Unrestricted Quantification and Extraordinary Context Dependence?*

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Abstract

This paper revisits a challenge for contextualist approaches to paradoxes such as the Liar paradox and Russell's paradox. Contextualists argue that these paradoxes are to be resolved by appeal to context dependence. This can offer some nice and effective ways to avoid paradox. But there is a problem. Context dependence is, at least to begin with, a phenomenon in natural language. Is there really such context dependence as the solutions to paradoxes require, and is it really just a familiar linguistic phenomenon at work? Not so clearly. In earlier work, I argued that the required form of context dependence does not look like our most familiar instances of context dependence in natural language. I called this extraordinary context dependence.

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In this paper, I shall explore, somewhat tentatively, a way that we can see the context dependence needed to address paradoxes as not so extraordinary. Doing so will also allow us to connect thinking about the context dependence of quantifier domains with some interesting ideas about the distinctive semantic properties of certain quantifiers.

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In this paper, I shall revisit a challenge for *contextualist* approaches to paradoxes such as the Liar paradox and Russell's paradox. Contextualists like me argue that these paradoxes are to be resolved by appeal to context dependence. Reasoning that appears to lead to contradictions is explained away by identifying unnoticed shifts in context. This can offer some nice and effective ways to avoid paradox. But there is a problem: is there really the sort of context dependence that contextualists propose? Context dependence is, at least to begin with, a phenomenon in natural language. This is supposed to help support contextualist responses to paradoxes, by allowing contextualists to argue that an independently understood linguistic phenomenon shows us what is happening with apparent paradoxes. But that makes the problem all the more pressing. Is there really such context dependence, and is it really just a familiar linguistic phenomenon at work? Not so clearly. Indeed, the required context dependence does not look like our most familiar instances of context dependence in natural language, so by what right do we say it is there? In particular, the version of contextualism I prefer proposes that the main issue is the context dependence of quantifier domains. But, it did not appear to me to be the ordinary context dependence of quantifier domains that linguists and philosophers have explored at length. In earlier work, I called the needed form of context dependence *extraordinary context dependence*, to highlight this observation. But this significantly weakens the appeal of contextualism. If we need to posit a special kind of context dependence just to avoid the paradoxes, are we not just offering an ad hoc solution?

In this paper, I shall explore, somewhat tentatively, a way that we can see the context dependence needed to address paradoxes as not so extraordinary. Not totally ordinary, but only a little unusual, not extraordinary. Doing so will also allow us to connect thinking about the context dependence of quantifier domains with some interesting ideas about the distinctive semantic properties of certain quantifiers. Along the way, I shall also raise a number of questions about which quantifiers can generate paradoxical effects. I shall conjecture that only a few can. As I argue, these are all amenable to a more ordinary contextualist solution. If this is right, it does add support to the contextualist view.

The plan of this paper is as follows. First, I shall review some very familiar arguments that suggest a contextualist solution to the paradoxes in section 1. In effect, these arguments try to show that absolute generality is impossible, and contextually restricted generality is the only option. With that in hand, contextualism follows naturally. I shall then in section 2 consider the idea that the needed context dependence is extraordinary, and not like any familiar kind. I shall then reconsider the way ordinary context dependence works for quantifiers, and argue in section 3 that a more nuanced understanding of quantification allows us to see the context dependence needed to avoid paradoxes as much more ordinary after all. I shall conclude in section 4 by discussing some limitations and questions for the current proposal; and in particular, ask which quantifiers are involved in paradoxical reasoning. As you can see, this paper is exploratory and tentative. I shall build a case that the kind of context dependence contextualist responses to the paradoxes require is not so extraordinary as I used to think, but a great many questions will be left unanswered. Starting with section 2, the paper will delve into some linguistic details. These are necessary to assess how ordinary the context dependence paradox seems to require might be. Much of the work in what follows tries to assess how much detailed linguistics can support broadly logical conclusions.

