Iconicity, scope, and the grammar

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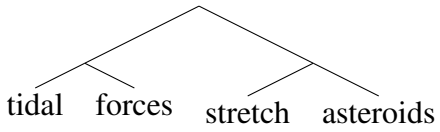
Abstract

Sign language communicates meaning not only through a combinatorial grammar but also through iconicity – structure-preserving mappings between form and meaning. How do iconicity and the grammar interact? The simplest possible answer is that they interact very little: both communicate meanings, but these meanings are combined intersectively at the level of discourse, like distinct propositions. I will argue that this simple hypothesis is incorrect: at least some iconic meanings are not combined via intersection, and iconic meaning must in general be integrated throughout grammatical composition. I will argue that an illuminating way to think about iconicity is in terms of semantic scope: like logical operators, iconic meanings can take scope at different levels in a logical form. Depending on where the iconic meaning takes scope, it may have different effects on the overall meaning of a sentence, sometimes seeming to disappear completely. I motivate this perspective with data from two different domains: first, iconic modifications of verbs, including pluractional verbs; second, the use of loci to organize discourse referents.

1 Introduction

Human communication expresses meaning in at least two different ways. The first system, the *grammar*, is combinatorial and descriptive, generating meaning by assembling the meanings of words and morphemes into the meanings of sentences via compositional rules. The second system, *iconicity*, is a holistic and depictive, showing rather than telling, generating meaning by structural analogy between the representation shown and its interpretation. Both of these ways of expressing of meaning are used easily and frequently by humans, and can be used in conjunction to describe the same object or event. An English speaker may describe a scene with words and sentences at the same time as depicting it through co-speech gesture. For example, in (1), the physicist Neil deGrasse Tyson explains an astronomical phenomenon; the speech and gesture provide complementary information regarding what causes the event and what it looks like. In sign languages, description and depiction are arguably even more intertwined, with the signing space being used to iconically organize and depict referents that have been introduced in the discourse.

(1) a.



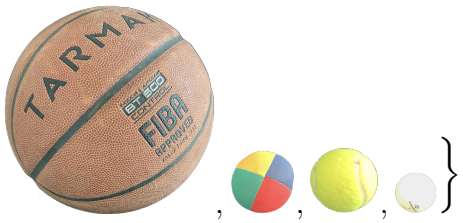
b.

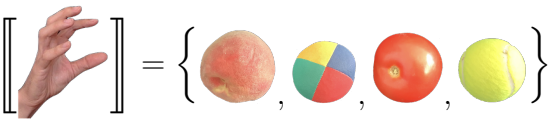
The present article addresses the question: How do these two kinds of meaning interact? One hypothesis maintains that the two interact very little. On this hypothesis, the two kinds of meaning are combined intersectively and at the level of discourse. I will argue that both aspects of the simple hypothesis are incorrect: at least some iconic meanings are not combined via intersection, and iconic meaning must in general be integrated throughout grammatical composition. I will argue that an illuminating way to think about iconicity is in terms of *semantic scope*: like logical operators, iconic meanings can take scope at different levels in a logical form. Depending on where the iconic meaning takes scope, it may have different effects on the overall meaning of a sentence, sometimes seeming to disappear completely.

The present work focuses on sign language (setting aside co-speech gesture in spoken languages). The data comes primarily from American Sign Language (ASL) and French Sign Language (LSF), and discusses phenomena related to verbs, and then phenomena related to nouns.

2 Modeling iconic meaning

A useful starting point for the discussion to come is the observation that descriptive and depictive meaning can be represented as the same *type* of semantic object. For example, noun phrases (an instance of descriptive meaning), are typically taken to denote sets of individuals. In a given context, the English word *ball* might denote the elements shown in (2). The description ('ball') specifies certain information about the referent, but leaves other information unspecified, such size and color. The underspecification of the word is observed in the fact that there are multiple elements in the set. Similarly, depiction also specifies certain information, but again leaves other information unspecified. For example, in a given context, the hand gesture illustrated in (3) might be used to refer to any of the elements shown to its right. We can thus represent depictive meaning as a set of entities, as well. The two kinds of meaning are of the same semantic type. As such, they can be combined using the standard combinatorial system; for example, the intersection of the two meanings is well defined, and contains the two elements common to the two sets.

(2) $[\![\text{ball}]\!] =$ 

(3) 

While the example above illustrates the point with noun phrases and sets of entities, exactly the same logic holds for verb phrases, denoting set of events. The example in (1) might be analyzed as the intersection of the events denoted by the verb phrase and the events denoted by the gesture.

(4) $[\![$ stretch asteroids $]\!] \cap [\![$  $]\!] = \{e_1, e_2, ...\}$

This being said, it certainly is true that the *manner* of expression is different. The grammar is discrete, combinatorial, and conventional, while iconicity is continuous, holistic, and transparent. It may thus turn out that some meanings are easier to express in one mode than the other. For example, it is difficult to imagine how one might depict 'tidal forces' using only iconicity, or to describe the hat in (5) using only words.[1] Nevertheless, regardless of the manner in which the meaning is generated, the *result* is the same: sets of entities or events.

