Novelty and Familiarity for Free

David Beaver and Elizabeth Coppock

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Outline

What's the difference between *the* and *a*?

Uniqueness! — Frege (1892), Russell (1905); Hawkins (1974); Neale (1990); Heim & Kratzer (1998); Horn & Abbott (2012); Coppock & Beaver (2015)

Familiarity! — Christophersen (1939); Heim (1982); Szabó (2000); Ludlow & Segal (2004)

Familiarity data

Discourse anaphora

(1) (A glass$_i$ broke last night. . . .)
The glass$_i$ had been very expensive.

Donkey anaphora

(2) If a farmer$_i$ feeds a donkey$_j$ the donkey$_j$ brays.

(e.g. Heim 1982)

Uniqueness data

Basic uniqueness

(3) The author of Waverly was Scott.
#There were two.

Indefinite multiplicity

(4) The/#an only way is up.

(See also Horn & Abbott 2012)

Super-uniqueness data

Weak uniqueness

(5) a. I don't know if iguanas have hearts, but is that the heart?
b. #I don't know if iguanas have bones, but is that the bone?

Anti-uniqueness

(6) Jane didn't score *the only goal*$_i$. #*It*$_i$ wasn't a bicycle kick, either.

(Coppock & Beaver, 2015)

Goal

Resolve the tension.

An intuition about indices

(7) There is a donkey$_i$ in Sicily. Several donkeys are identical to it$_i$. ✗

- The cardinality of the set of things identical to it$_i$ is clearly not the cardinality of the set of donkeys in Sicily.
- Suppose that for a familiar label i, "donkey$_i$" was the property of being a donkey identical with it$_i$.
- Then for familiar i, "donkey$_i$" would have cardinality of at most one.

The main argument

1. Since for appropriate familiar *i*, the extension of DESC_i is guaranteed to have cardinality 1, it follows that *the* will always be licensed for descriptions with appropriate familiar labels.
2. Given that *the* and *a* compete (Horn & Abbott, 2012), *the* should always be used for descriptions DESC_i with familiar *i*.
3. Contrarily, *a* is blocked for familiar descriptions, and so should only be used for novel descriptions.

Outline

File-card semantics

0. (initial state) (empty file)

File-card semantics

1. A guest$_1$ broke a glass$_2$ last night. [1: guest, broke 2]
   [2: glass, broken by 1]

File-card semantics

1. A guest$_1$ broke a glass$_2$ last night.

2. The glass$_2$ had been very expensive.

[1: guest, broke 2]
[2: glass, broken by 1, expensive]

World-sequence pairs

Heim (1982): "In order to establish the truth of a file [in a world], we must find a sequence of individuals that *satisfies* it [in that world]."

A file:

[1: guest, broke 2]
[2: glass, broken by 1]

Same file as set of world-sequence pairs:

$$\{\langle w, a\rangle : \begin{array}{l} a(1) \text{ is a guest in } w \\ a(2) \text{ broke } a(1) \text{ in } w \\ a(2) \text{ is a glass in } w\}\end{array}$$

Building a dynamic system

- Files are sets of world-sequence pairs, and sentences determine updates of such files, but we chose to build such a dynamic system using a static logic without world variables.
- The logic has a type for labels.
- A **sequence** is implemented as a function from labels to individuals (variables: f, g).
- Sentences correspond to **dynamic propositions**, which are relations between two sequences (input and output).
- Nouns and verbs correspond to **dynamic properties**, which are functions from individuals to dynamic propositions.

Labelled nouns

- We use e.g. **Glass** for a trivially dynamified version of the static property **glass**. ($\mathbf{Glass} \equiv \lambda x \lambda f \lambda g \,.\, f = g \wedge \mathbf{glass}(x)$)
- Translation of a labelled noun:

$$glass_i \quad \rightsquigarrow \quad \mathbf{Glass}_i$$

- This is derived compositionally by translating *glass* and i as the dynamic properties **Glass**, and $\mathbf{Labeled}(i)$, and then dynamically conjoining those properties:

$$\begin{aligned} \mathbf{Glass}_i &\equiv \lambda x \,.\, \mathbf{Labeled}(i)(x) \textbf{ And } \mathbf{Glass}(x) \\ &\equiv \lambda x \lambda f \lambda g \,.\, x = g(i) \wedge g \geq_i f \wedge \mathbf{glass}(x) \\ &\approx \texttt{being a glass labelled } i \texttt{ by the output} \end{aligned}$$

How labels work

Crucial insight from Heim (1982): use of an index is sufficient to add it to the context.

