Individuation and quantification

in semantic theory

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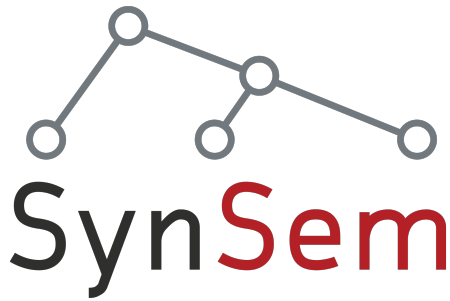

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Is it the same?

FBI believe suspect in Norman, OKC bank robberies the same man

The FBI released information Wednesday night indicating the suspect in an Oct. 24 robbery of BancFirst likely robbed an Oklahoma City MidFirst bank on Nov 15.

source: <http://tinyurl.com/h3pn9dy>, accessed: 22.11.2016

Individuation

- Roughly, telling things apart.
  - → Relevant expressions: ‘same’, ‘different’ …
- Connected to quantification
  - → Relevant expressions: ‘two’, ‘three’, ‘most’ …
- Problems with individuation cause problems with quantification.
  - → Transactions and the ‘double counting’ problem in accountancy/economics.
  - → How many suspects should the FBI look for?
- But individuation (including, but not limited to how it relates to quantification) can raise specifically *linguistic semantic* issues. Which is what this talk is about.

Geach's contention

a general term can occur as a name only if it makes sense to prefix the words "the same" to it. By no means all general terms satisfy this condition; and only in connection with such as do satisfy it can the question be asked how many so-and-so's there are. […]

I maintain that it makes no sense to judge whether x *and* y *are 'the same', or whether* x *remains 'the same', unless we add or understand some general term—"the same* F*". That in accordance with which we thus judge as to the identity, I call a* criterion *of identity. […] "The same* F*" does not express a possible way of judging as to identity for all interpretations of "*F*".*

(Geach 1962: 38–39)

- For Geach, a ‘criterion of identity’ is a necessary condition for quantification to be coherent.
- This is connected to a ‘way of judging’.
- Geach was actually concerned with cases that look, now, like examples of the mass/count noun distinction.

  we (logically) cannot count As unless we know whether the A we are now counting is the same A as we counted before

  (Geach 1962: 38–39)

(1) #How many waters are in the Rhine?

But there are other phenomena that these ideas can be applied to, which will be discussed today:

Outline

Slides available at <http://folk.uio.no/matthegg/research#talks>

Predication and individuation

Chomsky's question

> *Suppose the library has two copies of Tolstoy's* War and Peace*, Peter takes out one, and John the other. Did Peter and John take out the same book, or different books? If we* **attend to the material factor of the lexical item***, they took out different books; if we* **focus on its abstract component***, they took out the same book. We can* **attend to both material and abstract factors simultaneously** *[…]*
>
> (Chomsky 2000: 16)

- In Geach's terms, it seems that 'book' provides *more than one* possible 'criterion of identity'.
- For Chomsky, which criterion you end up with depends on the 'factor' or 'component' that you you 'attend to' or 'focus on'.
- But are we free to just pick any criterion?

Predicates and selection

Predicates often impose semantic selectional requirements. For example, ‘pick up’ requires its object to denote something physical,

(2) a. John picked up a stone.
b. #John picked up a rumour.

and ‘written by Tolstoy’ requires its subject to denote something with informational content.

(3) a. #This stone was written by Tolstoy.
b. This story was written by Tolstoy.

Copredication

(Asher 2011, Cooper 2011, Gotham 2014)

Some nominals can appear in *both* contexts:

(4) John picked up a book written by Tolstoy.

(A physical object with informational content)

But the different contexts may impose different principles of individuation, and hence different ways of counting…

Physical individuation

Suppose that Peter picked up objects 1–3

Situation 1:

physical object 1	*War and Peace*
physical object 2	*War and Peace*
physical object 3	*War and Peace*

Physically: 3 books. Informationally: 1 book.

(5) a. Peter picked up three books. ✓
b. There are three books written by Tolstoy. ×
c. Peter picked up three books written by Tolstoy. ×

Informational individuation

Suppose that Peter picked up object 1

Situation 1:

physical object 1

Family Happiness
The Kreutzer Sonata
The Cossacks

Physically: 1 book. Informationally: 3 books.