(5) 

How, then, do we combine these two kinds of meaning? The simplest hypothesis is that the two interact very little. Such minimal interaction is similar to the way that interlocutors integrate disparate pieces of information in a discourse context. This includes the way that separate sentences are combined in a discourse. For example, upon hearing (6), an addressee updates their representation of the world with each piece of information; the result is analogous to the conjunction of the two sentences: it is raining and the speaker is happy. Other non-linguistic discourse information may be integrated in the same way. For example, if the speaker of (6) has a notable tan, I might also integrate the propositional information that they recently got back from a beach vacation. In all these cases, information is combined intersectively at the propositional level.

(6) It is raining. I am happy.

The hypothesis in (7) asserts that iconic meaning is similarly non-interactive: it is combined by intersection (like propositional conjunction), once grammatical composition is complete. (The *extension* of an expression is the set of elements it refers to in the actual world.)

(7) *The non-interaction hypothesis:* Depictive and descriptive meaning compose...

I. by simple extensional intersection,

II. at the top level (once composition is complete).

[1]The picture is an illustration of an 'indescribable hat' from the children's book *The 13 Clocks* by James Thurber. Legend has it that Thurber, blind by the time he wrote the book, asked his illustrator to tell him what the hat looked like... and was only satisfied when he could not.

For at least some examples of description with depiction, this manner of composition seems to be all that is needed. For example, consider the co-speech gesture in (1). Here, we interpret the sentence ('Tidal forces stretch asteroids') as denoting a set of events. We interpret the gesture as denoting a set of events. The intersection of these sets provides us the meaning of the utterance as a whole.

In the rest of this paper, however, I will argue that neither component of this simple hypothesis is correct as a general rule. First, in at least some cases, semantic composition is more sophisticated than modification. Second, across a variety of examples, the iconic component can be interpreted at various different levels throughout composition, and sometimes has optionality of where it is interpreted, similar to the way that grammatical elements take scope.

3 Verbs

3.1 Iconic incompletives in ASL

In many sign languages, it has been observed that aspectual or adverbial information can be communicated via an iconic modification of the verb itself (Klima and Bellugi, 1979). How the verb is pronounced is interpreted as indicating how the event occurred. For example, in ASL, a verb may be signed slowly to communicate that the event happened slowly, as illustrated in (8). We observe that this example can be analyzed using simple intersective modification, as demonstrated by the fact that the translation in (8) is equivalent to the conjunctive proposition provided in (9).

(8) LAST-YEAR POSS-1 GRANDMOTHER DIE[slow] (ASL)
'Last year, my grandmother died slowly.' MVI_1145b

(9) My grandmother died, and it happened like this: slowly.

Not all iconic adverbial modification lends itself to this manner of analysis, however. In particular, it is also possible in ASL to sign a verb incompletely in order to communicate that an event happened incompletely (Liddell, 1984; Wilbur, 2008). For example, the verb WIN in ASL ends with the dominant hand forming a fist and making contact with the non-dominant hand. If, however, the verb is signed incompletely, ending with only partial closure of the fist and no contact with the non-dominant hand, this is interpreted as 'almost won', as shown in (10). Likewise, the verb SIT in ASL ends with contact between the dominant and non-dominant hand; if the movement is interrupted before this contact, the verb is interpreted as 'almost sat' or 'be in the process of sitting', as shown in (11).

(10) POSS-1 TEAM WIN-incomplete, LOSE (ASL)
'My team almost won, but we lost.' MVI_1243d

(11) IX-1 SIT-incomplete, FIGHT
'I was just sitting down when a fight broke out.' MVI_1364

Kuhn (2017b) argues that these interpretations are the result of an iconic process. In particular, arbitrarily many degrees of completion can be expressed by signing the verb to different extents,

thus displaying a gradience that is possible to state in iconic terms, but which is not available to discrete combinatorial morphemes.

Notably, however, these examples cannot be expressed by intersective modification. To illustrate this point, consider the intersective 'translations' in (12) and (13), parallel to (9), above. Clearly these are not equivalent to the meanings of (10) and (11)—indeed, they are completely non-sensical. The reason is because all events in the extension of WIN entail victory, and all events in the extension of SIT entail a tush on the chair; the incomplete events expressed by the forms in (10) and (11) are thus not elements of these sets so cannot be obtained intersective restriction.

(12) $^{??}$ My team won and it happened like this: incompletely.

(13) $^{??}$ I sat down and it happened like this: incompletely.

How, then, should one analyze these forms? One can take a cue from the English translations provided in (10) and (11), which use the adverb *almost* ('We almost won') and the present progressive aspect ('I was sitting down'), since whatever semantic technology is needed to analyze these constructions will also be sufficient for the sign language case at hand. While we won't go into in detail here about the many proposals for English (cf. Zucchi, 2021), a compelling insight underlying a number of analyses is that progressive aspect involves quantification over possible futures, as illustrated in Figure 1 (Dowty, 1979; Portner, 1998; but see Parsons, 1990). At the time of reference (t), the past is determined, but there are a variety of possible ways the future may unfold. The progressive entails that there exist (likely) possible futures in which X sat down or won, and that the reference time is included in the process of doing so.

