concepts in discourse through a process of broadening or narrowing. This is one of the ways these constructions can add to the propositional content of the message through the use of inference. This is done with classifier constructions instead of lexical signs because it reduces processing effort by conveying complex propositions in less time by forcing the addressee to infer and fill in the gaps of the fully propositional form, also called the explicature, than using lexical signs to do the same thing.

Discussing the three generally recognized classifier construction types separately allows us to understand how they indicate that the addressee should create *ad hoc* concepts or manipulate concepts.

Entity classifiers represent the whole of a concept. When used in classifier constructions they can manipulate *ad hoc* or general concepts. For example, in Figure 4, the right hand moves toward the left hand.

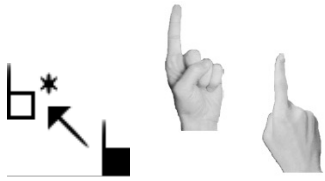


Figure 4. Entity classifier construction

If this was signed after two people were introduced as the referents, the context of people would be highly accessible. The right hand moving towards the left hand would be inferentially interpreted as the person represented by the right hand walking up to the person represented by the left, as this is the most accessible interpretation. Using the classifier construction provides an instruction to manipulate the whole of a referent whether they are general or *ad hoc* concepts.

SaSS handshapes work to redefine a general concept into a narrower *ad hoc* concept. This is done to help inferentially pick out a specific object or bring attention to specific details that are important to the discourse. They can also be used to pick out a highly accessible referent by putting constraints on the possible set of referents in context through procedural instructions.

Figure 5 is an example of a SaSS. The two hands working together indicate the size of the referent, while the tense movement represented by the '~' symbol emphasises the spatial relationship, which provides information to the inferential interpretation of this construction.

Figure 5. SaSS classifier construction

In the context in which this construction was used, the two hands were referring to the bristles of a broom. The tense movement informed the hearer to place importance on the size of bristles and their strength. This took encyclopedic entries from the encoded concept broom and narrowed them to a specific subset of really thick bristled brooms. The handshapes encode the instruction to 'pick out an object that is gripped with the full hand or of the same round shape', in this instance, 'pick out an object of the same round shape.'

Handling classifiers manipulate *ad hoc* or general concepts by showing how objects are handled by a person or other referent in the discourse. They can also provide an instruction to create *ad hoc* concepts through broadening when applied to abstract referents. The handshape helps the addressee to pick out referents in discourse by using encoded procedural instructions to indicate how an object is handled.

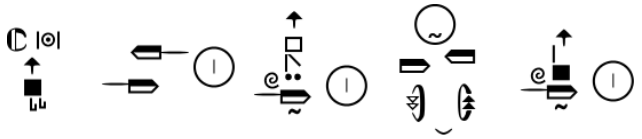
In Figure 6 the handshapes are the same and move apart as if they were opening a book. This is a stylistic imitation of real world movement.

Figure 6. Handling classifier construction

In the context of this example, the signer was talking about culture as the referent for this construction. This construction was used to broaden the abstract concept of culture to that of something that could be handled like a book and read. This took encyclopedic entries from book-like objects and applied them to culture creating an *ad hoc* concept CULTURE*.

Classifier constructions can work together to create *ad hoc* concepts involving the relative size of two classifiers and their referents, such as in 'CC1' in (13) below.

(13)



CC1 CC2 CC3 CC4 CC5

"We crawled into the small cave and continued forward on our stomachs."
(DawnSignPress, 1992)

'CC1' consist of an entity/SaSS classifier and an entity classifier. The right hand is assigned the referent of the eight friends as they are the only possible referent of the encoded instruction to 'pick out a referent that is animate and crawling'. The right hand shows how they entered the cave, which was on their stomachs as represented in the orientation of the right hand. The classifier construction also gives the addressee the implicated assumption that if people had to crawl on their stomach, then the cave was too small to walk through. Using these constructions provides positive cognitive effects while increasing the relevance to the addressee. The left hand could be considered a SaSS or an entity in this particular case because it represents both the size and shape of the cave and the mouth of the cave. So the left hand provides an instruction to 'pick out a referent that can be gripped with the whole hand or of the same round shape'. The concept cave is the only referent available from context, and thus represents the entity as a whole, while also representing its size relative to the size of the right hand's referent. Through involvement of both hands, it allows for a comparison of size between the cave mouth and the people entering it. This narrows the general concept of cave to become the *ad hoc* concept CAVE*, that is, a small cave that people have to crawl through to enter. Also, since the left and right hand are produced simultaneously in the signing space and the referent picked out by the addressee is the cave, the left and right hand's instruction is

to ‘pick out a referent that is of the same round shape’ instead of, ‘pick out an object that can be gripped with the full hand’.