1 Paradox and Contextualism

Following the lead of Parsons (1974b), I have used a version of Russell's paradox to motivate the idea that absolutely unrestricted quantification is impossible (Glanzberg, 2004b, 2006). Again with Parsons (1974a), I take the main lessons of Russell's paradox and the Liar to be the same (Glanzberg, 2001, 2004a, 2015).

Now, the simplest and most familiar version of this is the observation that if V is the collection of all sets, then V cannot be a set, on pain of contradiction. But of course, to the extent that our notion of set is well-defined, V looks like a perfectly good set. We can insist it is not, but we lack a good explanation of why not.

This observation is not specific to sets. Virtually any apparatus that gets us predication will do. As I have done before, I shall illustrate with an elegant and highly general version of Russell' paradox due to Williamson (2003).[1] Suppose we want to build an interpretation I for some language that contains a predicate 'P', using a collection F to interpret 'P'. Let us stipulate that $I(F)$ makes 'P' hold of all and only the Fs. Beyond that, we need say almost nothing about what interpretations or collections are.

What we will do is assume that interpretations are objects, or things of some kind, and we will treat all things as part of the same domain. With that, we can produce Russell's paradox again. Let the Rs be all and only the objects o such that o is not an interpretation under which 'P' applies to o. Given this collection, we can then build $I(R)$. But $I(R)$ cannot be in the domain of quantification. If it were we would have Russell's paradox: for $o = I(R)$, we would have $I(R)$ is an interpretation under which 'P' applies to o iff $I(R)$ is not an interpretation under which 'P' applies to o. So, we find we can get a form of Russell's paradox using interpretations and predication, as well as sets.

We can see something similar with the Liar, as I, Parsons, and Burge (1979), Murzi & Rossi (2018), and Simmons (1993) have maintained. The main issue is a version of what is often called the *Strengthened Liar*. In this form, we take a step from the conclusion that (somehow) the Liar sentence fails to be true to the observation that this is what the Liar sentence says, so it must be true after all.

In the manner of Parsons (1974a), we can make this clear with a variant Liar sentence:

(1) a. This sentence does not express a true proposition.
 b. l: $\neg\exists p(Exp(l,p) \wedge Tr(p))$

This encodes the idea that l says of itself that it does not express a true proposition. We reason:

1. $\neg\exists p Exp(l,p)$.
    - Since $Exp(l,p) \longrightarrow (Tr(p) \longleftrightarrow \neg Tr(p))$.
    - **But then:**
    - $\neg\exists p(Exp(l,p) \wedge Tr(p))$ (by logic!).

[1] Though of course, Williamson is arguing against the kind of position I am offering here. Another classic response is from Boolos (1999).

- This is l, so l is proved, and so must be true.
- Hence, $\exists p(Exp(l,p) \wedge Tr(p))$.

2. So, $\exists p Exp(l,p)$.

(This is the summary version. I spell it out in greater detail in Glanzberg (2004a).)

We can diagnose both this result and the generalized Russell's paradox as showing us expansions of quantifier domains. In this case, the propositional quantifier $\exists p$ must range over a wider domain at the end of the reasoning than it did at the beginning. Only then can it make sense for there to first be no proposition for l to express, and then for there to be one. Likewise, when we build our Russell interpretation $I(R)$, it must be outside of the domain of our original quantifier over all 'things'.

Of course, this is counter-intuitive. In both cases, it seemed that our quantifiers were maximal, ranging over everything—absolutely everything—at least of the right type. And yet, we seem to have shown that these quantifiers cannot be fully unrestricted. We can find some things that are not within their domains.

What we have here is a fairly general argument that attempts to show that no domain of quantification can be absolutely everything.

- **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, there is no such thing as 'absolutely unrestricted' quantification.

Though this argument is not specific to sets, with some standard set theory, we can assume among the problematic objects is the domain of the quantifier itself.