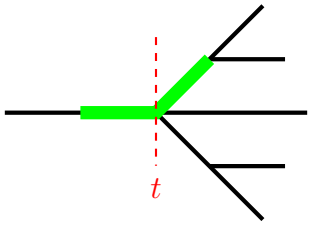


Figure 1: A branching time model for progressive aspect

On such an analysis, the relevant logical operator—PROG or *almost*—has to take an intensional argument, involving the verb's meaning in other possible worlds beyond the actual world. In Figure 1, the fact that the meaning is intensional is witnessed in the fact that there are multiple branches—multiple possibilities—after the reference time. Notationally, the appeal to intensions is indicated by the fact that the argument of PROG and *almost* in (14a) and (14b) is preceded by a $\wedge$ symbol. By an equivalent logic, the iconic predicate in (10) and (11) cannot combine by predicate modification; it too, must be represented as a function—here, an iconic function—that takes an intensional argument, as in (14c). (In (14c), the superscript Φ refers to the phonetic realization of the verb that serves as input to the iconic mapping.)

(14) a. PROG($\wedge$win)

b. almost(^win)

c. Icon$^{\Phi}$(^win)

While details remain open about the precise meaning of the function Icon$^{\Phi}$, what appears clear is that the composition of (at least some) iconic predicates requires mechanisms beyond simple extensional intersection.

3.2 Iconic pluractionals in LSF

In many sign languages, including ASL and LSF, it is possible to reduplicate a verb to indicate a plurality of events (Fischer, 1973; Kuhn and Aristodemo, 2017). These forms—called *pluractionals*—can be true if one event happens again and again, or if many events happened at the same time. In LSF, there are two different strategies to indicate pluractionality. The first strategy, involving exact repetition of the verb, indicates that events are distributed in time (an event happens on multiple occasions); the second strategy, involving alternating repetition of the two hands, indicates that events are distributed across participants (multiple individuals perform the event). These are illustrated in (15), with the LSF verb FORGET.

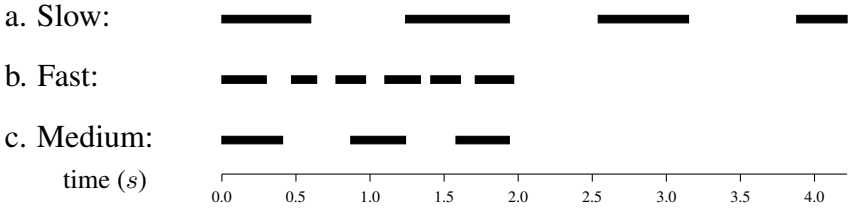
(15) a. /rep/ = distribution across time

b. /alt/ = distribution across participants

We note that this semantic distinction has an intuitive iconicity, with multiple articulators mapping to multiple event participants; such associations have also been described in sign language lexicons (Lepic et al., 2016). This being said, while the /rep/ versus /alt/ distinction probably has iconic *grounding*, it seems likely that they have been conventionalized in the current grammar of LSF.

On the other hand, LSF pluractionals do display productive iconicity in another way; specifically, the speed of reduplication is interpreted as indicating the speed of event repetition. The speed modulations of the verb GIVE indicated in (16) can thus be interpreted as indicating a slow, medium, or fast giving event.

(16)



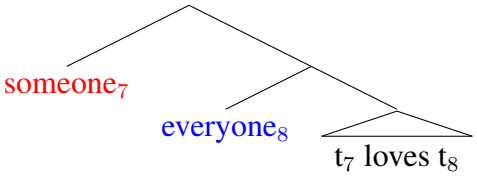
Notably, these examples falsify the 'top level' hypothesis about iconic composition. In particular, the iconic inference about the speed of the event can be interpreted in the scope of other logical operators. In (17), for example, the verb GIVE is inflected with accelerating reduplication, indicating an event that speeds up. Critically, this meaning is interpreted in the scope of the conditional IF: according to the sentence, the secretary will be happy if Mirko gives them papers at an accelerating rate (perhaps showing that he is getting used to French bureaucracy), but may not be happy of the papers are given slowly.

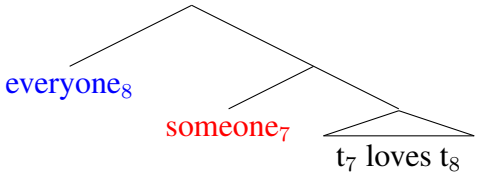
(17) SECRETARY IX-a, IF MIRKO PAPERS IX-b GIVE-rep[speeding-up], IX-a HAPPY.
'If Mirko gives the secretary papers at an accelerating rate, they will be happy.' MVI_1708

Possibly a more interesting interaction of iconic pluractionals with grammatical elements is the case of distributive operators. In (18), the pluractional morpheme /-rep/, indicating distribution over time, appears in the same sentence as the temporal quantifier EVERY-DAY, which indicates that an event occurred every day. Interestingly, in this configuration, the sentence is ambiguous. One one reading, each day involves a repeated giving event. On a second reading—the preferred reading—, Jean gave the speaker a single book per day; the pluractional inflection does not appear to contribute to the sentential truth conditions at all.

