Unrestricted Quantification Bottom-Up

The Existential Import of Singular and General Propsitions

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Plan

Quantified negative existentials

Counter-examples to universal statements

A dynamic insight into quantification theory

Interpretative remarks

"The hardest problem by far" (Kroon 2003: 149)

Consider the problem of how to analyse existential statements that feature (or seem to feature) the use of "exists" as a predicate, in particular the problem of how to analyse negative existential claims about fiction. It is often thought that the hardest version of this problem is what I shall call the singular negative existential (SNE) problem about fiction: how to analyse (true) negative existentials involving fictional names, say "Hamlet doesn't exist". But it isn't. The hardest problem by far is the quantified negative existential (QNE) problem: how to understand (true) quantified claims like

(1) *There is at least one famous figure in Shakespearean tragedy who doesn't exist,*

(2) *None of the towns and villages described in the Lord of the Rings trilogy really exist.*

- Why is it so difficult to account for these?
  1. Fictional names have the same "quantificational potential" as real names, i.e. seems like (1) can be inferred from "Hamlet does not exist" *via* existential generalisation.
  2. And these statements "rule out certain prima facie appealing solutions to the first problem", i.e. Russell-Quine like paraphrases simply won't work.
  3. I favours a "straight realist solution" (i.e. going for noneism in (Lewis 1990)'s terminology), according to which one can quantify over both existent and nonexistent entities (Van Inwagen 1977), though it is not "realist" in the usual sense.
     - It is a "realist" solution in the sense that is *reify* what is talked about;
     - but not in the sense that it presupposes the existence of what is talked about: indeed, QNE asserts the nonexistence of what is talked about.

QNE are metafictional statements

- These QNEs belong to a larger class of so-called "metafictional statements":[1] those which quantify over fictional entities "*qua* fictional entities" (Recanati 2018).
- Here are a few more examples of quantified metafictional statements:

(3) Was there a fictional or legendary character who married his grandmother? (There, of course, was a famous one who married his mother.) (Kripke 1973/2013: 71)

(4) There are only three characters in the whole of English literature who kill their mothers. (Evans 1982: 367)

(5) Some characters in novels are closely modeled on actual people, while others are wholly products of the literary imagination, and it is usually impossible to tell which characters fall into which of these categories by textual analysis alone. (Van Inwagen 1977: 302)

[1] There are alternative terminologies: "external statements" (Lamarque and Olsen 1994: 144), or "metatextual statements" (Bonomi 2008).

"A particular brand of strangeness" (Cumming §7.3)

- Here is another way of stating the problem about QNE (in relation to the one about SNE):

> *On the one hand quantification doesn't add anything new; on the other, its particular brand of strangeness should be appreciated. To begin with, observe that there are three Fates, three Furies, nine Muses, twelve labours of Hercules, and so on. The Furies don't exist, but that doesn't prevent them from being three. Thus three, and other quantitative predicates appear to be like famous and useful in not presupposing existence.*
>
> *A small digression is in order. Since the Furies don't exist, it seems right, on the one hand, to say that there are no Furies. But it is also right, on the other, to say that there are three of them. What should we make of this? We might suppose that only one claim is literally true. While according to (false) legend there are three Furies, in reality there are none. This won't do, however. We say there are three mythical Furies, but this is not what the legend says (it does not pronounce them mythical). We can also make claims like the following:*
>
> (6) *At least one of the wonders of the ancient world never existed.*
>
> *This would be true, intuitively speaking, if the Hanging Gardens of Babylon turn out not to be historical. But as long as it's a sensible claim, the logic of it requires the counting of nonexistent things.*[2]

[2] See Cumming's book chapter (2018).

Agenda for this talk

- My aim is to focus on quantification theory (QT);
- I will set up the problem as an inferential problem with this question in mind: "what counts as a *good* counter-example to a universal statement?"
  - Building on this straightforward idea that universal statements are true insofar as they resist counter-example.
- Why do I do this?
  - I am in the look for an antirealist QT which can deal with QNEs...
  - ... because I am, in general, in the look for an antirealist semantics for all metafictional statements (see (Rouillé 2021) and the description of my current research project).

