Advances in the study of signed languages within a cognitive perspective

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Abstract: In this paper we describe a cognitive grammar approach to the study of signed language grammar. Using data from different signed languages, we explore three broad topics. First, we examine pointing, Place, and placing. We analyze pointing as a construction consisting of a pointing device, a symbolic structure which directs the interlocutor's conceptual attention, and a Place, a symbolic structure consisting of a spatial location and a meaning, the focus of attention. Placing is a construction in which non-body anchored signs are placed at a location in space, thereby creating or recruiting a Place structure which can be used in subsequent discourse. We examine how these structures work in nominal grounding and in extended discourse. Second, we examine a cognitive grammar approach to grammatical modality. Our analysis is based on the cognitive model called the control cycle, which posits two types of control: effective, which describes our striving to influence what happens in the world, and epistemic, which concerns how we make sense of the world. We explore how effective and epistemic modality are expressed in facial displays, focusing on the brow furrow and a display with down-turned corners of the mouth we call the horseshoe mouth. Finally, we offer a brief account of a cognitive grammar approach to the relation between sign and gesture.

Key words: Cognitive grammar. Pointing. Modality. Gesture. Signed Languages.

1. Cognitive Linguistics and Signed Languages

Cognitive linguistics began in the 1970s from the work of a group of linguists and other researchers seeking to develop an approach to language based in embodied cognition and a usage-based perspective. Cognitive linguists are engaged in examining a number of areas, including metaphor, metonymy, iconicity, conceptual blending, force dynamics, discourse, and even poetics and literary discourse. Gesture researchers have adopted the cognitive linguistic perspective (Cienki 2005; Cienki 2016; Kok & Cienki 2015; Müller & Cienki 2009; Ruth-Hirrel & Wilcox 2018). Many signed language linguists have now embraced the cognitive linguistic approach to examine these same issues and more (Wilcox 2004; Wilcox 1998; Wilcox 2000; Wilcox 2006; Wilcox 2009; Ferrara & Hodge 2018; Lepic & Occhino 2018; Dudis 2004; Liddell 2003; Janzen 2004; Shaffer 2012; Wilcox & Shaffer 2017). In this article, we report on a series of research studies conducted by

our team on signed languages using the theory of cognitive grammar (Langacker 1987; Langacker 1991; Langacker 2000; Langacker 2008; Langacker 2009). Section 2 introduces some basic cognitive grammar (CG) concepts. Section 3 addresses three mechanisms, pointing, placing, and Places, that perform grounding functions in signed languages. Section 4 introduces an important cognitive model, the control cycle, and examines its role in the meaning of facial displays. Section 5 briefly touches on a central issue, the relation between sign and gesture. Section 6 offers our conclusions.

2. Cognitive Linguistics and Cognitive Grammar

CG claims that only three structures are needed to account for language function: semantic, phonological, and symbolic. **Semantic structures** are conceptualizations exploited for linguistic purposes. **Phonological structures** include sounds, gestures, and orthographic representations; an essential feature of phonological structures is that they are able to be perceived. **Symbolic structures** reside in the associative link between phonological and semantic structures.

Schematization is "the process of extracting the commonality inherent in multiple experiences to arrive at a conception representing a higher level of abstraction" (Langacker 2008, p. 17). Schematization can be carried out to varying degrees of abstraction. High level schemas subsume but do not necessarily replace lower level schemas. The more specified structures are called **elaborations** or **instantiations** of the schema. Schematization applies to phonological and semantic structures. Fully specified symbolic structures are pronounceable and perceptible usage events with a fully contextualized meaning, both what is said explicitly and what users can infer. As a consequence, a usage event is never precisely the same from user to user.

Symbolic structures combine with other symbolic structures to form complex symbolic assemblies. In CG terms, the **component** symbolic struc-

tures integrate to form a **composite** structure. **Correspondence** indicates how component and composite structures fit together to produce a coherent assembly. Often one of the component structures of a construction contains a schematic sub-structure which the other component elaborates by characterizing it in more detail. Both phonological and semantic schematicity and elaboration play an important role in our analysis of signed language constructions.

Generally speaking, **lexicon** resides in fairly specific symbolic assemblies, and grammar resides in more schematic ones. **Grammatical markers** are specific at the phonological pole and tend to be quite schematic at the semantic pole (Langacker 2008, p. 22). Symbolic structures also vary along the dimension of **symbolic complexity**. Symbolic structures of increasing complexity arise by combining **component structures** into ever larger **composite structures**.

In cognitive grammar, rules or generalizations take the form of schematic templates, patterns abstracted over symbolically complex expressions: "Complex expressions consist of specific symbolic assemblies, and the rules describing them are schematic assemblies that embody their common features" (Langacker 2008, pp. 23-24). A significant implication of this view is that lexicon, morphology, and grammar form a continuum of symbolic assemblies of any degree of complexity and schematicity.

Phonological, semantic, and symbolic structures are abstracted from **usage events**: "instances of language use in all their complexity and specificity" (Langacker 2008, p. 547). CG views discourse as the ongoing succession of **usage events**, actual instances of language use (Langacker, 2001). Discourse takes place within a shared **ground** which consists of the speech event, the speaker (S) and hearer (H), their interaction, their conception of reality, and the time and place of the speech event (Figure 1).[1] Discourse

[1]Figures 1 and 2, from Langacker, refer to speaker (S) and hearer (H). Because we are focusing on signed languages, we will refer to the signer (S) and the interlocutor (I).

also takes place within a **current discourse space** (CDS), "everything intersubjectively accessible to the interlocutors as the basis for communicating at a given moment in the flow of discourse."