(18) EVERY-DAY ONE BOOK JEAN GIVE-1-rep.
a. 'Every day, Jean gave me one book repeatedly.'
b. 'Every day, Jean gave me one book.' *(Preferred reading)* MVI_2461

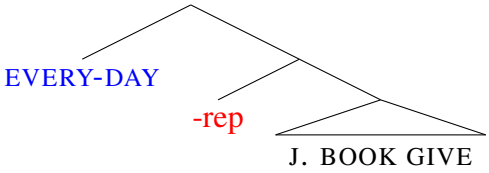
We can make sense of this ambiguity in terms of semantic scope. The mechanism of scope-taking is based on the observation that the linear order of morphemes doesn't always correspond to the order of interpretation. Textbook examples of scope-taking usually feature generalized quantifiers like *everyone* and *someone*. The example in (19), for example, can be used to indicate the existence of one big-hearted person who loves everyone in the world, but it can also be used to assert that nobody goes unloved ('everyone has a mother'). These two interpretations result from *someone* taking scope over *everyone*, in (19a), or *everyone* taking scope over *someone*, in (19b).

(19) Someone loves everyone.
a.


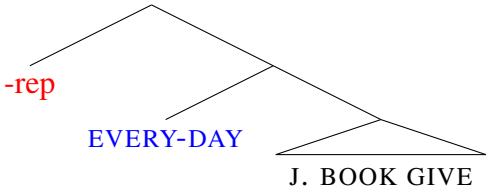
b.


In the example in (18), the relevant scope-taking operations do not involve two quantifiers, but rather one (temporal) quantifier and a pluractional morpheme. If EVERY-DAY takes scope above /-rep/, in (20a), the sentence entails that a pluractional event holds on each day: on Monday, Jean gave the speaker books repeatedly, on Tuesday, he gave books repeatedly, and so on. But if /-rep/ takes scope over EVERY-DAY, in (20b), we first build the meaning that John gave a book on each day; we then check that this new event involves repeated giving—which indeed it does. (For now, I leave it open how to implement this scope taking, although I revisit this question in the conclusion.)

(20) a.



b.



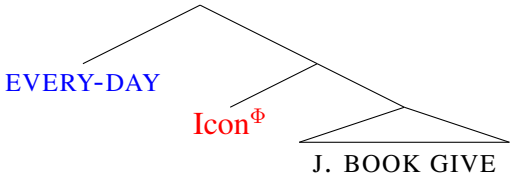
The above example involves a pluractional morpheme taking scope, but does not yet involve iconicity. Nevertheless, we observe that iconic pluractionals show an exactly analogous ambiguity, thus displaying *scopable iconicity*. Example (21) is parallel to example (18), but this time, the verb GIVE is modulated with fast repetition. The meaning is nevertheless ambiguous. On one reading, Jean gave the speaker books quickly on Monday, and so forth for the other days. On the other reading, Jean gave the speaker one book per day, but there is an additional inference that a book per day is a fast rate to give books. The iconic predicate can thus take scope over or under the temporal quantifier, as illustrated in (22).

(21) PERSON JEAN BOOK EVERY-DAY GIVE-1-rep[fast]

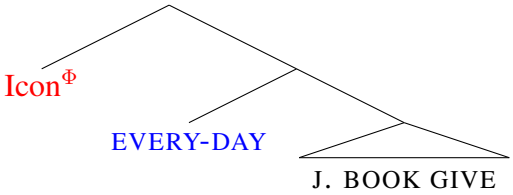
a. 'On each day, Jean gave me books repeatedly and fast.'

b. 'On each day, Jean gave me a book; that is a fast rate to give books.' MVI_3688

(22) a.



b.



We thus conclude that the iconic mapping must be calculated throughout composition, affecting the interpretation of constituents below the propositional level. We further observe that the formal apparatus of scope-taking allows us to understand cases of ambiguity, in which the same iconic form is compatible with different kinds of situations.

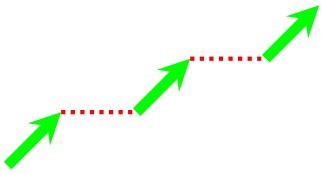
3.3 Pluractional degree achievements in LSF

A final application of the present perspective in the verbal domain involves *degree achievements*—verbs that express increase along a scale. The class of degree of achievements thus includes verbs like *grow* ('get bigger') and *rise* ('get higher'). Like other verbs, degree achievements can be inflected with pluractional marking. Interestingly, though, pluractional degree achievements are compatible with two different kinds of situations. Consider the English verb phrase *repeatedly rise*. This verb phrase can accurately describe a situation in which there was repeated rise and fall, illustrated in (23a). But it can also accurately describe a situation in which each successive rising starts at the degree attained by the previous one, illustrated in (23b).

(23) 'Repeatedly rise'

a. Repeated rise and fall:

b. Each step higher than the previous:



Of note, these meanings can be disambiguated in LSF. The verb RISE in LSF is signed with an upwards vertical movement of the hands in space. The examples in Figure 2 display two ways in which the verb can be reduplicated. In Figure 2a, the exact same movement is repeated, dropping the hands between each repetition to start the movement at approximately the same location each time. In Figure 2b, the each upwards movement of the hands starts at the location that the previous movement stopped, essentially creating a single upward movement interrupted by pauses.

