Unrestricted Quantification and Extraordinary Context Dependence?

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Goals for Today

- Revisit the contextualist approach to unrestricted quantification I have been quixotically advocating for a while now (Glanzberg 2004, 2006).
- Take up a concern I raised earlier, that the sort of context dependence required by my preferred approach is not on par with the ordinary context dependence of quantifier domains (thus weakening the appal of the contextualist view).
- In 2006, I bit the bullet.
- I will now explore a way that maybe we can see the context dependence needed for some quantifiers as perfectly ordinary after all.
- So, maybe a smaller bullet to be bitten?
- In doing this, connect with other issues about the semantics of quantifiers I have been worried about (Glanzberg 2008).

The Fiendish and Cunning Plan

1. Rehearse the argument from paradox that (I think) shows absolutely unrestricted quantification to be impossible.
2. Rehearse the contextualist response to the argument from paradox.
3. Review the 'extraordinary context dependence' question. (1–3 from Glanzberg 2006.)
4. Reconsider the assumptions that make the needed context dependence seem extraordinary.
5. Present an alternative for some quantifiers.
6. Show it allows us to understand the needed context dependence as ordinary for some cases.
7. Consider some limitations of the new approach.

The Problem

- Driven by a number of much-discussed paradoxes, including Russell's paradox and the Liar paradox (cf. Parsons 1974a, Glanzberg 2001, 2004a).
- To set the stage, review a generalized form of Russell's paradox (Williamson 2004).
- Old version shows:
  - If V is the collection of all sets, then V cannot be a set.
  - But not specific to sets . . .

A Generalized Form of Russell's Paradox

- Build interpretations $I(F)$ for some language under which 'P' hold of all and only the Fs.
- Let the Rs be all and only the objects o such that o is not an interpretation under which 'P' applies to o.
- Build $I(R)$.
- $I(R)$ cannot be in the domain of the quantifier just used.
- If it were, we would have Russell's paradox:
  - $o = I(R)$: $I(R)$ is an interpretation under which 'P' applies to o iff $I(R)$ is not an interpretation under which 'P' applies to o.

The Argument from Paradox

- **The Argument from Paradox:** We have here a procedure for identifying an object which cannot be in a given quantifier domain, even a domain which appeared to be ‘absolutely everything’.
- **Basic Conclusion:** Therefore, no such thing as ‘absolutely unrestricted’ quantification.
- The generalized version shows us:
  - Not specific to sets.
  - With some standard set theory, we can assume among the problematic objects is the domain of the quantifier itself.
- How to respond?
  - Option I think fails: no such object, and hence the Argument from Paradox is flawed. (Not our topic for today. Issues of quantification versus ‘nominalization’ I talked about in 2004.)
  - My preferred response . . .

The Contextualist Response

- The Argument from Paradox shows how even what appear to be the widest quantifier domains can *expand*.
- Hence, our widest quantifier domains differ from occasion to occasion.
- Subsume this under the general category of *context dependence*: the domain of even apparently unrestricted quantifiers are somehow relative to context.

The Context Dependence of Quantifiers

- Natural-language quantification, including natural-language uses of expressions like *everything*, is heavily context dependent. For instance:

  (1) a. Most people came to the party.
  b. I took everything with me.
  c. Nothing outlasts the energizer.

- The Basic Conclusion shows there must be some kind of context dependence even for apparently unrestricted quantifiers.
- Thus, try to make the Basic Conclusion appear palatable by showing it to be a species of a wide-spread phenomenon in natural language.

Some Distinctions

- A *restricted quantifier* contains a *non-trivial syntactic* restrictor (pronounced or unpronounced).
  - *Everything* is unrestricted.
- A *contextually restricted* quantifier is one that ranges over a contextually given domain that is a proper subset of the objects that can be quantified over in that context.
  - *Everything* in (1) is contextually restricted.
- The *background domain* of a context is the widest domain provided by the context.
  - Domain of all objects, according to the context.
  - The domain over which *unrestricted and contextually unrestricted* quantifiers range in that context.