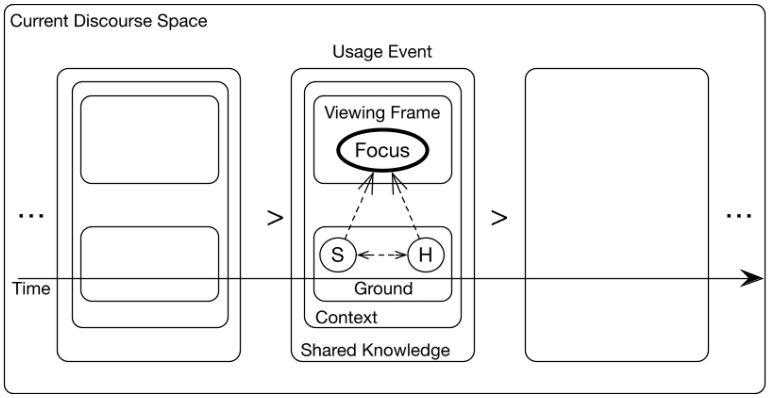


Figure 1: Discourse Usage Event

One goal of discourse is **intersubjective alignment**: "momentary alignment in the interlocutors' scope of awareness and focus of attention" within this shared discourse space (Langacker 2017, p. 14). Signers and speakers achieve intersubjective alignment by recruiting the symbolic resources available to them to manage their limited attentional and conceptual "field of view," akin to the visual field of visual perception. As Langacker (2001, p. 145) explains, "Metaphorically, it is as if we are 'looking at' the world through a window, or *viewing frame*. The *immediate scope* of our conception at any one moment is limited to what appears in this frame, and the *focus* of attention." Included within the immediate scope of conception is an expression's profile, its semantic focus of attention (Langacker 2016). Of course, for signed languages, this description is not entirely metaphorical: the resources available to signers for managing and directing attention include the signer's and interlocutor's visual field and the signer's use of the hands to direct visual and conceptual attention.

Two broad classes of entities on which interlocutors strive to achieve intersubjective alignment are **things** and **occurrences**. An occurrence is "something that occurs (happens), a relationship that exists in time" (Langacker 2016, p. 77). A thing is "something conceived as a single entity — intrinsically (like a point of light) or as the result of grouping (like a team)" (Langacker 2016, p. 63). Clauses profile occurrences; nominals profile things.

3. Pointing, Places, and Placing: Grounding

In CG, **grounding** refers to expressions that establish a connection between the ground (the speech or sign event, its participants, and the immediate circumstances including the time and place of speaking or signing), and the content evoked by a nominal or finite clause (Langacker 2008). Nominal grounding permits the signer or speaker to direct the interlocutor's attention to the intended discourse referent. Clausal grounding situates the profiled relationship with respect to the speaker's or signer's current conception of reality. As described by Langacker (2008, p. 259), "If left ungrounded, this content has no discernible position in their mental universe and cannot be brought to bear on their situation. It simply floats unattached as an object of idle contemplation." One way that signed languages achieve nominal grounding is with pointing constructions.

3.1. Pointing Constructions

Pointing is a ubiquitous feature of signed languages (Barberà & Zwets 2013; Meier & Lillo-Martin 2013; Wilcox & Occhino 2016) and of spoken languages (Clark 2003; Johnston 2013; Kendon 2010; Kita 2003). Langacker (2016, p. 110) considers pointing to be the baseline for explicit nominal grounding and for definite grounding in particular. An act of pointing takes place within the current discourse space, which includes the ground and the physical surroundings. Pointing has a directive force: it directs the interlocutors' conceptual attention "to follow its direction, so that both interlocutors end up focusing attention on the same entity, the gesture's inten-

ded referent" (Langacker 2016, p. 110). Figure 2 depicts the CG analysis of pointing. G is the ground; S and H are the speaker and hearer. The double-headed dashed arrow represents their interaction in the current discourse. The pointing gesture is represented by the bold arrow from the speaker to the intended referent, the focus of attention (FOC). Directive force is represented by the double arrow directed from the speaker to the hearer; this directive force instructs the hearer to direct her attention (dashed arrow from hearer) to the intended referent.

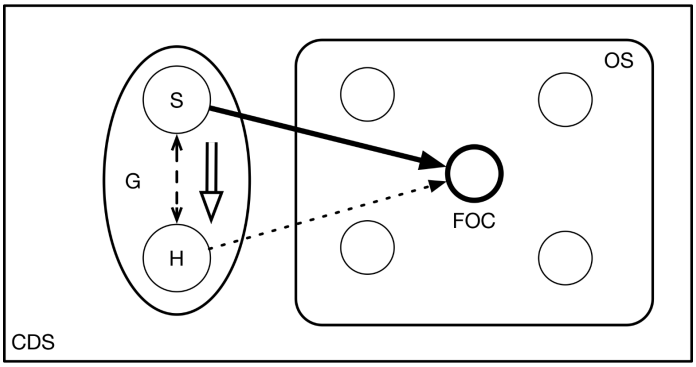


Figure 2: Pointing in Cognitive Grammar

Wilcox and Occhino (2016) extend this CG analysis of pointing to signed languages, observing that pointing is used for nominal grounding in American Sign Language (ASL). They claim that pointing is symbolically complex; that is, pointing is a construction consisting of two component structures: a **pointing device** and a **Place**.[2] Both component structures of the pointing construction are symbolic structures consisting of a form, the phonological pole, and a meaning, the semantic pole (Figure 3). One type of pointing device is an index finger, but others may include hand(s), eye-gaze, mouth or nose pointing, and even body orientation. The schematic

[2]Place is always capitalized to signify that it is the name of the entire symbolic structure, not the phonological pole, which is the location.

meaning of the pointing device is "direct attention." The schematic semantic pole thus is dependent, making reference to some autonomous element which is the focus of attention. This focus of attention is the function of the Place symbolic structure. The phonological pole of the Place is a spatial location in the current ground. The schematic semantic pole of Place is 'thing'.