- If i is defined on the input, then **Labeled**$(i)(x)$ just returns the input as output.
- But if i is not defined on the input, **Labeled**$(i)(x)$ extends the input.

Formally: **Labeled** $\equiv \lambda i \lambda x \lambda f \lambda g \,.\, x = g(i) \wedge g \geq_i f$

Defining Novelty and familiarity

Testing novelty vs. familiarity of an index: we just check whether the index is defined on the input sequence.

- **novel** $\equiv \lambda i \lambda f \lambda g \,.\, \partial(i \notin \textsc{dom}(f))$
- **familiar** $\equiv \lambda i \lambda f \lambda g \,.\, \partial(i \in \textsc{dom}(f))$

Reconstructing Heim

If $\mathrm{X}_i \rightsquigarrow X_i$, then:

Heimian article meanings

- *a* $\mathrm{X}_i \rightsquigarrow \lambda\mathcal{P}$. **novel**$(i)$ **And** **Ex**$(X_i)(\mathcal{P})$
- *the* $\mathrm{X}_i \rightsquigarrow \lambda\mathcal{P}$. **familiar**$(i)$ **And** **Ex**$(X_i)(\mathcal{P})$

Ex(A)(B), adapted from Partee's (1986) **A** operator, says something has both properties A and B.
$(\textbf{Ex} \equiv \lambda\mathcal{P}_1\lambda\mathcal{P}_2\lambda f\,\lambda g\,.\,\exists x\, f[\mathcal{P}_1(x)\ \textbf{And}\ \mathcal{P}_2(x)]g)$

Evaluation of Heimian system

- ✓ Familiarity data
- ✗ Uniqueness data
- ✗ Super-uniqueness data

Outline

Iota

Iota(A)(B) says that the unique A has property B (cf. Partee 1986):

$(\textbf{Iota} \equiv \lambda\mathcal{P}_1\lambda\mathcal{P}_2\,.\,\partial_d(\textbf{One}(\mathcal{P}_1))\ \textbf{And}\ \textbf{Ex}(P_1)(P_2))$

Crucial subtlety: It is because cardinality is checked on (extensions of) the input state, not the output, that familiar descriptions are always unique but novel descriptions need not be.

The neo-Fregean theory of definiteness

Neo-Fregean article meanings (cf. e.g. Barwise and Cooper 1981)

- *a* $\rightsquigarrow$ **Ex**
- *the* $\rightsquigarrow$ **Iota**

The glass$_7$ *broke* $\rightsquigarrow$ **Iota**(**Glass**$_7$)(**Broke**)

So the glass$_7$ presupposes that there is exactly one glass which is identical to whatever is labeled 7 (in an extension of the current assignment).

When the update relation is defined

world	*i* is familiar	*i* is novel
0 glasses	#	#
1 glass (a)	OK if a is labelled i	OK* (a gets i)
2 glasses (a, b)	OK if a or b is labelled i**	#

When the update relation is defined

world	*i* is familiar	*i* is novel
0 glasses	#	#
1 glass (*a*)	OK if *a* is labelled *i*	OK* (*a* gets *i*)
2 glasses (*a*, *b*)	OK if *a* or *b* is labelled *i***	#

*Uniqueness without familiarity

When the update relation is defined

world	*i* is familiar	*i* is novel
0 glasses	#	#
1 glass (a)	OK if a is labelled i	OK* (a gets i)
2 glasses (a, b)	OK if a or b is labelled i**	#

*Uniqueness without familiarity
**Familiarity without uniqueness

A labelled world (world-assignment pair)

#The glass$_2$ broke last night

A glass_2 broke last night (output)

A glass$_2$ broke last night (another possible ouput)

The glass$_2$ had been very expensive

The lamp$_3$ broke too

The lamp$_3$ broke too (output)

Deriving novelty for indefinites

- Recall that **Iota** is **Ex** + a presupposition.
- So *the* and *a* compete under Maximize Presupposition.
- Therefore *the* should be used whenever its presuppositions are satisfied, and *a* should be blocked in these cases.