Formulating the Thesis

- There is *contextual relativity* of *background domains* (cf. Parsons, 1974a,b; Glanzberg, 2004b).
  - The Argument from Paradox shows how to construct an object not in a given background domain.
  - The contextualist holds that this results in a new context with a *strictly wider* background domain.
- Thus, in the Argument from Paradox, we see quantifiers which are:
  1. Unrestricted
  2. Contextually unrestricted (according to the definition we just saw).
  3. Yet contextually relative.
- The contextualist thesis of Glanzberg 2006: there are Unrestricted and Contextually Unrestricted quantifiers (UCU) that still show context relativity to background domain.

Extraordinary Context Dependence

- The thesis reflects the way in which relativity to background domain is not quite like ordinary context dependence of quantifiers.
- Weakens the appeal of the contextualist response.
- Next steps:
  - Show that the standard semantics of quantifiers seems to force us to rely on extraordinary context dependence to sustain the contextualist response.
  - See what that sort of extraordinary context dependence requires.
  - Reconsider: alternative treatment of some quantifiers can make the context dependence involved ordinary again.

Standard Treatment of the Semantics of Quantification I

- Quantified Noun Phrases as (type $\langle 1 \rangle$) generalized quantifiers:

(2) a. $[\![\text{every NP}]\!]^c = \{X : [\![\text{NP}]\!]^c \subseteq X\}$
b. $[\![\text{most NP}]\!]^c = \{X : |[\![\text{NP}]\!]^c \cap X| > |[\![\text{NP}]\!]^c \setminus X|\}$

- *Every NP VP* is true iff $[\![\text{VP}]\!]^c \in [\![\text{every NP}]\!]^c$.
- Relational (type $\langle 1, 1 \rangle$) analysis of the determiner denotation:

(3) $[\![\text{every}]\!]^c(A, B) \longleftrightarrow A \subseteq B$

- Example:

(4) Every bottle is empty.

$[\![\text{every}]\!]^c([\![\text{bottle}]\!]^c, [\![\text{empty}]\!]^c)$ holds iff $[\![\text{bottle}]\!]^c \subseteq [\![\text{is empty}]\!]^c$.

Standard Treatment of the Semantics of Quantification II

- Local definition.
  - These are *local* definitions: assumed that $X, A, B \subseteq M$, for a background domain M.
  - Needed to make these set-theoretically well-defined.
  - Typically the universe of discourse of a model. Hence, makes the interpretation an element of a higher-type model.
- Global versions.
  - Functions from domains M to local GQs.

(5) a. $[\![\text{every NP}]\!]^c{}_M = \{X \subseteq M \colon [\![\text{NP}]\!]^c \subseteq X\}$

b. For every M, $A, B \subseteq M$,
$[\![\text{every}]\!]^c{}_M(A, B) \longleftrightarrow A \subseteq B$

  - In logic, many properties are global (e.g. definability and logical strength, conservativity and monotonicity), but also some important local results (e.g. counting results, Keenan and Stavi conservativity theorem).

Where *Doesn't* Ordinary Context Dependence Come From?

- **Not** from *M*, the background domain.
- Westerståhl's principles (Westerståhl, 1985):
- WP1: Background domains are large. Contextually restricted domains can be small.

  (6) At the department meeting today, everyone complained about the Governor.

- WP2: Background domains are (relatively) stable across stretches of discourse. Contextually restricted domains are not.

  (7) Nobody cared that nobody came (Stanley and Williamson, 1995).

  Background domain does not change, but the quantifiers are naturally read as having distinct domains.

Where Does Ordinary Context Dependence Come From?