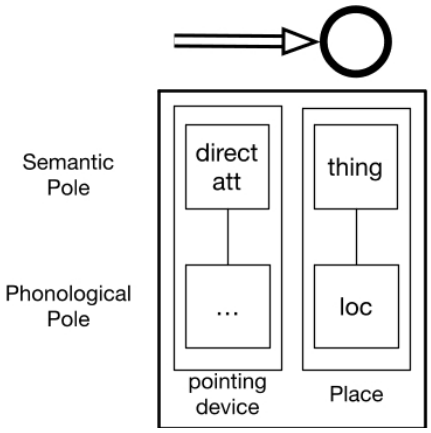


Figure 3: Pointing Construction

The schematic phonological and semantic poles of Place symbolic structures must be elaborated by specific content when produced in an utterance. The specific phonological location of a Place is given by the grammar on a construction by construction basis. For example, comparative constructions in Argentine Sign Language (LSA), and in fact many signed languages, specify two Places, one with a phonological location on the signer's dominant side and the other with a phonological location on the non-dominant side (Janzen 2012; Engberg-Pedersen 1993).

The semantic pole of Place also has to be elaborated. The grammar of a signed language specifies how this takes place within specific constructions. Wilcox and Occhino (2016) describe one such construction in ASL,

the Proxy-Antecedent construction. In the Proxy-Antecedent construction, the signer produces a noun antecedent and then points to a location typically on the dominant signing side, creating a Place and establishing a correspondence between the noun and the schematic semantic pole of the Place. The Proxy-Antecedent construction incorporates as part of its unprofiled base the expectation that the noun associated with this Place will be referred to later in the discourse with an anaphor, a point to the same Place. Figure 4 depicts how this construction is used in discourse. The dotted correspondence lines connecting the two phonological poles indicate that they are directed to the same location, the phonological pole of the Place symbolic structure. The correspondence lines connecting the semantic poles of the two Place symbolic structures and the antecedent noun indicate that they conceptually project to the same entity: they are *coreferential* with the antecedent. Thus, in addition to establishing a Place structure associated with a noun referent which can be recruited later in discourse, the Proxy-Antecedent construction grounds the noun antecedent through the directive force of the pointing device, creating a nominal and identifying its location in the shared intersubjective conceptual space being created by the interlocutors through their interaction in the ongoing discourse.

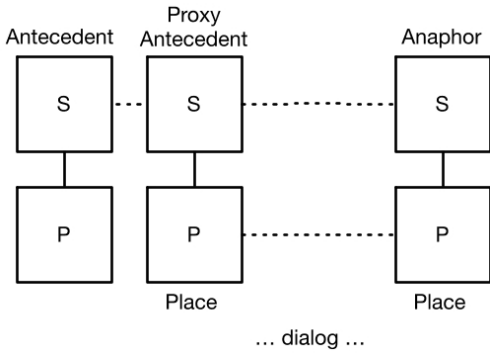


Figure 4: Proxy-Antecedent Construction

In example (1), from Argentine Sign Language (LSA), a portion of which is shown in Figure 5, a pointing construction is used in a more complex nominal clause including an embedded relative clause that syntactically functions as the subject (from POSS1 to the pause, marked with a slash) and a predicate (Martínez & Wilcox 2019).

(1) POS1 NUEVO PROFESOR PT(der.) <MISMO(der.) PRO1 1CONTAR2(perf.) PT(der.)
PARECERSE POS1 MAMÁ PARECERSE PT(der.) > / AYER FALTAR(perf.)
Mi nueva profesora, la que te conté que se parece a mi mamá, ayer faltó.
My new teacher, the one I told you resembles my mother, was absent yesterday.

(a) POSS1 (b) NEW (c) TEACHER (d) PT(right)

Figure 5: Pointing Construction

Anaphor-antecedent constructions are analyzed in CG as **reference point** constructions (Langacker 1993). Reference points invoke the conception of one entity in order to establish mental contact with another.

The reference point relationship is shown in Figure 6, in which C is the conceptualizer, R is the reference point, a salient entity in the current discourse space, T is the target structure to which R provides access, and D is the dominion, the set of entities to which a particular reference point provides access, the set of potential targets.

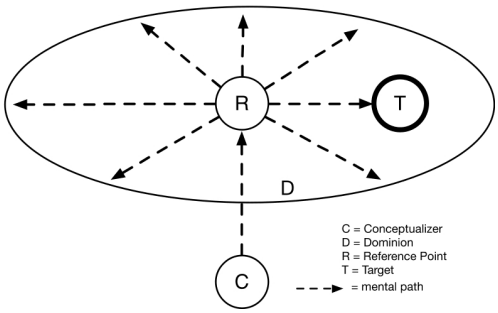


Figure 6: Reference Point

For anaphor-antecedent constructions, reference points work in the following way (Langacker 2000b: 238–239). The semantic pole of a pronoun profiles a schematic thing. It also incorporates the assumption that the speech act participants have mental access to the intended referent, the full nominal antecedent which serves as the pronoun's reference point. Mental access is provided by the reference point: the pronoun target is in the dominion of the reference point antecedent, which is presumed to be salient and accessible to the interlocutors in the current discourse context.