- **General dialectic**: I will show how to build unrestricted quantification bottom-up ("from Quine to Routley and back")
  - I take (Quine 1948) to represent *standard* QT (Lewis's "allism"), i.e. a radically realist QT in which the (unrestricted) quantification domain is identical with that of existing objects. Full stop.
  - I take (Routley 1982) to represent the most liberal QT (Lewis's "noneism"), in which the (unrestricted) quantification domain is completely silent as to what exists or not.
  - Following philosophical insights from free logicians (esp. (Lambert 2003) and (Bencivenga 2006)), I argue that both views capture some of what we need but not all.
  - I finally show how one can go from one to the other by building one simple dynamic idea into QT.[3]

[3] Appealing to some dynamics for QNE's is in line with Cumming's work, and also (Clapp 2009). My way of putting things is more "logicky" than "linguisticky", though. More on this at the end of the talk.

Plan

The Millennium Falcon

Maximum speed	1050 km/h (652 mph; maximum earth-like atmospheric speed) 75 MGLT (megalight per hour; subluminal speed) 0.5 HCR Blackmarket Drive (hyperdrive class rating; superluminal speed) 10.0 HCR Stock Back-up Drive

For more info: check the dedicated Wookieepedia page

The inferential puzzle

- Take the following statements:

  (7) Nothing travels faster than light.

  (8) Everything exists.

  (9) The Millennium Falcon is a fictional superluminal starship in the Star Wars franchise.[4]

- Sounds intuitive to say that:
  - (9) is not a good counterexample to (7)
  - (9) is a good counterexample to (8)
- But that's weird!

[4] Taken from https://en.wikipedia.org/wiki/Millennium_Falcon

Explanation of the problem

- In SQT it is true that:

  (10) $\vdash F[t/x] \rightarrow \exists x Fx$ (EG)

  (11) $\vdash \forall x Fx \rightarrow F[t/x]$ (UI)

- But:
  - Suppose (9) is a good counterexample to (8), it is an instance of EG. Then:
    - LF of (9) is: Fa
    - and there is a non-trivial existence predicate such that: $\exists x \neg E!x$
  - If (9) is not a good counterexample to (7), then:
    - LF of (7) cannot be: $\forall x \neg Fx$
    - and so (7) must be restricted to *existing individuals*: $\forall x(E!x \rightarrow \neg Fx)$
    - *Or else*, LF of (9) is not Fa (contra hypothesis).
- **Pb**: the LF of a universal statement (e.g. (7) and (8)) depends on what counts as "good" counter-examples (e.g. (9)).
  - *More trivially*: quantifiers are inferentially ambiguous; sounds bad for logical symbols!

Caveat

- I tacitly assumed (7) to be an *absolutely* universal statement; but "absolute generality" is a controversial notion meeting a lot of skepticism (Rayo and Uzquiano 2006).
- I hope you can change the example to your favourite (absolutely) universal statement (and corresponding fiction). Here are a few:

(12) Nothing lasts for ever.

(13) (Berkeley:) "God perceives everything".

(14) The world is but a perpetual seesaw. All things in it are in constant motion-the earth, the rocks of the Caucasus, the pyramids of Egypt-both with the common motion and with their own. Stability itself is nothing but more languid motion.[5]

[5] Montaigne "Du Repentir" (III;2).

- (15) (Dependent arising) The basic principle is that all things (dharmas, phenomena, principles) arise in dependence upon other things.[6]

  (16) Everything is self-identical.

- **By contrast**: if you do not believe in absolute generality, then you can translate the problem into how systematically interpret the contextual dependence of the universal quantifier.
  - And so: the logical form of (9) should be such that it can be used as a counter-example in some (but not all) contexts.

[6] https://en.wikipedia.org/wiki/PratÄńtyasamutpÄĄda

Plan

Quantified negative existentials

Counter-examples to universal statements
- Setting up the problem
- Allism and its discontents
- Noneism and its discontent

A dynamic insight into quantification theory
- (Absolutely) nobody saw this?
- Solution to the puzzle

Interpretative remarks

Quine's point

- To rescue SQT (EG + UI), one can paraphrase (9) away.
  - Take as terms all and only the *non-empty terms* (i.e. those referring to an existing object), and paraphrase away the empty ones.
    - **Csq**: the quantifiers are by definition existentially loaded.
  - *Insight*: the ontological question is settled at the level of (bound) variables, and the interpretation of quantifier merely reflects one's answer to the ontological question, i.e. one's interpretation of (bound) variables.
    - In philosophy of language idiom: it comes from the fastening the link between reference and existence.
- **Obvious problem**: (9) is never a counter-example to anything.
  - SNEs loose their "quantificational potential";
  - And QNEs resist paraphrase anyway...