- One option (Stanley, 2000; Stanley and Szabó 2000): a contextual parameter in the *nominal* of a quantifier.
- *Every bottle is empty* looks like:

  (8) $\textbf{every}_M(D^c \cap [\![\text{bottle}]\!]^c, [\![\text{is empty}]\!]^c)$

  D^c is a contextually fixed set of elements of M.
- Other options: index determiners (von Fintel, 1994; Westerståhl, 1985), no parameter in LF (Bach, 1994, Carston, 2004).

Making Room for Context Relativity of Background Domain

UCU quantifier:

(9) Everything is F.

- Semantics:
  - $D^c = [\![\text{thing}]\!]^c = M$.
  - True iff $M \subseteq [\![\text{F}]\!]^c$.
- Context relativity thus present if M varies with context.
- This recasts the role of M.
  - No longer the universe of discourse of a model.
  - No longer just thinking about global generalized quantifiers as an aspect of model theory.
  - Rather, see M—the background domain—as a distinct variable feature of context.
  - Presumably part of a model (for appropriate model-theoretic setting).
- Call this M-dependence.

M-Dependence Is Not Like D^c-Dependence

- D^c is a separate parameter whose value composes with the value of NP by intersection:

$$D^c \cap [\![\mathrm{NP}]\!]^c.$$

  (Thus sort of like a hidden pronominal element.)

- Makes no sense for M-dependence: no semantic value available that can be restricted by intersection with M, as any such restriction would be trivial for the background domain.
- Generally, as M is already the background domain for the context, no composition of M with a semantic value will result in the kind of relativity to background domain needed.

The Extraordinary Option for *M*-Dependence

- Do not treat *M* as a separate parameter, whose value composes with the semantics of determiners.
- Rather, a feature of the semantics of determiners themselves.
  - The subscript *M* does not indicate a separate argument of the meaning of a QNP, but a feature of that meaning itself.
- This makes determiners in a way like indexicals, whose values vary with context without any distinct parameter to compose with them.
- As D^c-dependence is the ordinary context dependence we observe with quantifiers, it appears the paradox has forced us to posit an additional *extraordinary context dependence*.

Ordinary or Extraordinary? I

- Standard semantics and assumptions about domain restriction make *M*-dependence look extraordinary.
- Metasemantics (considerations of how contextual parameters are fixed) make it seem more ordinary.

(10) a. Every philosopher is smart (= every philosopher around here, in our group).
b. Everything gets bigger and better (= UCU).

- For (10a):
  - A referential(ish) intention to pick out some group of philosophers.
    - Actually, I think the speaker's intention works with other contextual factors (cf. Gauker 1997).
    - But, I think the intention is a crucial factor, and to simplify discussion, I shall pretend it is the only one.
  - Context provides the group, and can play a role in fixing its extension.

Ordinary or Extraordinary? II

- For (10b):
  - A referential(ish) intention to talk about M, i.e. 'EVERYTHING'.
  - Context provides M, and plays a role in fixing its extension (according to the contextualist response to the paradoxes).
- Metasemantically M-dependence and D^c-dependence seem on par.
- Question: is it the GQ semantics and standard treatment of domain restriction as D^c-dependence that is making it seem extraordinary?
- Maybe these assumptions are the wrong way to go?

Hints of a Semantic Alternative

- Some QNPs act a lot more like context-dependent referring expressions.
- Example: *both*
- Presupposes a set of two salient individuals be provided by context.
- GQ semantics: presupposes a two element set A, with $A = [\![\mathrm{NP}]\!]^c$. $[\![\text{both NP}]\!]^c = \{X : A \subseteq X\}$.
- Intuitively, interpreted as talking about the elements of A (distributively).
- With right apparatus of plurals and distributivity, can simply see it as referring to the plural object A, i.e. $[\![\text{both NP}]\!]^c = A$ (see Glanzberg 2008).