(5) a. Peter picked up three books. ×
b. There are three books written by Tolstoy. ✓
c. Peter picked up three books written by Tolstoy. ×

Both together

Situation 1

phys obj 1 — *Family Happiness*, *The Kreutzer Sonata*, *The Cossacks*

Situation 2

phys obj 1 — *War and Peace*

phys obj 2 — *War and Peace*

phys obj 3 — *War and Peace*

(5) c. Peter picked up three books written by Tolstoy. × ×

Ideas

(Gotham 2014, 2016)

Whether or not *x* and *y* are considered to be the same thing depends on a number of factors. One of those factors is *what you say about them*. For example,

- if you say that they 'are written by Tolstoy', then two copies of *War and Peace* are considered to be the same book, and
- if you say that 'John picked them up', then two novels printed in the same volume are considered to be the same book.

↑ connected to the selectional requirements of the predicates

(5) a. Peter picked up three books.
⇒ Peter picked up three **physically distinct** books.
b. There are three books written by Tolstoy.
⇒ There are three **informationally distinct** books written by Tolstoy.
c. Peter picked up three books written by Tolstoy.
⇒ Peter picked up three **physically and informationally distinct** books written by Tolstoy.

How does this work?

Denotation of 'book' in situation 1: object 1+*War and Peace*
object 2+*War and Peace*
object 3+*War and Peace*

Denotation of 'book' in situation 2: object 1+*Family Happiness*
object 1+*The Kreutzer Sonata*
object 1+*The Cossacks*

So in both situation 1 and situation 2 there are three books, *but*

- The meaning of 'three' is sensitive to criteria of identity.
- In situation 1 there are three books that are physically distinct, but not three books that are informationally distinct.
- In situation 2 there are three books that are informationally distinct, but not three books that are physically distinct.
- In neither situation are there three books that are both physically and informationally distinct.

An ambiguity

(6) John read every book in the library.

?⇒ John read *every copy* of every book in the library.
(every physical book)

?⇒ John read *at least one copy* of every book in the library.
(every informational book)

'read' doesn't specify how to individuate its argument as precisely as 'pick up' or 'written by Tolstoy' does.

Back to Chomsky's question

Did Peter and John take out the same book, or different books?

(Chomsky 2000: 16)

We have to say that the meaning of 'same' is relative to a criterion of identity:

- Peter and John took out the same$_{\text{physical}}$ book.

$\Rightarrow$ There are books *x* and *y* such that Peter took out *x* and John took out *y* and *x* and *y* are physically equivalent.

- Peter and John took out the same$_{\text{informational}}$ book.

$\Rightarrow$ There are books *x* and *y* such that Peter took out *x* and John took out *y* and *x* and *y* are informationally equivalent.

The semantics of 'same' and 'different' is very tricky in general; see Barker 2007.

Objects and events

Objects and events

Example (7) is due to Krifka (1990: 487).

(7) Four thousand ships passed through the lock last year.

(7) is ambiguous; the two readings of it are paraphrased as R1 and R2 below.

R1: There are 4000 ships such that each of them passed through the lock last year.

R2: 4000 times last year, a ship passed through the lock.

R2 could be true, and R1 false, if there are 1000 ships in total, and last year each of them passed through the lock four times each.

What is being counted

in the R2 reading?

- According to Krifka (1990): events of a ship passing through the lock.

$\Rightarrow$ There were 4000 events of a ship passing through the lock that occurred last year.

- According to Doetjes & Honcoop (1997): pairs of a ship and an event of that ship passing through the lock.

$\Rightarrow$ There are 4000 of these: $\{$ship x, event of x passing through the lock last year$\}$.

Both take the view that the ambiguity is due to an ambiguous determiner (for Krifka, a silent one; for D&H, 'four thousand').

A challenge

It seems that ‘different’ blocks the R2 reading in (8).

(8) Four thousand different ships passed through the lock last year.

But it’s hard to see how this is possible on either of the event-based accounts described, since they both locate the ambiguity of (7) in the determiner meaning.