Quine's Pyrrhic victory

- More fundamentally, against (EG + UI), there is the "Freeing Forms From Facts" (FFFF) objection (Lejewski 1954: 108):

> *Quine does not think that empty noun-expressions are meaningless just because they do not designate anything. He allows for the use of such words as "Pegasus", "Cerberus", "centaur", etc. under certain restrictions and tries to distinguish between logical laws which prove to be true for any noun-expressions, empty or non-empty, and those which hold for non-empty noun-expressions only. It follows from his remarks that before we can safely use certain laws established by logic, we have to find out whether the noun-expressions we may like to employ, are empty or not. This, however, seems to be a purely empirical question. [...]*
>
> *This state of affairs does not seem to be very satisfactory. The idea that some of our rules of inference should depend on empirical information, which may or may not be forthcoming, is so foreign to the character of logical enquiry that a thorough re-examination of the two inferences may prove to be worth our while.*

- *In other words*: logic (EG + UI) applies *only after* the proper empirical work is done.[7]

[7] The same point was made in (Lambert 1967) (and subsequent work) by "squaring quantification": classical logic freed *general* terms from existence presuppositions; free logic is free for existence presuppositions with respect to *both* general and singular terms.

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Routley's point

- If we agree that (9) *is* a counterexample to (8), then we need to restrict EG + UI (thus modify SQT).
- As I did above, by introducing an extensional existence predicate $E!$:

$$(17) \quad \vdash (F[t/x] \wedge E!t) \rightarrow \exists x Fx \text{ (EG-R)}$$

$$(18) \quad \vdash (\forall x Fx \wedge E!t) \rightarrow F[t/x] \text{ (UI-R)}$$

- There is a philosophical discussion about whether one is *allowed* to treat existence extensionally;[8]
- But the logical machinery has shown that it is possible to do so.[9]
  - **Rq**: in *theoretical philosophy*, *pace* Quine, everything that is possible is allowed.

[8] E.g. many philosophers claims that *it makes no sense* to talk about existence extensionally. See (Lewis 1990) for a review of those.

[9] The original idea comes from (Leonard 1956) and was developed in (Hintikka 1959) and in a series of articles by Karel Lambert ((Lambert 1958), (Lambert 1961), (Lambert 1962), (Lambert 1964)).

- That gives you *double domain* QT:[10]
  - A double domain model is a triple $\langle D, E, v \rangle$, with $D \neq \emptyset$ and $E \subseteq D$.
    - D is the "outer domain"; E is the "inner domain".
  - We can now define truth-conditions for the *inner* quantifiers:
    - $v(\forall x Fx) = 1$ iff for all $d \in E$, $v(F[d/x]) = 1$ and 0 otherwise.
    - $v(\exists x Fx) = 1$ iff for some $d \in E$, $v(F[d/x]) = 1$ and 0 otherwise.
  - and for the *outer* quantifiers:
    - $v(\Pi x Fx) = 1$ iff for all $d \in D$, $v(F[d/x]) = 1$ and 0 otherwise.
    - $v(\Sigma x Fx) = 1$ iff for all $d \in D$, $v(F[d/x]) = 1$ and 0 otherwise.
- **Rq**: now we have the outer quantifiers, we can dispense with the inner quantifiers, given $v(E!) = E$:

$$\forall x Fx \equiv \Pi x(E!x \rightarrow Fx)$$

$$\exists x Fx \equiv \Sigma x(E!x \wedge Fx)$$

- *Routley's point*: DDQT is an extension of SQT, so we should prefer it.

[10] The first rigorous formalisation of DDQT is due to (Leblanc and Thomason 1968). I follow (Priest 2008a) for a now standard formulation of Routley's ideas from (Routley 1966), (Routley 1980) and (Routley 1982).

Problems for DDQT

- *Minor point*: In DDQT (straightforwardly conceived), (9) is in fact a good counter-example to (7).
  - One needs to contextually restrict quantifiers (when the quantifiers appear existentially loaded)...
  - ... which is the "top-down" definition of $\forall$ (using Π and $E!$).