Features behind the Hint

- Presupposition: makes *both* tied to an element provided by context. (Not likely to help with *every NP*.)
- Principal filter semantics.
  - Set of the form $\{X : A \subseteq X\}$ is the 'principal filter' generated by A.
  - Appears closely linked to definiteness (cf. Barwise and Cooper 1981, Heim 1991).
- Generator sets for PF-GQs are all one needs to look at in determining truth values. They provide the unique 'witness set' (in Barwise and Cooper's terminology, cf. Szabolcsi 1997).
- A PF-GQ thus in effect contributes its generator to truth conditions.
- Often think of a PF-GQ as simply referring to its generator.

Taking the Hint for *Every* I

$[\![\text{Every NP}]\!]^c$ is a PF-GQ.

- Generator $[\![\text{NP}]\!]^c$: $[\![\text{every NP}]\!]^c = \{X : [\![\text{NP}]\!]^c \subseteq X\}$.
- With domain restriction as D^c-dependence, can have: $[\![\text{every NP}]\!]^c = \{X : [\![\text{NP}]\!]^c \cap D^c \subseteq X\}$.
- Metasemantics: referential(ish) intention required to fix domain.
- Can attach to D^c.
- But, can also just think of speaker's intention as fixing a set $A \subseteq [\![\text{NP}]\!]^c$.
- Can interpret *every NP* as the PF $\{X : A \subseteq X\}$.

Taking the Hint for *Every* II

- As with *both NP*, can think of it as simply having value A: the set which the speaker intends to talk about, fixed by referential intention via $[\![\mathrm{NP}]\!]^c$.
- Differs from *both NP* mostly in presupposition.
  - No anaphoric presupposition like *both* has.
  - Might also carry a presupposition that A is non-empty (controversial).
  - But, need a salient A or D^c to be provided by context in most cases.

The Distributive-Universal Analysis I

- With both *both NP* and *every NP*, not quite so simple as saying refers to *A*. Still need universal force, for instance.
- But, can appeal to non-GQ apparatus to make things work.
- Basic idea: *every NP* is always interpreted distributively.

(11)
a. The boys carried the piano (collective and distributive).
b. All the boys carried the piano (collective and distributive).
c. Each boy carried the piano (distributive only).
d. Every boy carried the piano (distributive only).

(See Beghelli and Stowell 1997, Szabolcsi 1997.)

The Distributive-Universal Analysis II

- NB there are some important differences between *each* and *every*, and the claim that *every* is always distributive is a little delicate. I shall ignore these issues here.
- Distributive universals QNPs contribute the PF generator set A (or, if we like $[\![\mathrm{NP}]\!]^c \cap D^c$) as semantic values. (NB in settings with plurals have to distinguish from 'groups'. Cannot be interpreted as a single plural individual.)
- Universal force comes from a distributivity operator:

$$^{Dist}P(X) \longleftrightarrow \forall x \in X\, P(x).$$

(Cf. Lasersohn 1998, Schwarzschild 1996 for other options.)

The Distributive-Universal Analysis III

- Where does the distributivity come from?
  - Could be built into understanding of plurality (cf. Landman 1989). If so, can really just treat *each* and *every* as contributing PF generator *A*.
  - Could be that *every* and *each* contribute a *Dist* operator (cf. Roberts 1987). Then:

$$[\![\text{every}]\!]^c = \lambda X \lambda P.^{Dist} P(X).$$

  - In DRT-based system of Szabolcsi (1997), *every NP* contributes set variable *A*, which is bound by a DRT-style universal operator.
  - Following Beghelli and Stowell, suppose a highly articulated syntax, where there is a DistP functional head that contributes the universal operator.

The Distributive-Universal Analysis IV

- Restatement with choice functions (Szabolcsi forthcoming, cf. Kratzer 1998, Reinhart 1997, Winter 2001).
  - Semantic value $[\![\text{every NP}]\!]^c = f(\wp([\![\text{NP}]\!]^c)$.
  - f a choice function, returns a selected element of $\wp([\![\text{NP}]\!]^c)$. Can contain parameters.
  - Dist head still provides universal operator, to distribute predicate over the choice set.
  - Choice function essentially picks out a contextually restricted witness set.
  - NB some interesting connections to interpretation of *indefinites* as choice functions (bound or not).