We should pause to note that the argument here has been challenged in a number of ways, most forcefully by Williamson (2003). Williamson highlights some difficulties the argument has in stating its own conclusion coherently. But with Williamson, I think the best way to see it is as a strategy which will allow one to, if given a quantifier that is supposed to be absolutely unrestricted, build or point out a new object that cannot be in the domain of that quantifier.[2]

There are a number of responses to the Argument from Paradox, and they are fairly well-known. One is to deny the objects presented by the Argument from Paradox are actually there. Williamson offers one version, by insisting they are second order, and so do not fall within the domain of first order quantifiers we started with. In the case of the Liar, much work has been done on non-classical approaches to truth that block the reasoning involved. Less attention has been given to set theory along these lines.[3]

The response I prefer is a contextualist response. This response takes the Argument from Paradox to show that even what appear to be the widest quantifier domains can *expand*. Hence, our widest quantifier domains can differ from occasion to occasion. That is a common idea across a range of views, grouped together under the heading of generality relativism. The distinctively contextualist idea is that we would like to subsume this expansion under the general category of *context dependence*: the domain of even apparently unrestricted quantifiers are somehow relative to context. For any context, there is another context in which the domain of even apparently unrestricted quantifiers will be wider.[4]

Part of the appeal of this idea is that it tries to relate a solution to the paradoxes to a familiar and well-established idea. It is well-known that natural language quantifiers often show context dependence. Even natural language uses of expressions like *everything* are heavily context dependent. For instance:

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

In each of these, the quantifier is usually read as contextually restricted. I took everything relevant to a trip with me, for instance, not everything in the world.

[2]In addition to the papers already mentioned, other good sources on this debate include the papers in the volume edited by Rayo & Uzquiano (2006), McGee (2000), and extended works by Ferrier (2018) and Studd (2019). Among many other more recent papers, see Florio & Shapiro (2014), Linnebo (2013), Linnebo & Rayo (2012), and Uzquiano (2015).

[3]For non-classical responses to the Liar, see the many references in Beall et al. (2018). For a non-classical view of Russell's paradox, see Restall (1993).

[4]A thorough critique of the contextualist approach is offered by Gauker (2006).

The contextualist holds that the Basic Conclusion shows there must be some kind of domain relativity for unrestricted quantifiers, and then hopes to make this more palatable by arguing it is nothing but a species of a widespread phenomenon in natural language.

To formulate this idea somewhat more accurately, it will be helpful to draw some distinctions. First, let say that a *restricted quantifier* is one that contains a *non-trivial syntactic* restrictor (pronounced or unpronounced). By this definition, *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. Hence, *everything* in (2) is contextually restricted. It is a contentious issue, that we will return to, whether contextually restricted use of a quantifiers must contain syntactic restrictors, sometimes unpronounced. So, we can coherently ask if a quantifier can be contextually restricted but (syntactically) unrestricted.

Let us define the *background domain* of a context as the widest domain provided by the context. It is thus the domain of 'all objects' as the context sees it. This is the domain over which *unrestricted and contextually unrestricted* quantifiers range in that context.

The main contextualist thesis is that the Argument from Paradox shows that there is *contextual relativity* of *background domains*. 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.

Let us abbreviate quantifiers that are Unrestricted and Contextually unrestricted as UCU quantifiers. The contextualist thesis is that there are UCU quantifiers that still show context relativity to background domain. (Focus on UCU quantifiers allows us to sidestep for now the question just noted, of whether there can be contextually restricted but syntactically unrestricted quantifiers.)

My defense of the contextualist thesis has been minimal. I have really only argued that it offers one way to respond to the Argument from Paradox, and to refine the Basic Conclusion. I have tried to defend the thesis in other work, as have others cited above. For now, I am more concerned to asses the kind of context dependence for UCU quantifiers that the thesis requires.