An important feature of anaphor-antecedent constructions as reference point phenomena is that they manifest a **degenerate** reference point relationship: the reference point and the target collapse to a single point in conceptual space. That is, the reference point (antecedent) and the target (pronoun) are co-referential. In signed languages, the Proxy-Antecedent construction incorporates not only this **conceptual degeneracy**, but also a unique type of **phonological degeneracy**: the phonological pole of the pronoun target and the phonological pole of the proxy-antecedent collapse to the same location, the phonological pole of the Place symbolic structure.

3.2. Place and Placing

Martínez and Wilcox (2019) introduced the concept of **placing** to describe the second nominal grounding strategy. The term placing was first used by Clark (2003, p. 185), who identified pointing and placing as two

forms of gestural indicating, that is, of "creating indexes for things." In pointing, speakers *direct* their addressee's attention *to* the object they are indicating. In placing, "speakers try to *place* the object they are indicating so that it falls within the addressees' focus of attention" (Clark 2003, p. 187).

In signed language constructions the objects that are placed are communicative objects: signs may be spatially placed. We observe that there are two types of placing, serving different functions: *Placing-for-Creating* (create-placing) and *Placing-by-Recruiting* (recruit-placing). Figure 7 depicts a generic placing construction. S is the signer, I is the interlocutor, and G is the ground. The bold line with ball end indicates the act of placing. The basic difference is that create-placing creates a Place, while recruit-placing recruits an existing Place. The dashed line with a magnet end indicates the important distinction between pointing and create-placing: rather than directing attention, create-placing serves to *attract* the *attention* of the interlocutor to the Place. Recruit-placing does not direct attention, or even exhibit attractive force; Recruit-placed elements appear to have little if any role in identification. Thus, recruit-placing does not directly serve a grounding function. Rather, recruit-placing associates the semantic poles of the new element with the existing nominal Place. As we will see, the nature of this association varies.

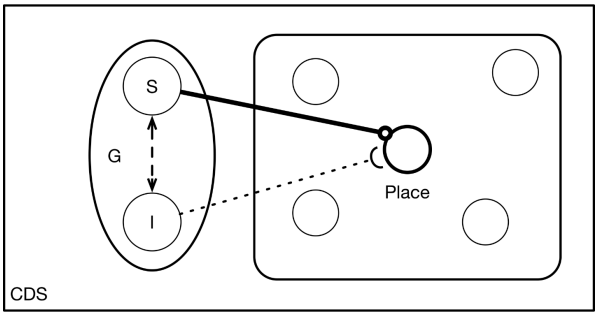


Figure 7: Placing

In create-placing, a lexical sign, typically a noun, is placed at a certain location. This creates a Place; the location of the placed sign becomes the phonological pole of the Place, and the schematic semantic pole of the Place is elaborated by the semantic pole of the placed noun. For example, in Figure 8 the LSA signer uses create-placing to place the sign PERSON on his right. By doing so, he creates a new Place, with a phonological location on the right; the schematic semantic pole of the Place is elaborated by the semantic pole of the noun 'person'. The act of create-placing serves to attract conceptual attention to 'person' and locate it in relation to the interlocutors' shared ground, thus creating a grounded nominal. In recruit-placing, a lexical sign is placed at the phonological location of an existing Place. In other words, having already established a Place, such as with a pointing construction or by create-placing, in later discourse a sign is placed at that phonological location.

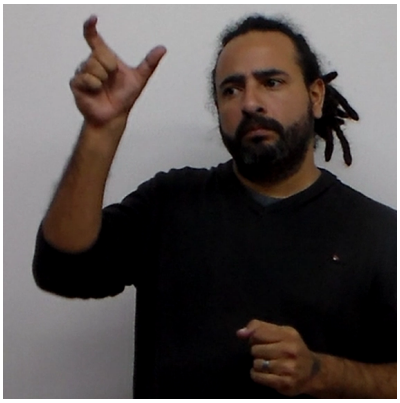


Figure 8: Create-placing the lexical noun PERSON

3.3. Combined Grounding Constructions in Extended Discourse

Pointing and placing are used to ground and track nominals at multiple levels of structure, from clauses to larger constructions, up to discourse topics. The following extended discourse, a portion of which we will analy-

ze, comes from a video in LSA of the official account of the Argentine Deaf Movement or, in Spanish, Movimiento Argentino de Sordos (MAS). This Movement was born in 2012 to support the bill on the national recognition of the Argentine Sign Language that the National Association of the Deaf in Argentina (CAS, Confederación Argentina de Sordos) had submitted to the National Congress. Among other political actions, on November 21, 2012, this group organized a Hug surrounding the Congress that gathered more than 5000 people. The video we analyze shows a message in LSA from two of the Deaf leaders of the Movement, Alejandro Makotrinsky and Pablo Lemmo, to the Deaf community in Argentina. The main goal of this video was to agree on strategies of explaining the linguistic problems of the community in Argentina to people who were not acquainted with it, such as politicians, media, and hearing people in general.