- *More serious point*: In DDQT, there is nothing special about $E!$
  - In fact, you could substitute $E!$ for "being red" and define "redly loaded inner quantifiers".
  - **Csq**: a theory of $E!$ is needed, and it must be independent from logico-linguistic notions.
    - So the tradition got it *all wrong*: ontology has simply nothing to do with logic.
    - DDQT is a technical form of existentialism (yielding non-logical, non-linguistic theory of existence as in "existence precedes essence").
- **Yet**, there are undoubtedly strong connections between existence, identity and modality:
  - $E!t =_{def} \exists x(x = t)$: existing individuals are self-identical.[11]
  - $(Pt \wedge \neg Pt) \rightarrow \neg E!t$ and $E!t \rightarrow \neg(Pt \wedge \neg Pt)$
    - "Impossible implies nonexistent" and "existent implies possible"

[11] See (Scott 1979) for an argument to the effect that a good theory of = presupposes a good theory of $E!$.

A deeper insight into DDQT (Bencivenga 2006: 296)

- Routley's point misses the *whole* point.[12]
- **First and foremost**, we don't want to drop UI, we want *restrict* it.

From

(19) Nothing is a winged horse ($\forall x \neg Px$)

we can infer

(20) The Queen Mary is not a winged horse ($\neg Pb$)

The Queen Mary exists, hence whatever is true of everything existing is true of it.

- That point is well-taken.

[12] I would say he gets half of it, but Bencivenga, I think, would say he really misses the *whole* point.

- *Moreover*, the idea consists in restricting *the use* of quantifiers, when we make inferences.
  - So that the quantifiers keep track of ontological reasoning...
  - ... and not disconnect the two.
- **Csq**: In regimenting the quantification domain, one is prejudiced in favour of realism because they objectify (i.e. reify) the nonexistent.[13]

  just as you don't want your new understanding of what a name is [...] to force you to admit fewer objects that the conceptual realist does, you also don't want to be force to admit more. [...] It will continue to be true for you that all objects exist, that is:

  (21) $\forall x E!x$

  [...] will also have to be adopted as an axiom.
- **Csq**: DDQT is not radical enough (Bencivenga 1985):
  - It carries the realist ideology beyond existence...
  - ... but there is no *antirealist* ingredient in it.

[13] It is an echo of Quine's point: the ontological question is settled at the level of (bound) variables, and the interpretation of quantifiers merely reflects one's interpretation of (bound) variables.

Plan

Inter-related pairs of quantifiers

- (Priest 2008a: 297) glosses Routley's point by saying: "There is no way of defining outer quantifiers in terms of inner quantifiers."
- This is not, *stricto sensu*, true.
  - There is a way to define outer quantifiers bottom-up...
  - ... once we recognise there is a 3rd pair of quantifiers, definable in DDQT.
- Here is the "nonexistentially loaded pair of quantifiers", in $\langle D, E, v\rangle$:
  - $v(\pi x Fx) = 1$, iff for all $d \in D \setminus E$, $v(F[d/x]) = 1$ and 0 otherwise.
  - $v(\sigma x Fx) = 1$, iff for some $d \in D \setminus E$, $v(F[d/x]) = 1$ and 0 otherwise.
- Given $v(E!) = E$, we thus have the following equivalences in DDQT:

$$\forall x Fx \equiv \Pi x(E!x \rightarrow Fx)$$

$$\pi x Fx \equiv \Pi x(\neg E!x \rightarrow Fx)$$

$$\Pi x Fx \equiv \forall x Fx \wedge \pi x Fx$$

Plan

Going out, bottom up

- There is a dynamic interpretation of this defining outer quantifiers:
  1. Start with a standard model: $\langle E, v \rangle$
  2. Then, *introduce* empty singular terms,
     - i.e. talk/think about a (putatively) nonexistent individual.
  3. Interpret the new singular terms,
     - i.e. construct (*inter alia*) a new domain E' such that: $E' \cap E = \emptyset$.
  4. Now, run a parallel SQT-like model $\langle E', v \rangle$ with $E' \neq \emptyset$
     - Define the nonexistentially loaded quantifiers $v(\pi x F x) = 1$ iff for all $d' \in E'$, $v(F[d'/x]) = 1$ and 0 otherwise.
  5. To get $\langle D, E, v \rangle$, merge the two models: $D = E \cup E'$.
  6. The outer quantifiers for your DDQT are defined bottom-up:

$$\Pi x F x =_{def} \forall x F x \wedge \pi x F x$$

Solving the initial puzzle

- Here are the three inferentially linked statements I began with:

  (7) Nothing travels faster than light.