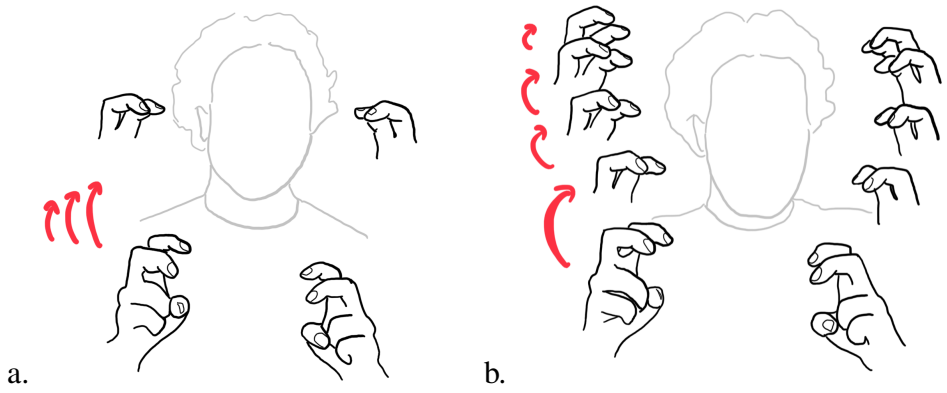


Figure 2: Pluractional degree achievements in LSF: a. RISE-(fall)-rep, b. RISE-(incremental)-rep.

These two forms respectively single out the two situations described in (23). In (24), both examples describe the price of rental houses in the south of France. Since houses are more in demand in the summer, the prices go up, then fall back down in the winter. This rise and fall is entailed by (24a), in which the hands return to the same position after each repetition. In contrast, (24b) entails that the price each summer is higher than the previous year, mirroring the monotonically increasing phonological movement of the hands. These forms thus iconically indicate the progressive degrees on the scale.

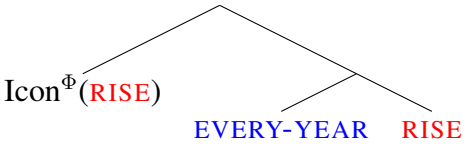
(24) a. FRANCE AREA-full SOUTH AREA-south HOUSE RENTAL CONTRACT TYPICAL-a PERIOD SUMMER PRICE RENTAL RISE. AFTERWARDS FALL. SUMMER RISE-(fall)-rep.
'In the south of France, rental house prices go up in the summer, then later go down again. In the summer, they go up.' 23 Film le 04-05-2020 à 12.10

b. FRANCE AREA-full SOUTH AREA-south HOUSE RENTAL PERIOD SUMMER THRONG PRICE RISE. EVERY-YEAR RISE-(incremental)-rep PRICE EXTORTION.
'In the south of France, rental house prices go up in the summer when people arrive in hordes. Every year, they're higher than before, going to extortionate prices.'
24 Film le 04-05-2020 à 12.11

Additionally, we observe that, like other pluractionals, pluractional degree achievements may be innocently redundant with temporal quantifiers like EVERY-DAY or EVERY-YEAR. In (24b), the pluractional degree achievement RISE-(incremental)-rep co-occurs with the temporal quantifier EVERY-YEAR. The salient interpretation is nevertheless not that there is a step-by-step increase *within* each year, but rather that there is step-by-step increase *across* the many years. Intuitively, each repetition of the motion corresponds to the rise in price in a given year. We observe that this example combines several of our previous insights. First, like incompletive modification in ASL, the present example iconically represents the degree of event progression. Second, like other verbs in LSF, the event progression is itself pluractional.

Intuitively, a large 'rising' event is made of small 'rising' events. Analytically, though, these forms pose a compositional puzzle: it appears that we need to interpret RISE above *and* below EVERY-YEAR. We need to interpret it below EVERY-YEAR to obtain the inference that the price rises each year. But we also need to interpret it above EVERY-YEAR in order to obtain the inference that the global event is a rising event with the iconically-depicted intermediate levels. In technical terms, the verb appears to need *split scope*, as shown in (25)

(25)



As it happens, split scope has independently been motivated for distributivity in the nominal domain (Kuhn, 2017a, 2022b). Specifically, in ASL and LSF, a numeral (such as ONE, TWO, or THREE) can be inflected to move over an area of space previously associated with a plural or distributive noun (the licensor). The result is a *distributive numeral*, generating the inference that there is one (or two, or three) objects per member of the plural licensor. Notably, distributive numerals impose two distinct cardinality checks: one below the licensor, and one above it. For example, in the ASL sentence in (26), the distributive numeral ONE-distr, shown in Figure 3, is iconic in two (contradictory!) ways: on the one hand, the single raised finger represents singularity; on the other hand, the movement over an area of space represents plurality. These two components of meaning can be reconciled by taking split scope around the distributive licensor EACH-distr, as shown in (27): each professor nominates a single student, but because there are multiple professors, a plurality of students are nominated overall.