Reconsidering D^c I

Observe that on any of these distributive-universal options, D^c is not necessary for contextual domain restriction.

- Not needed in the PF analysis.
  - Semantic value is the generator A of PF.
  - This is a contextually salient set.
  - Relies on speaker intention to pick out a salient set of NPs.
  - Role of NP is to help fix and indicate A. Then simply passes A to the semantics.
  - Thus, D^c plays no independent role in the semantics or pragmatics.
    - Still correct to describe A as $[\![\mathrm{NP}]\!]^c \cap D^c$, but not part of the semantics.
  - Role of NP is now like its role in *that NP* (on my favored view, Glanzberg and Siegel 2006).

Reconsidering D^c II

- Choice function version makes this even clearer.
  - Context dependence from the context dependence of NP, plus context dependence in choice of f.
  - Latter is provided by the meaning of *every*.
  - No semantic or pragmatic role for a distinct domain restriction parameter D^c whose value composes with an otherwise context-independent semantics for determiners.
  - Rather, builds the context dependence into the semantics of the determiner.

What about Scope? I

- Still has it (though we should pay attention to differential scope potentials for different quantifiers).

  (12) Two students read every book.

  (Cf. Beghelli and Stowell 1997.) Has a reading where for each book, two students read it; and a reading each of two students read all the books.
- Inverse-wide scope: *every book* might move to wide scope position at LF.
- Contribution of set value does not change. Rather, scopes the *Dist*:

$$^{Dist}[\lambda x.([\![\text{two students}]\!]^{c}{}_{y}[\![\text{Read}]\!]^{c}(x,y))](A).$$

What about Scope? II

- Surface scope:

$$[\![\text{two students}]\!]^{c}{}_{y}[^{Dist}[\lambda x.[\![\text{Read}]\!]^{c}(x,y)](A)].$$

- Readings where *every book* varies its value? Possible under embedding:

(13) In every class, two students read every book (for that class).

(Cf. Stanley 2000.)

- A multiple domain-restriction effect.

What about Scope? III

- Easy on the choice function view. Multiple salient f_y with bindable parameter.
- PF analysis needs multiple generators. They are salient. But need a way to bind their selection.
- Can be done with DRT apparatus for manipulating discourse referents.
- Maybe a purely pragmatic story about salience.
- Most straightforward treatment seems to be essentially choice functions.

Non-Uniform View of Quantifiers

- Skip some tricky issues about negative quantifiers (e.g. *no*), and their interactions with distributive-universals (cf. Beghelli and Stowell 1997).
- Not all quantifiers are apt for the treatment given here: *most*, *few*, possibly *more than five*, ...
- These presumably get treated as standard generalized quantifiers.
- Part of a view that takes the differential scope properties of quantifiers to heart, and offers a non-uniform analysis of them.
- Makes *every* and *each* distinctive.
- Indefinites like *some* will get a separate treatment.
  - Though interestingly, the choice function approach makes semantics of indefinites and distributive universals surprisingly similar.

Another Option for Ordinary Context Dependence in *Every NP*

- Makes ordinary context dependence for *every* distinctive.
- Contribution of a contextually salient set of individuals is all that is required semantically (modulo embedding issues).
- Domain restriction on these views is a matter of selecting a salient set of the right sort (a subset of $[\![\mathrm{NP}]\!]^c$).
- Functions (somewhat) like selecting a referent.
- Not a matter of composing a distinct D^c value.
- Rather, meaning of *every* does the selecting.
- Not so much different than we need for relativity of UCU quantification to background domain.

UCU *Everything* I

- Mostly like *every NP*, but simpler.

  (14) Five people considered everything.