Pablo begins by softening the boundary between groups of people, saying in effect that "people in general" should be respected, that people are not inherently wrong. He then begins his explanation of the goal of the movement:

(2) IDEOLOGÍA(arriba.derecha) PT(abajo.desde arriba)+
IDEOLOGÍA(arriba.derecha) PT(abajo.desde arriba)+ + +
... es ESTA ideología, ESTA ideología.
[...] it is THIS ideology, THIS ideology

Pablo here introduces what will become the overall topic of his discourse: that it is hearing people's ideology that leads them to think that deaf people are mentally challenged, not equal, or are deaf-mute. He does this by first signing IDEOLOGY, a two-handed sign with a location at the head. He holds the non-dominant hand in position at his head and his dominant hand points to the sign. The grounding function of the pointing construction grounds IDEOLOGY as a nominal. However, rather than simply pointing up to the sign (since its location is high in signing space), Pablo reaches his

pointing arm *up above* the sign and points *down* to it. Upward pointing can denote a distal meaning (Martínez & Wilcox 2019). Here, Pablo wants to create a sense of conceptual closeness with the concept of ideology, emphasizing that "this thing we call ideology, *this ideology* that hearing people have, *this* is what we have to attend to and focus on." The sense of conceptual affinity is achieved by the somewhat unusual proximal point; to emphasize that ideology is the culprit, Pablo uses forcefully articulated, reduplicated points marking strong conceptual directive force.

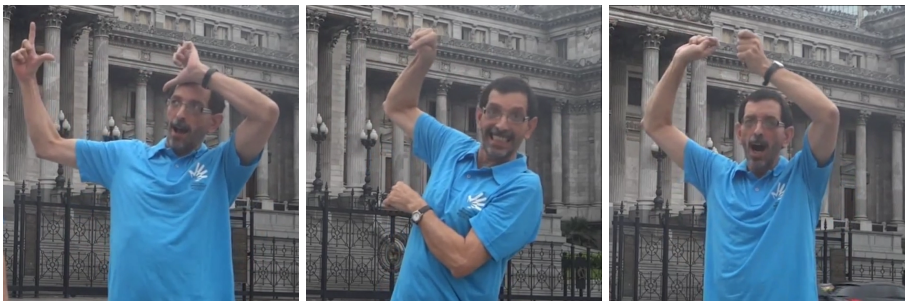
Thus, just as signs as communicative objects may be placed, they also may be pointed to. Signers often point to their hands to direct attention as a way to emphasize either the meaning or the form of a sign. In the construction used by Pablo, pointing to the sign IDEOLOGY grounds the nominal 'ideology' with strong directive force; the downward proximal point is a rhetorical device that brings the topic of 'ideology' conceptually close to his audience. It also creates a Place. Pablo continues:

(3) **IDEOLOGÍA(arriba.derecha) PT(abajo.desde arriba)**+ PRO1 BUSCAR QUÉ / **IDEOLOGÍA(arriba.derecha) CAMBIAR(arriba.derecha) PT(abajo.desde arriba)** PERSONA(hacia su propio cuerpo) CAMBIAR(hacia su propio cuerpo) NEG.

Es esta ideología la que queremos cambiar, no las personas.

It is this ideology that we want to change, not the people.

Figure 9 shows the discourse sequence of the nominal IDEOLOGY, the pointing construction which creates a Place, and later recruit-placing the sign CHANGE in that Place. The three panels correspond to the three panels of Figure 10 (with the exception that Figure 9 shows the index finger pointing device and Figure 10 depicts only the Place).



(a) IDEOLOGY (b) Pointing Construction (c) Recruit-placed CHANGE

Figure 9 IDEOLOGY Pointing and recruit-placing constructions

To express the idea that the goal is to change hearing people's ideology, Pablo recruit-places the sign CHANGE in the newly created 'ideology' Place (Figure 9). CHANGE is unspecified for phonological location; in this construction, the schematic location of CHANGE is elaborated by the location of the Place, which has in turn been elaborated by the phonological location of IDEOLOGY. The semantic pole of CHANGE profiles an action chain, which includes an unexpressed agent and a theme, the changed entity. In this construction, the theme is elaborated through the chain of semantic correspondences between the recruit-placed verb CHANGE to the Place which in turn corresponds to IDEOLOGY. Thus, the theme of the verb 'change' is specified as 'ideology'. Finally, to reiterate the message that the target of change should be a hearing person's ideology and not the person, Pablo places PERSON on his body (the sign is oriented toward his chest), recruit-places CHANGE at this location, and adds NEG[3]: "it is not people that we are trying to change."

Figure 10 diagrams the grounded nominal IDEOLOGY (a) and the Place (b) created by the pointing construction. IDEOLOGY has a full pho-

[3]There are several signs for negation in LSA. According to Pablo Lemmo (personal communication), he selected this two-handed variant because it has a "softer" polite connotation.

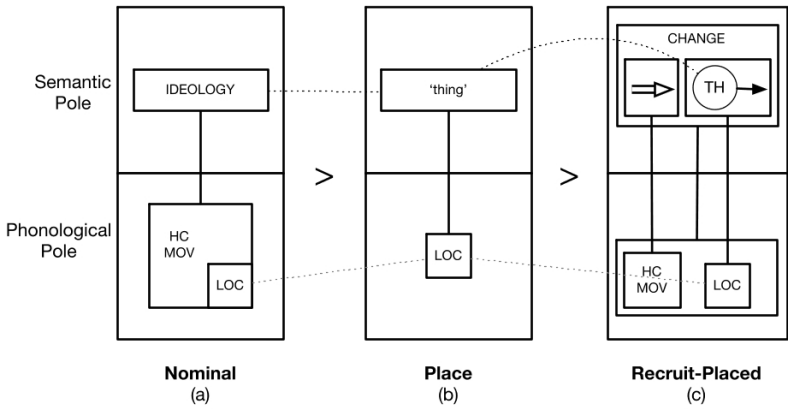


Figure 10: Recruit-placing of CHANGE

nological specification (HC is hand configuration, MOV is movement); its location (LOC) corresponds to (dotted line) and elaborates the schematic location of the Place, and its semantic pole corresponds to and elaborates the schematic semantic pole of the Place. The new Place is, in effect, a proxy for 'ideology', the theme (TH) of the recruit-placed process 'change'. CHANGE, although a single sign, is shown as a construction consisting of two symbolic structures: the action chain process 'change' (double arrow) and the theme 'ideology'.