(26) EACH-distr-a PROFESSOR NOMINATE ONE-distr-a STUDENT. (ASL)
'Each professor nominated one student.' MVI_1287

(27)

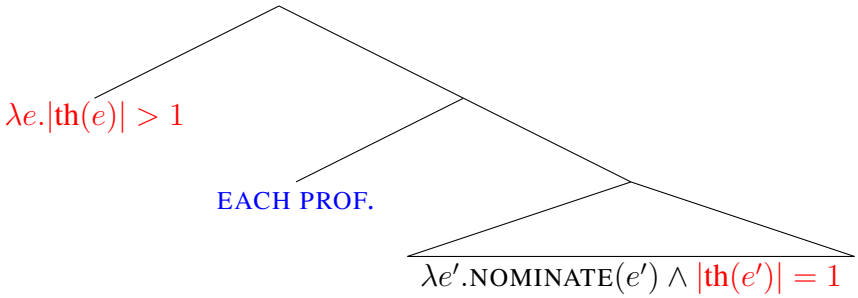


Figure 3: ONE-distr-a in ASL.

In summary, iconicity and the grammar interact through composition. Cases of optionality when interpreting iconicity can be understood in terms of semantic scope.

4 Nouns

4.1 R-loci and local contexts

In sign languages, noun phrases can famously be indexed locations in space, called referential loci or R-loci, and retrieved later with pronouns. In the LSF sentence in (28), for example, SARKOZY is established on the contralateral side and OBAMA on the ipsilateral side; directing a pronoun at one or the other of these two R-loci disambiguates whether Sarkozy is predicting the victory of himself or of Obama.

Figure 4: A pronoun directed towards an R-locus in LSF.

(28) SARKOZY CL-a OBAMA CL-b, IX-a TELL IX-b IX-{a/b} WILL WIN.
'Sarkozy told Obama that he would win.' MVI_0450

Some of these uses of space are clearly iconic; for example, if one is describing the topographic positions of individuals in an environment, one can place two loci close together to indicate two individuals close together, or place a locus in a high position to indicate an individual in a high location. But many other uses of loci are fully schematic; in these cases, space is not interpreted in

any absolute sense. In (28), for example, no inference is generated about the relative positions of Sarkozy and Obama.

On one line of analysis, loci impose a presupposition on the value of a pronoun (xxx, xxx). Just as English *she* restricts its possible referents to individuals that use the feminine pronoun, LSF IX-a restricts its possible referents to individuals that are at locus a, as in (29).

(29) a. $[\![\text{she}]\!] = \lambda x : \text{fem}(x) \,.\, x$
b. $[\![\text{IX-a}]\!] = \lambda x : \text{at(a)}(x) \,.\, x$

This explanation, of course, leaves open a number of questions. Notably, what does it mean to be 'at' a locus, especially in schematic cases like (28), in which locus placement seems to have no semantic effect on truth conditions? Nevertheless, whatever this presupposition means, it should identify a set of individuals: those with the relevant property.

Following this line of reasoning, Kuhn (2016) considers the hypothesis in (29), and argues that at least one implementation of it is not viable. On this implementation, the set of individuals identified by a locus is set by the global context, as defined in (30).

(30) A locus i denotes a set $S_c(i)$, provided by the global context c.
This set constrains the value of a pronoun: $[\![\text{IX-a}]\!] = \lambda x : x \in S_c(i) \,.\, x$

For simple cases, such as the one in (28), this analysis works perfectly. In the global context, locus a is associated with the singleton set $\{\text{Sarkozy}\}$ and locus b is associated with the singleton set $\{\text{Obama}\}$; pointing to one locus or the other can only select one possible value, and the sentence is unambiguous.

But the hypothesis fails for examples in which two quantifiers range over the same set of individuals. Sentence (31), for example, makes a general statement about people helping each other. If there are three salient people in the domain, Alex, Brooke, and Casey, then the sentence makes entailments about situations in which Alex helps Casey and situations in which Casey helps Alex: each of the three people in the domain can either be the helper or the person helped. But on such an interpretation, the presupposition imposed by locus a and locus b must be identical—both are associated with the same set of possible values: $\{$Alex, Brooke, Casey$\}$. The hypothesis in (30) thus incorrectly predicts that either pronoun can refer to either discourse referent.

(31) EACH-TIME SOMEONE-a HELP SOMEONE-b, IX-b THANK-a
'When someone helps someone, they thank them.' MVI_1183

As observed by Kuhn (2022a), the source of the problem above is that the presupposition is taken to be a constraint on the *global context*. We can avoid this problem if we relativize to the *local context* of a locus. First, a note about terminology is in order. In Section 3, the discussion was in terms of low vs. high scope; now, in Section 4, the discussion is in terms of local vs. global context. This motivation for this change in dialectic comes from the literature itself: discussion of presuppositions are more commonly discussed in terms of local contexts than in terms of scope-taking (but see Grove, 2019). But for present purposes, in which we remain relatively agnostic about implementation, the two notions coincide.

The global context corresponds to the maximal scope of an expression. It includes all information available at the discourse level, and is roughly equivalent to the common ground of a conversation. In contrast, the local context corresponds to the immediate scope in which an expression is interpreted. This includes the global context, but also incorporates information about the semantic environment in which expression occurs. As a simple example, consider (32). In the global context, we do not know whether it is raining or not. However, when evaluating the consequent of the conditional (*I'll bring an umbrella*), it is interpreted in a local context that includes the supposition of the antecedent; its local context thus includes the proposition that it is raining.