  No UCU reading with value of *everything* varying: one salient set will suffice.
- UCU reading of *thing* fixes generator *M*: the background domain.
- Still need referential intention, as need to fix that it is the UCU reading that is intended (cf. Rayo 2003).

UCU *Everything* II

- Known that *everything* and *everyone* can allow collective readings.

  (15) a. Everything collided.
  b. # Each thing collided.
  c. # Each atom collided.

  Each is uniformly distributive. (Cf. Moltmann 2003, 2004 on other aspects of *thing*.)
- Not clear to me if the collective readings can really be UCU: the group already has to be somehow salient, blocking full UCU status (but see work of Rayo and Uzquiano).
- Nonetheless, I shall only consider distributive cases here.

Context Dependence for UCU *Everything* Is Ordinary!

- Assume $[\![\text{thing}]\!]^c = M$, i.e. the NP is vacuous. (Alternatively, could see *something* as a distinct QNP.)
- Semantic value $[\![\text{everything}]\!]^c$ is then any appropriately salient set.
- UCU intention is to pick out the background domain M.
- But no different in nature from an intention to pick out any other salient set.

(16) a. Everything is simple (= a claim in metaphysics).

b. Everything is packed (= a claim that I am ready for my trip).

Both rely on the same contextual mechanism: an intention of the speaker picks out the salient set provided by context (or choice function, etc.).

UCU Context Dependence Is a Little Extraordinary?

- Westerståhl's principles remind us that *M* behaves very differently metasemantically.
- It is also clearly different metaphysically.
- I tried to tell a story about how *M* is generated in discourse, and how it can expand, in other work (Glanzberg 2006).
- Here, I am simply suggesting that if we can make sense background domains and how they behave, their affect on context for some quantifiers is ordinary.

Is It More Extraordinary after All? I

- Can't I just talk about 'everything' without any particular intention?
  - No. On any analysis, a domain restriction mechanism is in place. It must be satisfied somehow.
  - However, it can be very easy to satisfy.
    - Just need to intend a salient set, or a salient property that context can fix an extension for.
    - Not like the anaphoric presupposition of *both* (UCU is always deictic).
    - Can *default* to a maximal value $[\![\mathrm{NP}]\!]^c$, if the intention is general.
  - *M* is a feature of any context, and stable across many contexts. Hence, an easy default value.
  - Easy default to *M* might make it seem like there is no intention.

Is It More Extraordinary after All? II

- What about other quantifiers?
  - That is a question for another day . . . but . . .
  - Genuine GQs like *most*.
    - Rely on cardinality comparisons:
      $[\![\text{most NP}]\!]^c = \{X : |[\![\text{NP}]\!]^c \cap X| > |[\![\text{NP}]\!]^c \setminus X|\}$.
    - Not amenable to the kind of treatment I have suggested here (not PF-GQ, for one thing).
  - Not clear if there is really a UCU usage of *most*.

(17) Most things are concrete.

    - Intuitively highly general.
    - But not clear how to make sense of $|[\![\text{thing}]\!]^c \cap X|$ and $|[\![\text{thing}]\!]^c \setminus X|$ on genuine UCU reading.
    - Might be just highly general restricted.
    - If really UCU, still might need extraordinary context to account for relativity to background domain?

Is It More Extraordinary after All? III

  - Might also be apt for typical ambiguity treatment? (Not clear if, e.g. stacking up *artifacts of discourse* ad infinitum would affect truth conditions.)

- Existentials. Can be given choice function interpretations which allow similar conclusions to the ones for *every*.
- Other quantifiers . . .

Conclusions

- Can see relativity to *M* of UCU *everything* as ordinary context dependence (at least, in important semantic respects).
- *Everything* gives us some of our clearest stock examples of UCU uses, like *Everything is self-identical*. (So do indefinites.)
- If we can show how *M*-dependence for these is ordinary context dependence, we give the contextualist view a big push forward.