Specificity and Ignorance in Indefinites.

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Plan

- Issues about specificity and a framework proposed by Brasoveanu and Farkas 2011.
- Ignorance of indefinite; Aloni and Port’ s work about the method of identification which analyzed the epistemic indefinite
- a few examples to show the issue about ignorance of Chinese *Mou* and *Mou ge*

Reference

- Adrian Brasoveanu and Donka Farkas, How Indefinites Choose their Scope, *Linguistics and Philosophy*, 2011, 34(1)
- Donka Farkas, Quantifier scope and syntactic islands. In R. Hendrik, et al. (Eds.), *Proceedings of CLS 7*, 1987, pp. 59-66. Ithaca: CLC, Cornell University.
- Mark Steedman, Surface-compositional scope-alternation without existential quantifiers. Ms, University of Edinburgh, 2007

Overview

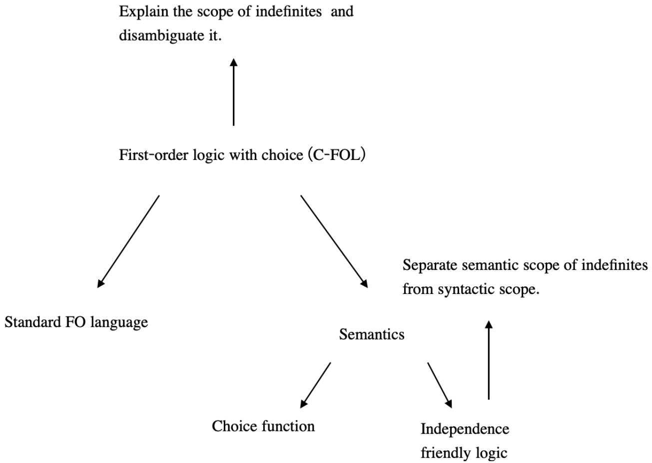

Figure: Structure of [Brasoveanu and Farkas 2011]'s proposal

Overview

Specificity

In English and many other languages, specificity of an indefinite is not typically marked. As a result, sometimes, specificity can be ambiguous. Consider the following example:

(1) Every student in my class read a paper about scope.

Sentence (1) has two interpretations. Under one reading, every student read the same paper , and here the *a paper* is specific (the wide scope of *a paper*).

Under the second reading, every student read various papers. In this case, a paper is non-specific (the narrow scope of *a paper*)

Dependence v.s.Independence

How can we tell the wide or narrow scope of the indefinite in (1)?

- From a dependence-based perspective, $Q'y$ is in the scope of Qx if the values of the variable y (possibly) co-vary with the values of x.
- From an independence-based perspective, $Q'y$ is outside the scope of Qx if y's value is fixed relative to the values of x.

In [Brasoveanu $\&$ Farkas, 2011], the authors propose an independence-based approach to the scopal properties of natural language indefinites, and furthermore separate semantic scope from syntactic scope.

[Brasoveanu & Farkas] 's proposal

- The wide scope indefinites can be conceptualized in terms of independence.
- A narrow scope reading of the sentence arises when the witness for the indefinite is allowed to vary depending on the value of variables introduced by the previous quantifiers.
- To implement their analysis, [Brasoveanu & Farkas, 2011] utilize a logic like the one developed from *Independence-Friendly Logic* and *Choice Function*.

Semantic Scope of Indefinites

(2) Every student read every paper that a professor recommended.

The three readings of sentence (2) are provided below:

- Narrowest Scope (NS): for every student x, for every paper y such that there is a professor z that recommended y, x read y.
- Intermediate Scope (IS): for every student x, there is a professor z such that, for every paper y that z recommended, x read y.
- Widest Scope (WS): there is a professor z such that, for every student x, for every paper y that z recommended, x read y.

The scopal freedom of indefinites is problematic for accounts in which semantic scope relations reduce to syntactic command relations.

Choice-function Accounts of Indefinites

The main idea is that the core semantics of indefinites involves choosing a witness that satisfies the scope of the indefinite.

The different ways in which a witness is chosen give the indefinite different semantic scopes.

In particular, the choice of the witness can be dependent on the values of the variable introduced by another quantifier.

Skolemization in FOL

$$\forall x \exists y R(x, y) \iff \exists f \forall x \Big(R(x, f(x)) \Big)$$

where $f(x)$ is a function that maps x to y.

Intuitively, the sentence "for every x there exists a y such that $R(x, y)$" is converted into the equivalent form "there exists a function f mapping every x into a y such that, for every x it holds $R(x, f(x))$".