In this discussion we have demonstrated a few of the ways in which placing of nominal and verbal elements, and proximal pointing with emphatic directive force, interact to create complex meanings which can be used to track topics in an extended discourse. These strategies are also rhetorical devices creatively used by signers to achieve subtle discourse goals, such as we have seen in this political discourse as Pablo strives to avoid confronting hearing people from whom he seeks support in pursuit of the MAS cause.

4. Control Cycle: Modality

Another important cognitive model that plays a ubiquitous role in the grammar of signed and spoken language is the control cycle. The control cycle represents our striving to make sense of the world and to influence or control the world. Making sense of the world is epistemic control: "As living creatures, we are constantly striving for control on numerous levels. Being sentient and intelligent, we strive for control at the epistemic level by constructing and continually updating a conception of reality" (Langacker 2008, p. 153). Effective control describes our striving to influence what happens in the world.

The control cycle consists of four phases, depicted in Figure 11 (Langacker 2013, p. 4). Elements of the control cycle include an actor (A), the actor's dominion (D), a field (F), and a target (T). The actor is an entity who strives for control. In the baseline phase, the actor is in a state of stasis or relaxation. In the potential phase some target enters the actor's field, producing a state of tension and requiring the actor to deal with the target in some way. One way of dealing with the tension is an action in which "the actor exerts force in order to capture the target and bring it under control" (Langacker 2013, p. 5). Depending on the action taken, the actor now either incorporates or excludes the target. The result phase is once again stasis. It is important point to note that both effective and epistemic control require the exertion of force. In effective control this force is **objective**, aimed at influencing reality. In epistemic control we strive to construct a conception of reality, an effortful activity requiring exertion. Being a mental activity, the exertion of force in epistemic control is **subjective**.

Another cognitive model essential to our analysis is the **reality model** (Langacker 2009). In CG, this is the idea that the world evolves in a certain way out of all conceivable ways. There is a certain course of reality in which some events have occurred and others have not. Reality consists

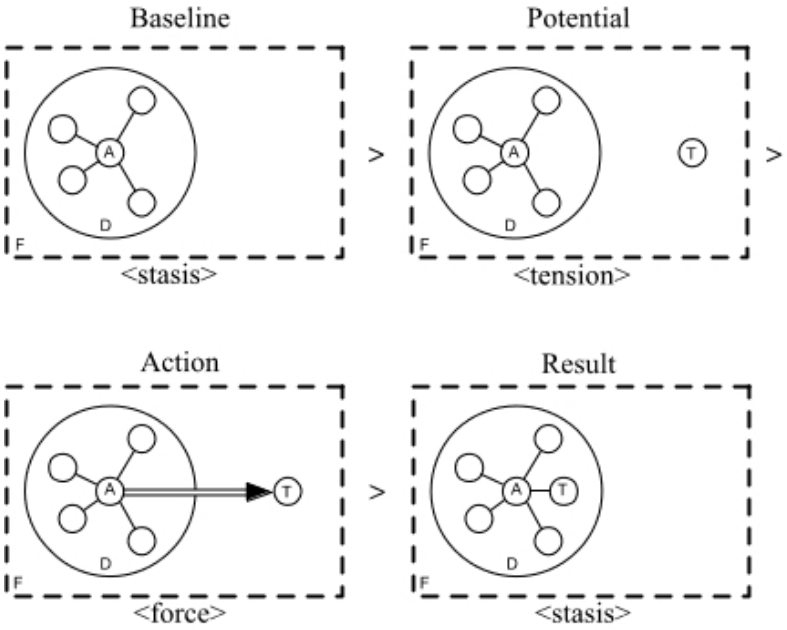


Figure 11: Control Cycle

of those events and situations that have occurred up to the present. Importantly, in epistemic control it is our knowledge of reality that concerns us, our reality conception. By contrast, effective control pertains to effecting the course of "real" reality.

In CG, the notion of reality is elaborated at multiple levels (Langacker 2013). Basic reality includes the baseline level of identification for objects and existence for occurrences: how the profiled thing or event relates to what the interlocutors know. Identification pertains to nominal grounding. For clauses, the epistemic concern is existence, or the occurrence's status in relation to reality. Basic reality includes tense and modality. CG identifies two basic types of modality, **effective** and **epistemic**. At a higher conceptual level is **propositional reality**, where the epistemic concern is not whether an event occurs, but the validity of a proposition. Since each

of us has a different reality conception, interlocutors must engage in interactive negotiation through various speech acts, such as ordering, asking, or asserting, regarding theirs and others' propositional reality.

Effective and epistemic control play an important role in the grammar of signed languages (Siyavoshi, 2019). Natually, constructions expressing effective control use manual signs. We also find that facial displays express the control cycle in many complex ways. Two facial displays that especially pertain to the control cycle are an upper display in which the eyebrow are pulled together called brow furrow, and a lower display in which the corners of the mouth are turned down into a distinctive shape that resembles a horseshoe or upside-down "U".