Presuppositional blocking

The glass$_i$ broke

Context	*i* is familiar	*i* is novel
1 glass	Good	Good
$\diamond >$ 1 glasses	Good	Undefined

A glass$_i$ broke

Context	*i* is familiar	*i* is novel
1 glass	Blocked	Blocked
$\diamond >$1 glasses	Blocked	Good

Evaluation of the neo-Fregean system

- ✓ Familiarity data
- ✓ Uniqueness data
- ✗ Super-uniqueness data

Outline

Minimal articles

- Coppock & Beaver (2015) propose that English DP meanings are derived much as Partee (1986) and Chierchia (1998) suggest e.g. bare Russian DPs are derived.
- On this view, *the cat* and *a cat* are underlyingly predicative, accounting immediately for uses like *Felix is a cat and very smart.*
- EX and IOTA are not part of the lexical meanings of articles, but rather are freely available type shifts.
- The shifts are triggered when a predicate with a type e argument slot combines with a property denoting DP.

Minimal articles

Coppock and Beaver style articles

- $a \rightsquigarrow \lambda\mathcal{P}\,.\,\mathcal{P}$
- $\mathit{the} \rightsquigarrow \lambda\mathcal{P}\lambda x\,.\,\partial_d(\text{at-most-one}(\mathcal{P}))$ **And** $\mathcal{P}(x)$

- Indefinites are still always interpreted with **Ex**, based on a blocking argument that precisely mirrors the argument above for novelty of indefinites.
- Coppock & Beaver (2015) (and the pre-proceedings paper) give pragmatic principles leading to a preference for definites to get **Iota** readings, just as in the Fregean system.
- However, **Ex** readings for definites are also possible. Hence *Jane didn't score the only goal* can get a reading $\neg\exists x\,.\,\text{only-goal}(x)$, which allows for multi-goal games.

Evaluation of dynamic uniqueness-only theory

- ✓ Familiarity data
- ✓ Uniqueness data
- ✓ Super-uniqueness data

Conclusion

- All you need to derive novelty/familiarity is (i) a uniqueness-based account of definiteness, (ii) some way of tracking discourse referents, and (iii) some way of restricting descriptions to the property of identity with a referent.
- The rest is pragmatics.
- The system is conservative wrt Coppock & Beaver (2015), accounting for a range of data not discussed here, including possessive descriptions.
- We have presented a limited proposal, but we hope we might have changed the way you next approach your favorite definiteness phenomena (plurals, bridging descriptions, weak definites, langauges which lack definite markers, languages which lack indefinite markers. . .), by giving a familiar Fregean theory a novel twist.

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Outline

Meta-notions

Acceptance

F *accepts* S iff for every pair $\langle w, f\rangle \in F$, there is a g such that $f[\![S']\!]^w g \neq \#_t$

Update

$F + S$ is defined iff F *accepts* S, in which case
$F + S = \{\langle w, g\rangle \mid \exists f\ \langle w, f\rangle \in F \text{ and } f[\![S']\!]^w g = \mathrm{T}\}$

Outline

Problems with weak familiarity

(8) If there is a girl who is a virgin engaged to a man, and another man finds her in the city and lies with her, then you shall bring them both out to the gate of that city and you shall stone them to death; the girl, because she did not cry out in the city, and the man, because he has violated his neighbor's wife. *(Deuteronomy)*

(9) Video surfaced online of a woman hitting another woman...with her dog! The woman literally picked up her dog's leash and swung with her poor dog hanging on for dear life. *(Youtube)*

(10) A man and a priest were playing golf. The man took his first shot and missed, " Damn, I missed the fucker!" he said. *(Reddit Jokes)*

Note on markers

Suppose that certain lexical items are designated as "referential" and that by a general convention, each occurrence of a referential item is assigned a marker, say an integer, as a feature.

⋮

The semantic component will then interpret two referential items as having the same reference just in case they are strictly identical — in particular, in case they have been assigned the same integer in the deep structure. This gives the right answer in many cases, but there are interesting problems that arise when the referential items are plural, and of course there are problems in specifying the notion "referential" properly.
Chomsky (1965)

After John Adams$_i$ woke up, he$_i$ was hungry.
Ross (1969)