Markedness and Economy on Signs

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Stockholm,26-4-03

1 Signs

A simple mathematical notion of a sign is a partial function f defined on semantic representations and mapping its parts to a set of morphs in a syntactic representation together with the domain and target representation. $S = < f, sem, syn >$

Discourse representation theory: create a new representation out of an old one, in response to a linguistic input. With a sentence you can associate the subrepresentation of the new representation that it accesses (the old part) or creates (the new part).

A semantic representation is a discourse representation structure, a set of conditions and a set of discourse referents. I am assuming the usual hierarchical structure is flattened.

A syntactic representation is a linear ordering of morphs.

Understanding a syntactic representation is linking it to a semantic representation.

Producing a syntactic representation is creating a mapping from a semantic representation to it.

2 Abstraction, Concepts and Constraints

Natural Concepts

"constituent": the ordered set of morphs a discourse referent maps to

"NP" the constituent of a spatiotemporal continuant

"S" the constituent of an event or state

"old-new", topic-focus.

"subject"

agent(e,x), most prominent role

finite form:
the image of tense conditions
in the image of subject/object

Real concepts are evolutionary transformations from these. Language, concepts and constraints have coevolved from a common base. Concepts and constraints are only weakly universal.

Example Constraints

syntactic: NP coheres
semantic: *new
syntactic: subject < object
lexical: cat → *cat'(x)*
lexical: *cat'(x)* → cat
lexical: a(n) N → new DR

3   Learning

Gerhard Jaeger's BGLA. Constraints are weighted. Weighting around zero means they are not important.

Weighting goes down if errors occur as a result of following it or if following it leads to an unusual expression for the input.

Absolute constraints are possible and have an absolute meaning. Maximum value means you never lead to error or unusual form.

All syntactic and semantic constraints have their inverse.

If NP coheres, it is bad to interpret a non cohering set of morphs as an NP.

If it is bad to interpret material as new, you have to express new material by marking it as new.

Constraints exist because they are expressible in the concepts of the language and →, *, <.

4   Pragmatics

$consistent > resolve > *new > relevant$

Van der Sandt's model in Discourse Representation Theory

1. compute the presupposition associated with the trigger as part of the interpretation of the trigger

2. try to identify the presupposition with part of the material that is accessible at the site of the trigger (resolution)

3. try to add the presupposed material to an accessible box of the DRS (accommodation), fail if this leads to inconsistent results

4. prefer 2 over 3

5. prefer additions in the highest possible box

Markedness ordering

1. Corrections are more marked than additions are more marked than repeats

2. Activation ordering (Gundel, Hedberg and Zacharski):
$*participant < *topic < *given < *known < *connected < *new$

3. A new condition is not as bad as a new object

The best interpretation involves the smallest change.

Overriding by other constraints.

max(1st)
max(2nd)
max(topic)
max(given)

These block participant interpretations for 3rd person pronouns and lexical NPs, and block topic and given interpretations for lexical NPs (unless in contexts where pronouns would lead to confusion).

Relevance is here derived from connection and oldness, preferring the current sentence to be a topical issue or to be connected to one (as in elaborations). Full and pointless repeats are ruled out by new markers.

3

5 Blocking

In a sign based OT we can in principle omit any part and organise OT matches for the best way of filling in the hole. (Omitting can be constrained by the concepts discussed before.) The following is more restricted.

A sign is optimal iff it wins the competition given the interpretation and given the form.

Blocking Law:

An optimal sign cannot be turned into another optimal sign by replacing form, meaning or association with less marked ones.

Notice that the blocking law is not a definition of improper signs: for this we need the property that the dimensions that are unchanged are sufficiently unmarked.

Blocked forms:
$< cat, dog(x) >$
$< dog, dog(x) >$ favoured by $dog(x) \rightarrow dog$

Blocked meanings:
$< cat, dog(x) >$
$< cat, cat(x) >$ favoured by $cat \rightarrow cat(x)$

Blocked associations:
$\{f(y) = NP1, f(x) = NP2, V \in f(e), agent(e,x), theme(e,y), NP1 < NP2$
subject $<$ object

6 Statistics

Speak as everybody else does!
Interpret as everybody else does!
Interpret a form in such a way that everybody would have said it that way!
Speak in such a way that the chance you will be understood as intended is maximised!

Goal directed maxims: you maximise your chance of understanding it correctly and your chances of being understood.

But how to carry it the statistical analysis necessary given sparse data and limited memory? One answer is concepts and regularities expressible in these

concepts.

7 Iconicity

a. Black Bart killed the sheriff.
b. Black Bart cause the sheriff to die.

a. Mrs. T produced a series of sounds closely resembling the score of "Home Sweet Home".
b. Mrs. T sang "Home Sweet Home".

2. Zipf law (approximated): frequent words are briefer

Towards historical explanation of 2.

Frequent words are more easily recognised.
Less recognition failure.
More tolerance towards non standard pronunciation.
More variation.
Loss of features.

Non frequent words become longer.

1. Non standard expressions acquire a special meaning.

Non standard here: long, but can be unusual in other ways.

Pragmatic effect:
a. the extra meaning is vague.
b. the extra meaning can be cancelled

Black Bart caused the sheriff to die and did so in a very direct way.

Here: the sign composed by the unusual form and the standard meaning is not optimal: it is blocked by the sign with the standard form and the standard meaning. It can only be saved by assuming a non standard meaning for the non standard form. In that case, the sign is optimal again.

8 A Counterexample

We have a version of weak superoptimality here. This is an unfaithful rendering of a counterexample in Beaver and Lee (to appear).

Assume we have a sentence with two NPs. By *new the most unmarked case

is to assume that both NPs are given and not new, followed by two unordered cases with one of the NPs given and the other new and a final case where both NPs are new.

Markedness on the syntactic level is given by : subject < object.

In weak bidirectionality to happen we predict that if the meaning is marked, the order object subject will express that.

But in Dutch or English, unlike Korean and German this order is just ungrammatical. Why?

Circular: SOV can also be used with new subject and old object, even in German and Korean (?). Context and definiteness marking are (often) good enough to prevent misunderstandings.

In none of the languages we obtain the pattern: form → meaning → other form. That means that SOV is not blocked for subject new and object old. That means that no special form is necessary.

German and Korean: **given < new** is in balance with **subject < object**. And **given < new** makes OSV mark that the object and not the subject is new. In Dutch/English **subject < object** outranks **given < new**. Historically, more frequent case marking for objects in Korean and German prevents the misunderstandings that would arise in Dutch and English with a higher ranking for **given < new**.

Sequential blocking is possible.

me → 1,acc, sg
himself → refl, acc, sg, male
him → acc, sg, male, activated
that → sg, given

max(1) > max(refl) > max(activated)

The natural order on the meanings is given by 1 > 3, refl > nonrefl, and activated > nonactivated.

The max(X) principles block all other interpretations for *that* except sg, given, non-refl, non-activated, 3. And refl and 1 interpretations for *him* etc.

9 Rat-Rad

Welches Maedchen liebt Johann?

a. Which girl does John love?
b. Which girl loves John?

Stay predicts that b. is the optimal interpretation, whereas it is ambiguous.

Here we just note that a and b are not marked with respect to each other and there is just one form.

Liebt Johann Maria?
Liebt Maria Johann?

10   Conclusions

Sign based OT is a natural way to think of OT syntax-semantics.

Sign based OT also offers a simple way to conceive of statistical bias given natural concepts and thereby of linguistic evolution.

The blocking principle is a natural principle recapturing Smolensky's left right asymmetry due to different candidate sets and Blutner's weak super-optimality.