Prototypical effective control requires effortful physical activity and the forceful exertion of energy. Physical exertion is commonly correlated with upper face activity. The "face of effort" is often called a 'frown' and has been described as "a general converging of the lines to the root of the nose, with transverse wrinkles over the bridge" (McKenzie , pp. 19–20). Brow furrow reflects not only physical but also mental effort. The 19th century British anatomist Sir Charles Bell first observed that "when the eyebrows are knit, energy of mind is apparent" (Bell 1806, p. 139). Darwin noted that brow furrow marks "the perception of something difficult or disagreeable, either in thought or action" (Darwin 1872, p. 221). The *corrugator supercilia* facial muscles controlling the brow furrow reflect the degree of physical exertion (de Morree & Marcora 2010; de Morree & Marcora 2012; Huang et al. 2014). Like physical exertion, cognitive effort requires the expenditure of energy, and one correlate of such mental effort is contraction of the corrugator supercilia (Shenhav et al. 2017).

We endeavor to exert effective control linguistically by asking someone something (interrogatives), ordering someone to do something (imperatives), and obligating someone to do something (effective modals). Brow

furrow marks these speech acts in a number of signed languages (Wilcox & Wilcox 1995). Brow furrow, for example, marks content or wh-questions in a large number of signed languages. Brow furrow is also associated with imperatives in many languages. The order "Give me the ticket!" is expressed in ASL as TICKET, YOU-GIVE-ME (Wilcox & Wilcox 1995, p. 147)(from (Humphries et al. 1980)). The word 'ticket' is marked as a topic (eyebrows up), and the imperative clause is marked with brow furrow.

Another manifestation of effective control is effective (root or deontic) modality, typically expressing obligation, permission, or ability (Langacker 2013). In effective modality, the prototype is for the signer or speaker to direct modal force at the interlocutor. We would therefore expect to find effective modals to be associated with exertion and marked with brow furrow.

Brow furrow marks necessity, permission, and obligation in ASL (Wilcox & Wilcox 1995; Wilcox & Shaffer 2006; Shaffer & Janzen 2016). It has similar functions in Spanish Sign Language (Iglesias Lago 2006) and Brazilian Sign Language (Xavier & Wilcox 2014). In Catalan Sign Language, HAVER.DE and CANON, both expressing 'must', are accompanied by brow furrow (Shaffer et al. 2011). French Sign Language accompanies IL FAUT 'must' with brow furrow.

The horseshoe mouth is often associated with epistemic control. The horseshoe mouth has been attributed such meanings as distancing and disengagement from the world (Streeck 2009), and epistemic indetermination or lessened epistemic endorsement (ignorance, uncertainty) (Debras 2017). The goal of epistemic control is to construct and continually update our conception of reality. Epistemic control is about striving to understand the world rather than influencing what happens in the world. One aspect of epistemic control is the acquisition and control of propositional knowledge. In terms of the control cycle, "At this level, the actor is a conceptualizer,

the target is a proposition, and the dominion is the conceptualizer's view of reality (or epistemic dominion), i.e. the set of propositions the conceptualizer currently holds to be valid" (Langacker 2009, p. 131). Examples of epistemic control are making an inference or the use of reasoning to determine some inclination towards accepting or rejecting a conclusion; evaluating the veracity of a memory (e.g, whether some event did or did not occur); considering or entertaining a possibility; and concluding. Linguistic expressions of epistemic control include epistemic modality, assertions, and evidentiality.

Expressions of epistemic control are frequently marked with the horseshoe mouth facial display in signed languages (Siyavoshi, 2019). A primary example is epistemic modality. In epistemic modality, the modal force is not directed at effecting the process; rather, it is the internally directed epistemic assessment and resulting inclination as to whether the process will be realized. It is interesting to note that in some signed languages (e.g., Spanish Sign Language) (Iglesias Lago, 2006), while effective possibility requires a manual sign, epistemic possibility may be expressed only with horseshoe mouth.

The use of facial displays as grammatical markers still requires considerable research. Our CG analysis points out the ways in which two displays, brow furrow and horseshoe mouth, manifest aspects of effective and epistemic control. What is clear is that our analysis is still in a preliminary stage. Other facial display, such as eye squint, head nods and side-to-side movements, and more obviously interact with these two facial displays to produce complex symbolic assemblies expressing subtle meanings. Of course, all of these facial displays interact with the semantic of manual signs, which also include subtle variations of movement producing their own complex meanings.

5. Sign and Gesture

A topic of considerable current interest among sign linguists is the relation between language and gesture. Although decades of solid linguistic research has established that signed languages are not simply gestures, the specter of gesture has reappeared. One currently popular attempt to resolve the language versus gesture issue is a kind of middle ground. Some linguists who adopt this approach claim that some signs are fusions of language and gesture. Such an approach requires a predictable and reliable method for identifying the components of the fusion, and so it is assumed that there exists a categorical, objective, and observable distinction between the two. In their critique of the fusion model from a cognitive linguistic perspective, Lepic and Occhino (2018, p. 163) identify the components as those that are "listable, analyzable, and conventional, on the one hand, and those that are holistic, context-dependent, and defy rule-based generalizations, on the other." Proponents of the fusion model claim that the former are language, the latter are gesture. The assumptions and the dichotomy of the fusion model are, we believe, untenable and certainly incompatible with a cognitive linguistic approach. Additionally, what is missing in the fusion approach is the observer, the language user.