In other words, if the difference in meaning comes from ‘four thousand’, then how is ‘different ships’ different from ‘ships’?

Stages

Barker (1999) suggests that, rather than counting events (or event-object pairs), what is going on the the R2 reading is quantification over *stages*:

> *In both cases there must be 4000 ship entities present in the model—but several of those discourse entities (stages, if you prefer) may correspond to the same ship in the world of experience.*

(Barker 1999: 688)

Stages *might* be modelled as event-object pairs, but they might also be modelled as 'time-space instances' of individuals (Carlson 1982). And we can imagine other ways of doing it. The general idea:

It's possible to treat Titanic-at-time-1 as a *different ship* to Titanic-at-time-2 (for example).

Other accounts

On this point, Barker is in agreement with Geach (1962), Gupta (1980), Luo (2012), Carlson (1982). But where he parts company from them is over the significance of the following observation:

Observation 1 (Gupta 1980, Carlson 1982)

Certain lexical items lend themselves to R2 readings.

For Gupta (1980), for example, it's a lexical fact about 'passenger' that (9-a) can (must?) have the interpretation shown in (10), unlike (9-b).

(9) a. Easyjet served 10 million passengers last year.
b. Easyjet served 10 million people last year.

(Barker 2010: 12)

(10) The sum of fulfilled Easyjet bookings last year was 10 million.

- For Gupta (1980), Luo (2012), it is a lexical fact about 'passenger' that Jim-on-the-London-Paris-flight and Jim-on-the-Paris-London-flight are different passengers.
- For Barker (2010), they are the same passenger (Jim), and the R2 reading in (10-b) arises via some kind of pragmatic shift, which also occurs in the derivation of the R2 reading of (7).

Barker (2010) points out/claims that both (9-a) and (9-b) *can* have the reading described in (10) under the right conditions, summarised in the following observation:

Observation 2 (Barker 1999, 2010)

R2 readings are (only?) licensed in circumstances where a human might plausibly fail to 'recognize that two entities are stages of the same individual' (Barker 1999: 689).

In support of this, he notes that it would be unacceptable to say (11) in a situation where my wife made five Easyjet flights last year.

(11) Easyjet served 10 million passengers last year. Five of them live in my flat.

The idea being that if Vicky-on-flight-1 were a different passenger to Vicky-on-flight-2 (etc.), then there would be five Easyjet passengers living in my flat. (But I'm not sure about the significance of this point).

ANOTHER INTUITION, which is difficult to make precise, is that the R2 reading is licensed because it *doesn't matter* whether or not you keep track of the entities in question. The point of uttering (7) can be nothing to do with ships—really it's about how busy the lock is, and that's not affected by whether or not the lock traversals are all by different ships or not (and mutatis mutandis for (9), Easyjet and people/passengers).

Barker (2010) also makes the following observation:

Observation 3 (Barker 2010)

R1 and R2 do not exhaust the possible readings.

By way of noting this, he points out that 'different' need not force an R1 reading:

> *Imagine therefore that you work for Easyjet, and you are faced with a stack of receipts for drinks that have been bought on two recent Easyjet flights. Your job is to calculate the average amount spent on alcohol per passenger. Then your boss might ask you* How many different passengers do these receipts correspond to? *There is no need to figure out which passengers correspond to the same individual across the two flights; rather, it is only necessary to figure out which receipts correspond to a single passenger stage. If so, then* different *is not guaranteeing per-individual identity, but only stage identity.*

(Barker 2010: 17)

Summary

- Individuation (telling things apart) has an effect on quantification (counting).
- Specifically, there are sentences of the form [Num NP VP] in which what you end up counting is not fully determined by the semantics of the N in NP.
- We've seen examples where it seems to be also partially determined by the selectional properties of VP and other predicates in NP (e.g. a relative clause).

John picked up three books written by Tolstoy

↑ individuate physically

↑ individuate informationally

We've also seen examples where it seems that what you end up counting is determined by other factors, like

how hard it would be to keep track of different Ns, or

what the conversational interests are, e.g.

- how busy the lock is,
- how much business Easyjet gets,
- what percentage of people/flight buy at least one drink,
- etc.

Thanks!

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