Since the right hand  in ‘CC1’ is understood as a person moving into the mouth of the cave as represented by the left hand, ‘CC2’ is understood from the person’s point of view indicating how narrow the cave tunnel was as they moved along. The two hands in ‘CC2’ represent the cave floor and ceiling, since they are the most highly accessible referents after understanding ‘CC1’ to mean “crawling into a cave.” The left hand of ‘CC2’  , which represents the floor, is held as an anchor and continues into ‘CC3’ which represents the group of people continuing forward on their stomachs down the tunnel. The continuation of  as an anchor in ‘CC3’ connects the addressee to the small space of ‘CC2’ as the concept of people is manipulated with the right hand  to show them moving further into the cave. By encoding the instruction to ‘pick out an animate biped’ the handshape  limits the possible referents to the people in the cave and thus represents their motion forward.

Throughout (13) all of the movement relates to the people and how they interacted with the cave. When one of the two hands is held in position it represents the cave itself, creating a salient concept that is accessible. When ‘CC4’ is signed. it is understood to indicate how the people were able to move along the floor of the cave by almost crawling, propelling themselves with their hands. Finally, ‘CC5’ gives a general representation of forward movement, with the general motion classifier  moving forward. All of this continues to narrow the concept of cave into a more and more specific concept of CAVE* while also manipulating the referent ‘eight friends’ by showing how they interacted with the cave.

It is possible to understand the referents in (13) because of the fingerspelling of ‘cave’ before this utterance which activated the concept cave, and because of the schema of people going into something. In context, the eight friends were the only people involved and the cave is the only thing they could be crawling through. Thus, through a search for relevance we choose the context that gives the most positive cognitive effects with the least amount of processing effort. If these concepts were produced with lexical signs alone, they would take more processing effort and would still not represent the information as clearly and accurately as do the underdetermined classifier constructions that limit the possible referents and then add detailed meaning by providing instructions to form *ad hoc* concepts or manipulate general concepts.

Since the whole clause in (13) is produced with underdetermined classifier constructions, it leads the hearer to multiple weak explicatures that could apply to each classifier construction.[4] The current free translation is just a small summary of the possible propositions this set of classifier constructions could convey. Another perfectly acceptable free translation would be, “We crawled in to the small opening of the cave on our stomachs with barely enough room to squeeze in. The walls and ceiling left little room to move as we struggled forward deeper into the cave. We had to use our hands to propel ourselves forward with great difficulty and we slowly made forward progress deeper into the cave.”

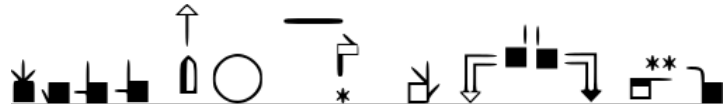
[4] “Explicature may be weaker or stronger, depending on the degree of indeterminacy introduced by the inferential aspect of comprehension.” (Wilson & Sperber, 2012) Since classifier constructions have a high degree of indeterminacy the possible explicatures range from stronger to weaker. The stronger is the more obvious, while the weaker is father from the central meaning conveyed.

The only translations that would be ruled out would be those that do not satisfy the instructions of all the classifier constructions. For example, it would rule out the translation that it was a large cave because it conflicts with 'CC1' that indicated a small opening to the cave, even though neither the lexical sign large or small were used.

This second free translation shows that there was significant processing effort in assigning referents to these classifier constructions, but the number of weak explicatures possible provided many positive cognitive effects, making the effort to fill out the propositional form from the activated context for this utterance worth it. Communicating the above propositions with only lexical signs would require even more processing effort because of the large number of lexical signs required. The addressee accessing the immediate contextual assumptions and assigning the referents to the constructions took less processing effort because the classifier constructions pulled from previously activated concepts and assumptions. The lexical signs would be activating new concepts with every sign and thus would require more processing effort for less gain and would not be optimally relevant. As a result, the addressees would likely experience it as boring. Also, the use of classifier constructions allows for several weak explicatures to be communicated simultaneously that would have to be fully fleshed out if the speaker were to use lexical signs to convey the same meaning.

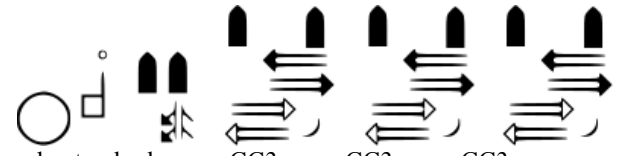
Another example of the creation of *ad hoc* concepts can be seen in the use of classifier constructions in (14).