(32) If it's raining, I'll bring an umbrella.

Notably, a variety of different constraints on discourse reference are sensitive to the local context. First, the simple use of a pronoun presupposes the existence of a discourse referent in the local context. This presupposition is illustrated in the examples below. In (33a), the existence of a cow is entailed by antecedent of the conditional, so the pronoun *it* is licensed in the consequent, evaluated in this local context. (33b) shows that such a pronoun cannot be used in the global context, where the existence of cow is not guaranteed. The examples in (34) provide a similar contrast in which the pronoun *it* appears either within the scope of *nobody* or outside of it.

(33) a. If a farmer has a cow, he milks it.
b. * If a farmer has a cow, he's happy. I milked it.

(34) a. Nobody received a prize and bragged about it.
b. * Nobody received a prize. It was made of gold.

A second example involves the presupposition of the English expressions *(an)other N* and *someone else*. The expression *another N* presupposes the existence of a non-identical individual that the noun *N* applies to. For example, the discourse in (35) is felicitous, but the second sentence in the discourse would be infelicitous if uttered out of the blue. Once again, this presupposition is evaluated with respect to the local context. In (36), the antecedent of the conditional introduces a kid into the local context. When evaluated within this local context, *another kid* is perfectly acceptable, as in (36a); when evaluated outside of this local context, it is not, as in (36b). The examples in (37) provide a similar contrast in which *other* is evaluated either within the scope of *every* or outside of it. To the marginal extent that it's acceptable, (37b) appears to refer to two groups of boys: every member of one group coughed; every member of the other group laughed. Notably, on such a reading, the existence of the first group is entailed by the global context.

(35) One boy coughed. Another boy laughed.

(36) a. When a kid sees another kid, they say hi.
b. ?? When a kid is happy, they laugh. When another kid is sad, they cry.

(37) a. Every boy told every other boy that he'd win.
b. ?? Every boy coughed. Every other boy laughed.

We can thus reconsider the LSF data in this light. We assume a simple iconic constraint: that the use of two distinct loci entails the existence of two distinct individuals. Notably, in the local context in which the two loci are introduced and retrieved by pronouns, we consider only a single helping event. In this local context, there may indeed be two non-identical individuals—the helper and the person helped—, even when the sentence as a whole can be interpreted as quantifying over the same set of individuals twice. If the presupposition in (29) is interpreted relative to the local context, we thus escape from the challenge discussed by Kuhn (2016).

(38) EACH-TIME SOMEONE-a HELP SOMEONE-b, IX-b THANK-a
'When someone helps someone, they thank them.' MVI_1183

On the other hand, we note that the simple iconic constraint posited above—that two distinct loci entail two distinct individuals—does very little in example (38), since canonical helping events generally involve two individuals anyway. In order to provide evidence of the putative iconic constraint, we need to an example in which it has a non-trivial effect in the local context. One such example is provided in (39), describing the rules of an (imaginary) card game. Upon drawing a certain card, it is plausible that the person who loses might be completely random (e.g. rolling a die), but also plausible that the person who drew the card is exempt from the possible adverse effect. Both sentences in (39) contain two instances of the indefinite SOMEONE; the local context in which the second instance is interpreted contains the individual introduced by the first instance. In (39b), the two indefinites are located at distinct loci; in (39a), they are not. This use of space has an effect on interpretation: while (39a) is compatible with a scenario in which the person who drew the card may themself end up losing, (39b) entails that it is someone *else* who loses. That is, in the local context, the use of two distinct loci entails the existence of two distinct individuals. There is thus a semantic effect of the use of loci, even if, at a global level, both indefinite quantifiers range over the same set of individuals (since the sentence is explaining a rule that applies to anyone).

(39) *Context:* Explaining the rules of a card game

a. IF SOMEONE-a DRAW IX SWORD, SOMEONE-a LOSE
'If someone draws the sword card, someone loses.' MVI_0764

b. IF SOMEONE-a DRAW IX SWORD, SOMEONE-b LOSE
'If someone draws the sword card, someone else loses.' MVI_0765

4.2 Modal subordination with R-loci

The phenomenon of *modal subordination* is a way to refer, in the global context, to a discourse referent introduced in a local context. In example (40), for example, the indefinite *a girlfriend* appears in the non-veridical environment created by *I don't know*. Consequently, the existence of a girlfriend is not ensured in the global context, and so the relevant discourse referent cannot be accessed by the pronoun *she* in the follow-up sentence in (40a). Interestingly, however, the addition of the modal verb *would* in (40b) makes this follow-up sentence perfectly felicitous. An influential explanation of this contrast is that *would* reconstructs the earlier local context by restricting the set of worlds to just those in which Nate has a girlfriend (Roberts, 1987).

(40) I don't know if Nate has a girlfriend.

a. ?? She is welcome to join us tomorrow.

b. She would be welcome to join us tomorrow.