2 Extraordinary Context Dependence

The way I have formulated the contextualist thesis already indicates some ways that it makes extraordinary demands on quantifiers and contexts. In part this is by definition. I made contextually restricted quantifiers restricted relative to a background domain, while the Argument from Paradox and the Basic Conclusion need the background domain itself to shift. But I think this is a reasonable and familiar way to think about ordinary quantifier domain restriction, and in highlighting the unusual nature of the context dependence paradox might require, we are just being honest. It does, no doubt, weaken the appeal of contextualism. I motivated the appeal to quantifier domain restriction by looking at ordinary uses of *everything* that are not UCU. But now, we need to find context shifts even for UCU quantifiers. Fair enough that this is asking a lot.

In what follows (mainly section 3), I shall try to mount a case that things are not as bad as they look. But before that, we should start by looking at the standard semantics for quantifiers, and how that might lead us to think the domain relativity of UCU quantifiers is very extraordinary indeed.

To do this, I shall present, in abbreviated form, a standard semantics for quantification common in linguistics and in logical approaches to natural language. This is based on generalized quantifier theory.[5] Let me present the core ideas in summary form. Quantified noun phrases are interpreted as generalized quantifiers, which are in effect sets of sets:

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

We get truth conditions from these by:

(4) [[Every NP] VP] is true iff $[\![\text{VP}]\!]^c \in [\![\text{every NP}]\!]^c$

[5]See Peters & Westerståhl (2006) for an extensive overview. The classic papers in semantics are a trio of Barwise & Cooper (1981), Higginbotham & May (1981), and Keenan & Stavi (1986), and work of van Benthem (1986). The logical underpinnings of this theory were explored by Lindström (1966) and Mostowski (1957).

This inverts what you might find the natural idea of predication, as it requires the predicate interpretation to be in the subject interpretation, but it captures the meaning of a quantified sentence very well.

For those unfamiliar with the notation here, let me spell out the key features. We are assuming a fairly simple syntax. The subject and object of a sentence will be what we are calling DPs (Determiner Phrases). Determiners are expressions like *every, most, a*, etc. that combine with a nominal to make a full phrase. In current parlance, the nominal is an NP (Noun Phrase), though the reasons for this terminology are not really important. A sentence is typically built out of a DP and a VP (Verb Phrase) where the VP itself can be complex, e.g. be built from a verb (V) and a DP object. We get something like:

(5) $[_{\mathrm{S}}\ [_{\mathrm{DP}}\ [_{\mathrm{D}}$ every$]$ $[_{\mathrm{NP}}$ local student$]]$ $[_{\mathrm{VP}}\ [_{\mathrm{V}}$ met$]$ $[_{\mathrm{DP}}\ [_{\mathrm{D}}$ a$]$ $[_{\mathrm{NP}}$ foreign student$]]]]$

(See any good syntax textbook for a more thorough explanation, such as Adger (2003).)

Perhaps more important is the semantic notation. Each word or phrase is assigned a semantic value, written $[\![\bullet]\!]^c$. This is the semantic value of $\bullet$ in context c, which is a theoretical representation of its meaning. We will work in an extensional setting; so for instance, we can assume proper names take as semantic values their bearers. Predicates will take sets of individuals as semantic values. Simplifying somewhat, that allows us to treat both $[\![\mathrm{NP}]\!]^c$ and $[\![\mathrm{VP}]\!]^c$ as sets.

The superscript c in $[\![\bullet]\!]^c$ indicates the context where the semantic value is assigned. Some expressions will be highly context-dependent. For instance, $[\![\mathrm{I}]\!]^c$ picks out the speaker of whatever context in which it appears. Proper names, on the other hand, might well show no context dependence. Some predicates (NP or VP) will show more context dependence, some less.

I shall be fairly sloppy about use and mention. When mentioning a word or phrase in-line, I shall often put it in *italics*, but in displays or formulas often will not bother.