Example-I

The two possible scopes of the indefinite *a paper* in sentence (1) can be formalized by choice function as:

- $\forall x[student(x)]([paper(f)](read(x, f)))$
- $\forall x[student(x)]([paper(f(x))](read(x, f(x))))$

The formulas interpret the indefinite *in situ*, but letting it contribute a choice function f of variable arity.

Insight of Independence-Friendly Logic

Except for the idea form choice function approaches, i.e., taking the essence of the semantics of indefinites to be choosing a witness. [Brasoveanu & Farkas, 2011] develop the idea of independence from *Independence-Friendly Logic*.

- Taking witness choice to be part of the interpretation procedure. That is, indefinites choose a witness at some point in the evaluation and require its non-variation from that point on.

Example-II

Recall the sentence (2) and its different readings, and (2) can be formalized as (3).

(3) $\forall x[\phi](\forall y[\phi'](\exists z[\phi''](\psi)))$

Suppose that the set of values for x satisfying the formula ϕ is $\{\alpha_1, \alpha_2\}$ and that the set of values for y satisfying the formula ϕ' is $\{\beta_1, \beta_2\}$, and the existential $\exists z$ chooses a witness (γ_n) satisfying ϕ'' and ψ.

NS

x	y	z
α_1	β_1	γ
α_1	β_2	γ'
α_2	β_1	γ''
α_2	β_2	γ'''

IS

<table>
<tr><th>x</th><th>y</th><th>z</th></tr>
<tr><td>α_1</td><td>β_1</td><td rowspan="2">γ</td></tr>
<tr><td>α_1</td><td>β_2</td></tr>
<tr><td>α_2</td><td>β_1</td><td rowspan="2">γ'</td></tr>
<tr><td>α_2</td><td>β_2</td></tr>
</table>

WS

<table>
<tr><th>x</th><th>y</th><th>z</th></tr>
<tr><td>α_1</td><td>β_1</td><td rowspan="4">γ</td></tr>
<tr><td>α_1</td><td>β_2</td></tr>
<tr><td>α_2</td><td>β_1</td></tr>
<tr><td>α_2</td><td>β_2</td></tr>
</table>

Figure: Matrices of Semantic Scope of (3)

Two Semantic Features

Their account is couched in a slightly modified first-order language with quantification.

While the syntax of the language is fairly standard, the semantics is **not**:

- In contrast to standard Tarskian semantics where evaluation indices are single assignments, in this logic, formulas are evaluated relative to sets of assignments G, G'...
- In the spirit of the main insight in Independence-Friendly Logic, a quantifier is evaluated relative to the set of variables V introduced by the syntactically higher quantifiers, i.e., the indices of evaluation contain the set of variables $V = \{x, y, ...\}$ introduced by all the previously interpreted quantifiers $Qx, Q'y$...

Sets of Assignments

A set of assignments G can be represented as a matrix with assignments g, g', ... as rows:

G	$\dots$	x	y	z	$\dots$
g	$\dots$	α_1 $(= g(x))$	α_2 $(= g(y))$	α_3 $(= g(z))$	$\dots$
g'	$\dots$	β_1 $(= g'(x))$	β_2 $(= g'(y))$	β_3 $(= g'(z))$	$\dots$
g''	$\dots$	γ_1 $(= g''(x))$	γ_2 $(= g''(y))$	γ_3 $(= g''(z))$	$\dots$
$\dots$	$\dots$	$\dots$	$\dots$	$\dots$	$\dots$

Figure: Matrices with Assignments Set G

Fixed Value Condition

Having sets of assignments as indices of evaluation enables us to encode when a quantifier $Q'y$ is independent of another quantifier $Q''z$ by requiring the variable y to have a fixed value relative to the varying values of z.

- Fixed value condition: for all $g, g' \in G$, $g(y) = g'(y)$.

The fixed value condition for y leaves open the possibility that the values of z vary from assignment to assignment, i.e., that $g(z) \neq g'(z)$ for some $g, g' \in G$.

Choice for Existentials

Working with sets of assignments instead of single assignments enables us to formulate fixed-value condition relativized to particular variables.

And it is required to keep track of the variables introduced by the syntactically higher quantifiers in order to be able to relativize such condition to only some of these quantifiers.

Choice for Existentials

To do that, a structure to the indices of evaluation is required to be added: the set of variables $V = \{x, y, ...\}$ introduced by the previous quantifiers.