Sometimes, proponents of the fusion model point to Kendon in support of their position. Kendon, however, not only rejects the fusion model but even the utility of the term "gesture" (Kendon 2017, p. 30):

> "Gesture" is so muddied with ambiguity, and theoretical and ideological baggage, that its use in scientic discourse impedes our ability to think clearly about how kinesic resources are used in utterance production and interferes with clarity when comparing signers and speakers. [In Kendon (2008)] I argued that we should get rid of the categories "gesture" and "sign" and proposed, instead, that we develop a comparative semiotics of visible bodily action (kinesis), as it is used in utterances by speakers and by signers. To do this, I suggested, would resolve and clarify the otherwise rather fraught discussions of how "gesture" and "sign" are related, as well as the problems encountered when, in a signed utterance, we sometimes have difficulty in deciding whether a given expression is a "gesture" or a "sign."

From our cognitive linguistic perspective there is no categorical, objectively observable distinction between language and gesture. Usage events and visible bodily actions do not come to observers as sorted, listed, and labeled phenomena. Figuring out what is what is a categorization problem, and the solution lies with the observer, not the observed. We are reminded of a story told by the cultural anthropologist Clifford Geertz (1973, p. 6):

> Consider two boys rapidly contracting the eyelids of their right eyes. In one, this is an involuntary twitch; in the other, a conspiratorial signal to a friend. The two movements are, as movements, identical; from an I-am-a-camera "phenomenalistic" observation of them alone, one could not tell which was twitch and which was wink, or indeed whether both or either was twitch or wink. Yet the difference, however unphotographable, between a twitch and a wink is vast; as anyone unfortunate enough to have had the first taken for the second knows. As Ryle points out, the winker has not done two things, contracted his eyelids and winked, while the twitcher has done only one, contracted his eyelids. Contracting your eyelids on purpose when there exists a public code in which so doing counts as a conspiratorial signal is winking. That's all there is to it: a speck of behavior, a fleck of culture, and — *voilà!* — a gesture.

In the current context we might rephrase Geertz and say, "the same behavior, the same movement, with a different fleck of experience and a speck of categorization by the observer, and — *voilà!* — language." Like Ryle's wink, the visible bodily actions of usage events are the very stuff from which language is made. We must not confuse labels with knowledge. The labeling of visible bodily actions as "language" or "gesture" is, as Geertz says, a matter of determining what counts as what. "Language," "gesture," and "sign" are historical-cultural constructs, folk classifications. Whether deaf and hearing people share the same folk classifications is an interesting question, and there is some research to suggest the answer is, as we might expect, complex (Kusters & Sahasrabudhe 2018).

The key here is to not forget the observer. Geertz is helpful again: we must see things, he tells us, "from the native's point of view." The native in this case is the deaf language user observing and categorizing usage

events of visible bodily actions. As Wilcox and Occhino have pointed out, "Simply because certain elements of usage events are categorized as gesture by hearing speakers and hearing linguists does not mean that deaf people categorize them the same way. … The categorization of usage events is an individual user's cognitive activity. The linguist's task is to discover the user's categories" (Wilcox & Occhino, 2016, p. 400).

Our position is that the "language vs. gesture" issue has conflated two questions which should be distinguished and answered separately: how does a language user categorize usage events, and what labels are assigned to these categories? The second question is a matter of labels — a question of what counts as "language," "gesture," and "sign." These labels are historical-cultural constructs, folk classifications. Whether deaf and hearing people share the same folk classifications is an interesting question; as we might expect, research suggests the answer is complex (Kusters & Sahasrabudhe, 2018). We claim that language and gesture are not "out there" objectively in the world. It's not the label that matters, it is the language user's knowledge — or as a linguist would call it, the grammar — that we seek to understand. This is the focus of the first question.

Our cognitive grammar account of the first question would be framed in terms of the control cycle, starting with the observation that usage events, visible bodily actions, are perceptual targets that must be dealt with by an actor, who is in this case a deaf user of a signed language. Thus, they are targets of striving for control, involving epistemic control — acts of categorization by which deaf people understand a new experience with respect to their established linguistic knowledge.

6. Conclusions

In this article, we have reviewed work done by our research team taking a cognitive linguistic approach to signed languages. We presented three main topics of research: pointing and placing as nominal grounding strate-

gies, the role of two facial displays (brow furrow and horseshoe mouth) in the marking of effective and epistemic control, and the sign-gesture categorization problem.

The first two research topics are meant to understand expressions in different signed languages that establish a connection between the ground (the speech event, the signer and the interlocutor, their interaction, and the immediate circumstances) and the content evoked by a nominal construction (for pointing and placing constructions) or finite clause (for the grammatical modal markers). The last topic, the sign/gesture problem, aims to discuss which model offers a better account of linguistic categorization in the case of signed languages that belong to different Deaf communities.

What our approaches on these topics have in common is a cognitive perspective in understanding the way signers of different signed languages make abstractions of recurrent elements of usage events, and thus create conventionalized expressions that help them make sense of the world. As Langacker (2001, p. 146) points out, cognitive grammar "takes the straightforward position that *any* aspect of a usage event, or even a sequence of usage events in a discourse, is capable of emerging as a linguistic unit, should it be a recurrent commonality." Within the cognitive approach, the users of the languages — in our studies, the signers and the communities they belong to — have a key role, because it is from their perspective that linguistic meaning is created, negotiated, and changed. Cognitive meaning is not understood as an objective reflection of the world; it is a dynamic way of constructing the world that is grounded in the user's experience. Paraphrasing Langacker (1987, p. 12): a dynamic, perspectival, usage-based meaning is what language is all about. Our efforts as a research team aim to that direction.

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