As observed in (Kuhn, 2021), an exactly parallel phenomenon can be observed for R-loci in sign language. For example, the LSF sentence in (41) involves the disjunction of indefinites placed at two different loci, a and b. In the final sentence, a pronoun is directed at locus b. Notably, because the intended antecedent was introduced under disjunction, the global context does not entail the existence of a winning Asian candidate. The sentence, though slightly degraded, is nevertheless interpretable with a conditional inference: *if* the Asian candidate wins, he *would* establish the new law. In the local context generated by (covert) modal subordination, the relevant discourse referent does indeed exist.

(41) NEXT-YEAR PRESIDENT ELECTION, WHO GONNA WIN? PERS-a BLACK OR PERS-b ASIAN. THEN IX-b ESTABLISH NEW LAW THEME CITIZEN EQUALITY.
'In next year's presidential election, who is going to win? A black person or an Asian person. The Asian would then establish a new law on citizen equality.'
9 Film le 03-04-2020 à 10.57 #2

It bears noting the relation of these inferences to recent work on the *cosuppositions* of co-speech gesture (Schlenker, 2018a). In general, a gesture co-occurring with a verb may indicate the way in which the event happened, as in (42a), in which the lifting gesture communicates that the parents helped by lifting. Schlenker observes that such gesture can even be used in non- and anti-veridical environments, as in (42b). Critically, in these environments, the global context entails that no helping event happened. The sentence can nevertheless be interpreted with a conditional interpretation very similar to the one above: *if* the parents had helped their children, it *would* have been by lifting. On the analysis of Schlenker (2018a), this interpretation results from the fact that the gesture is interpreted *in its local context*, with a presuppositional meaning that projects.

(42) a. The two parents $\overset{\text{LIFT}}{\overline{\text{helped}}}$ their kid.

b. None of these ten people $\overset{\text{LIFT}}{\overline{\text{helped}}}$ their kid.

4.3 Wide-scope interpretation of R-loci

We have argued that in many cases, the R-loci are best understood as being interpreted with low scope, relative to the local context. There nevertheless exist some cases in which loci have been reported to introduce an inference into the global context, sometimes even at the expense of the acceptability of the sentence.

A first kind of example involves examples involving quantifiers at two separate loci. Specifically, Kuhn (2016) reports that the ASL sentence in (43) receives different interpretations from different signers; at least one signer allows an interpretation in which the quantified expressions range over the same group of boys, but several other signers prefer an interpretation involving two

groups of boys: those tellers and those told. The inference for this second group of signers is similar the interpretation of English *other* in example (37), repeated in (44). Rather than being interpreted relative to the local context, as in (44a), the loci in (43) are interpreted relative to the global context, as in (44b), and produces a similar meaning with similarly degraded acceptability.

(43) % [ALL BOY]-a TELL [ALL OTHER BOY]-b IX-a WILL WIN. (ASL)
'All the boys told all the other boys that he would win.' VID00095a

(44) a. Every boy told every other boy that he'd win.
b. ?? Every boy coughed. Every other boy laughed.

Second, Graf and Abner (2012) report that certain signers of ASL do not allow pronouns to be bound by negative quantifiers. Specifically, they report that the sentence in (45) lacks the interpretation provided in the English translation. The strength of this generalization is not entirely clear, and there may be variation; notably, Kuhn (2016) reports similar examples as acceptable.[2] Notably, though, the judgments of the signers who reject this sentence are parallel to the judgment of the English example (34b), repeated in (46). Rather than being interpreted relative to the local context, the locus in (45) is interpreted relative to the global context, thus yielding a contradiction: the use of a locus entails the existence of a discourse referent that the sentence itself denies.

(45) % [NO POLITICS PERSON]-a TELL-STORY IX-a WANT WIN
'No politician said he wants to win.' (Graf and Abner, 2012)

(46) * Nobody received a prize. It was made of gold.

While the generalizations here are a point of some debate, the perspective that we have outlined here provides us a way to understand them, as a preference for the level at which the iconic component takes scope. More generally, notions of semantic scope allow us to gain traction on puzzles where R-loci sometimes seem to be interpreted and sometimes do not.

5 Discussion

The present work leaves open a number of questions. First, the presentation here has been deliberately agnostic about the *way* in which these elements take scope. Indeed, a variety of different mechanisms have been proposed in the literature, including—depending on the phenomenon in question—Quantifier Raising and its theoretical relatives (which would need to be extended to apply to verbs), postsuppositions, and local accommodation. Furthermore, it is not even necessarily the case that all things take scope in the same way; it is certainly imaginable that verbal iconicity takes scope in one way while nominal iconicity takes scope in another.

Second, the present work has limited itself almost exclusively restricted itself to sign language data. As suggested in the introduction, however, the questions raised nevertheless extend to co-speech gesture: is there the same level of integration for gesture in spoken language? The possibility that there is divergence on this front is made plausible by the recent discovery of fine-grained

[2]These judgements may also reflect competition with the more iconically 'congruent' version of the sentence that uses a null pronoun. See Kuhn (2020) for discussion of these interacting pressures.

differences between the inferential typology of sign language iconicity and of co-speech gesture (Schlenker, 2018b).

But at least for sign language, it appears that iconicity and the grammar are tightly interwoven. At least some combination is not intersective, and iconicity is incorporated into interpretation throughout composition.

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