The set of variables V is an existential could co-vary with, but, in contrast to the standard Tarskian semantics, the existential does not have to co-vary with them. They can choose which ones of the quantifiers that take syntactic scope over them also take semantic scope over them.

Example

When we interpret an indefinite Q, we choose a subset of variables $V' \subseteq V = \{x, y, ...\}$ containing the variables that Q possibly co-varies with (dependent on). And the complement set of variables $V - V'$ contains the variables relative to which Q does not vary (is independent of).

C-FOL Model

A model M for C-FOL has the same structure as the standard models for FOL, i.e., M is a pair $\langle D, I \rangle$, where D is the domain of individuals and I the basic interpretation function. An $M-assignment$ g for C-FOL is also defined just as in FOL.

To formalize the idea that assignments g' and g differ at most with respect to the value they assign to x, a abbreviation $g'[x]g$ is given:

- $g'[x]g :=$ for all variables $v \in VAR$, if $v \neq x$, then $g'(v) = g(v)$.

Given that, a generalized version for sets of assignments is defined as:

$$G'[x]G := \begin{cases} for\ all\ g' \in G', there\ is\ a\ g \in G\ such\ that\ g'[x]g \\ for\ all\ g \in G, there\ is\ a\ g' \in G'\ such\ that\ g'[x]g. \end{cases}$$

Interpretation

The interpretation function $[\![\bullet]\!]^{M,G,V}$ respects with the set of assignments G and a set of variables V.

- $[\![\exists^{V'} x[\phi](\psi)]\!]^{M,G,V} = 1$ iff $V' \subseteq V$ and $[\![\psi]\!]^{M,G',V \cup \{x\}} = 1$, for some G' such that:
  1. $G'[x]G$
  2. $[\![\phi]\!]^{M,G',V' \cup \{x\}} = 1$
  3. $\begin{cases} if\ V' = \emptyset :\ g(x) = g'(x),\ for\ all\ g, g' \in G' \\ if\ V' \neq \emptyset : g(x) = g'(x),\ for\ all\ g, g' \in G'\ that\ are \\ V' - identical \end{cases}$

Two assignments g and g' are $V' - identical$ iff for all variables $v \in V'$, $g(v) = g'(v)$.
In this way, an existential formula $\exists^{V'} x[\phi](\psi)$ is interpreted relative to a set of variables V introduced by the sequence of quantifiers that take syntactic scope over the existential.

Example III

For example, consider the sentence (4) below and its C-FOL translations in (5) and (6).

(4) Every student read a paper.

(5) $\forall x[student(x)](\exists^{\emptyset} y[paper(y)](read(x,y)))$

(6) $\forall x[student(x)](\exists^{\{x\}} y[paper(y)](read(x,y)))$

NB: an indefinite is always interpreted *in situ* and is translated by existentials that can have any superscript that is licensed by the interpretation of the previous quantifiers in the sentence.
Thus in this example, given that the indefinite *a paper* is evaluated after the universal quantifier *every student*, it is interpreted relative to the non-empty set of variables $\{x\}$, so there are two possible superscripts, namely $\emptyset$ and $\{x\}$.

Example III

Assume that there are exactly three students in our model M, namely $\{stud1,\ stud2,\ stud3\}$. Then, the interpretation of the formulas in (5) and (6) proceeds as shown below:

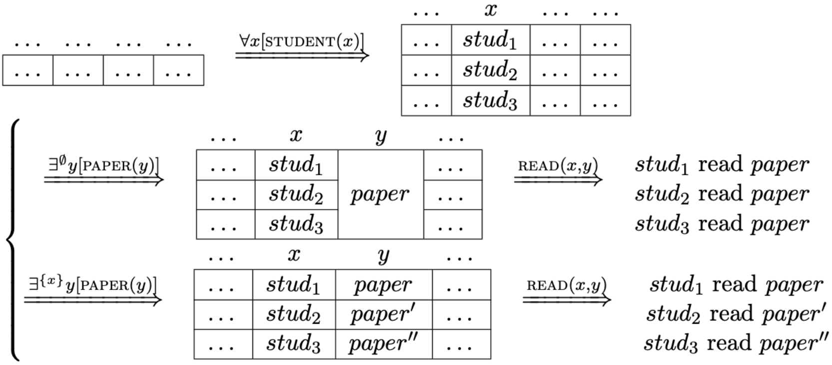

Figure: Scope of (5) and (6)

THANKS!!!!

Now let's welcome Beinan to present on the ignorance of indefinite.