(14)



W-A-L-L CC1 have three CC2 closet

"On the left there was a wall with three closets…"



understand door CC3 CC3 CC3

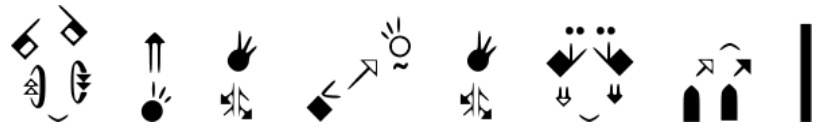
"…that had sliding doors."
(ASLTA Conference, American Sign Language Teachers Association & CSD-TV, 2007)

With 'CC1' the signer indicates a large, flat, vertical object to the left. The only available referent is the immediately preceding fingerspelling of 'wall'. This is the base concept that is modified by 'CC2'. In 'CC2' a SaSS is used to outline the door frames of the closets. It is understood that 'CC2' is modifying the concept 'wall' to WALL*, which includes three closets in it. This is done through reference assignment since 'wall' is the only referent that 'CC2' could be describing as having a large square on it. Then, the lexical sign 'closet' clarifies that 'CC2' is not just a large square on the wall, but the door frame of three closets. The second classifier construction 'CC3' modifies the concept of

door that comes right before it. This is a case of an entity classifier construction providing an instruction to create an *ad hoc* concept DOOR* through narrowing, so that DOOR* represents sliding closet doors only. By using these two classifier constructions the signer is able to reduce processing effort for the addressee by allowing the addressee to pick out the referent and then modify it using underdetermined handshapes that are assigned to the referent. The handshapes are clearly understood through the addressee's search for relevance which involves looking at the procedural instruction of the handshape and finding the limited set of possible referents that fit the instruction and assigning the full referent.

The next example, (15), is an example of broadening using a handling classifier construction as 'CC1'.

(15)



sign CC1 CC2 look CL1 CC2 analyze IX-POSS

"They picked out signs individually to be looked at and analyzed."
(Padden, 1988)

In 'CC1' we see the right hand encoding an instruction to 'pick out a referent that can be picked up with two fingers.' The only possible referent in this sentence and context is the abstract concept of a sign (an ASL sign). In this context, the speaker was talking about two different approaches to analyzing signs, this one being a more analytical, vocabulary method, in contrast to the other teaching ASL as a full language. The concept 'sign' becomes broadened to SIGN* by taking encyclopedic entries of 'things that can be picked up' and applying them to the abstract concept. Thus the concept 'sign' gains the property of being able to be picked up as if it were a physical object. This act of broadening seems to happen by applying physical attributes to abstract concepts that typically have no shape.

8. Conclusion

In this paper I have claimed that classifiers encode procedural instructions to help the addressee pick out the intended referent for the procedural referring expressions made with classifier constructions. I explained that the three classes of classifiers manipulate concepts differently and that some instruct the addressee to create *ad hoc* concepts though the use of inference, narrowing, and broadening. I also made the case that classifier constructions do not encode a conceptual meaning, but a procedural instruction. They can only be understood once referent assignment has been made, and then the meaning of the motion and orientation of the constructions can be understood through a process of inference.

Classifier constructions function in an anaphoric way, referring back to previous discourse or highly accessible referents in the addressee's cognitive environment. When an utterance is signed the addressee then infers what is being referenced by the

classifier constructions and understands the meaning of the construction through referent assignment, disambiguation, and inference. The addressee interprets the handshape, orientation, movement, and facial expression in context of the activated referent and then through inference comes to a conclusion as to what the construction meant. The process of having the addressee infer the meaning, instead of the speaker making it overt, reduces processing effort and can convey complex concepts in a shorter period of time with fewer signs than using strictly lexical signs.

I explained how classifier constructions, being underdetermined, encode instructions that instruct the addressee on how to fill out the explicature of an utterance. Often, because of their indeterminacy, they are able to convey several weak explicatures simultaneously in a shorter period of time than would be used by lexical signs to convey the same concept. Using classifier constructions instead of lexical signs increases the number of cognitive effects, using fewer signs, with less processing effort on the part of the addressee compared to the number of lexical signs required to convey the same propositions.

I have shown that classifier constructions function in a procedural way to convey complex propositions and instruct the addressee to manipulate concepts or create *ad hoc* concepts through inferential processes. Relevance Theory adequately describes how and why classifier constructions are used and how they convey meaning through inference and the use of the relevance-guided comprehension heuristic and the communicative principle of relevance by that of the addressee.

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