  (8) Everything exists.

  (9) The Millennium Falcon is a fictional superluminal starship in the Star Wars franchise.

- Before we even utter (9), both (7) and (8) should ring true.
- Once (9) is interpreted, then both (7) and (8) are ambiguous. And one has to find a disambiguation strategy:
  - (8) tends to get re-interpreted as unrestricted quantification (Π); whereas (7) tends not to.
  - probably this has to do with the kind of predication involved: "traveling faster than light" probably presupposes existence whereas "exists" obviously does not.

- Interestingly, we can always go back and forth:
  - i.e. we can "forget" about our intentional constructions: we can make reality prevail when needed.
  - This is because "Π" is *conceptually dependent* on "$\forall$" (and "π"), and not the other way around.
    - And so, if nothing goes astray, information about reality is always backed up somewhere.

Constructivism

- I think my view is in line with (Bencivenga 2006: 302):[14]

  > *The (conceptual) "construction" of objects simpliciter takes time, and during this time intentional objects play a role: but by the end they are supposed to disappear.*

- From a purely metaphysical viewpoint, the dynamic interpretation of QT that I propose says that what exists is *primary* and what does not exist is *derived*.
  - In other words, intentional objects are constructed (in the imagination) and then introduced into language *qua* constructed (nonexistent) objects.
  - This is, very roughly, a constructivist metaphysics.

[14] See also his description of the dynamics of "cognitive spaces" in (Bencivenga 1983: 798-90).

Connection with linguistics

- The idea that negative existentials require some dynamic ideas is not new, for it goes back to (Strawson 1950);
  - see esp. (Clapp 2009) for a case against *any* static solution to negative existentials.
- In fact, my picture is very similar to (and partially inspired by) Sam Cumming's (broadly) fegean account of intentional entities.[15]
  - In particular, for *quantified* negative existentials, he has a semantic account which quantifies over discourse referents (as understood in (Karttunen 1969))
  - *Importantly*: drefs are fewer than expression tokens (because of anaphoric links), but more than referents.

[15] Which is also similar to (Friend 2011)'s use of "mental symbols". See his book in prep (p.c.); and also his previous (Cumming 2013), (Cumming 2014).

On what drefs are (Cumming, §7.3)

Karttunen does not provide a metaphysical account of drefs. For all he says, they could be the natural numbers (as Heim 1982 suggests at one point). I propose to understand them as socially constructed abstract objects (that is to say, in the manner suggested by Devault and Stone 2006). This contrasts with standard model-theoretic treatments in dynamic semantics, where their only role is to be assigned objects by assignment functions (see e.g. Muskens 1996). It also contrasts with their appearance (as "discourse markers") in Discourse Representation Theory (Kamp and Reyle 1993), where they correspond to agent-specific mental symbols.

A linguistic winkle

- My story makes an essential use of this nonexistentially loaded quantifier "π". Doesn't it sound like a theoretical artifact with no natural language correlate?
  - Clearly there is some discussion about whether the natural language quantifiers are (or ought to be) existentially loaded or neutral (see for instance (Priest 2008b))...
  - ... but I have not seen anything like a natural language inquiry about nonexistentially loaded quantifiers!
- *Ironically enough*: it is possible that π does not exist!

- Here are some thoughts, for a rejoinder:
  - Maybe the notion of *simulated quantification* (Lewis 1990: 28) is enough;[16]
  - provided we add a strong antirealist flavour on the notion of simulation:
  - like: "simulated ϕs" are nonexistent ϕs;
  - Be it as it may, an analysis of *simulation* will plausibly be a theory in the philosophy of mind,
  - and thus these artificial "nonexistentially loaded quantifiers" are not a linguistic phenomenon, after all;
  - but rather a mental operation on (regular, non-simulated) quantification theory.

[16] The many ways of "quantify without quantifying".

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