So now we can state the main semantic hypothesis in slightly more precise terms. What we called above 'quantified noun phrases' are quantified determiner phrases (QDPs). The semantic value of these phrases—roughly their meanings, are provided by sets of sets. This is in accord with generalized quantifier theory in logic. The rule for truth conditions illustrated in (4) is actually fully general. In full form, we have:

(6) $[[\text{QDP}]\ \text{VP}]$ is true iff $[\![\text{VP}]\!]^c \in [\![\text{QDP}]\!]^c$

This shows us how to combine QDP meanings with VP meanings to get truth conditions for sentences. To work an example, consider:

(7) a. Every Austrian skis.

b. $[_{\text{S}}\ [_{\text{DP}}\ [_{\text{D}}\ \text{every}]\ [_{\text{NP}}\ \text{Austrian}]]\ [_{\text{VP}}\ \text{skis}]]$

Our semantics interprets *every Austrian* as the set of sets that contain at least all the Austrians, i.e. $\{X\colon [\![\text{Austrian}]\!]^c \subseteq X\}$. The sentence (7a) is true if the set of people who ski is among those sets, i.e. $[\![\text{ski}]\!]^c \in [\![\text{every Austrian}]\!]^c$. That is correct, as it means the set of skiers includes all the Austrians. If we consider *most Austrians* instead, our semantics asks us to look at sets X for which more Austrians are X than not X. The sentence *Most Austrians ski* is then true if more Austrians ski than don't ski, which captures the meaning correctly.

Notice, the sets of set of sets that give the semantic values of quantified determiner phrases are fixed by some simple cardinality comparisons. This insight helps to extend generalized quantifier theory to provide meanings for determiners directly. They are treated as relations that encode simple cardinality comparisons. So, for instance:

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

Likewise, for a more complex determiner like *most*, we have:

(9) $[\![\text{most}]\!]^c(A, B) \longleftrightarrow |A \cap B| > |A \setminus B|$

These just capture what we already saw above, but applies it to the determiner directly. We still have that *Most Austrians ski* is true if the set of Austrians who ski is larger than the set of Austrians who do not ski.

Putting the pieces together, we have, for example:

(10) a. Every bottle is empty.

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

To keep track of use and mention, we will often call the semantic value of a determiner or QDP a generalized quantifier, which is a set of sets, or a relation between sets, usually expressing some simple cardinality comparisons. I shall sometimes just refer to a quantifying determiner as a quantifier, where use and mention are not at issue.[6]

[6] The generalized quantifier literature distinguishes type $\langle 1 \rangle$, quantifiers, which are sets of sets, from type $\langle 1, 1 \rangle$ quantifiers, which are relations between sets. I shall for the most part suppress this.

It is worth highlighting that these analyses give no role to the context c in the meaning of a determiner itself. *Every* and *most* are not themselves analyzed as context-dependent. They express the same relations between sets in every context.

One more detail will be important. What we have seen so far are called *local* generalized quantifiers: it is assumed that $X, A, B \subseteq M$, for a fixed background domain M. Of course, this helps to make everything set-theoretically well-defined. But also, we typically assume the background domain M is the universe of some model. So, we are simply working relative to a model, as usual. But we can introduce *global* quantifiers. These are simply functions from domains M to local GQs:

(11) a. $[\![\text{every NP}]\!]^c_M = \{X \subseteq M \colon [\![\text{NP}]\!]^c \subseteq X\}$
b. For every M, $A, B \subseteq M$, $[\![\text{every}]\!]^c_M(A, B) \longleftrightarrow A \subseteq B$

Given a domain M (of a model), the results are just the quantifiers we discussed above. In logic, many properties are global (e.g. definability and logical strength), but there are also some important local results (e.g. counting results, and the Keenan and Stavi conservativity theorem).[7]

With all that, we can get back to the business of characterizing the context dependence readily observed for QDPs, as we saw in (2). It might be tempting to use global generalized quantifiers, and model context dependence as simply providing different inputs M for a global generalized quantifier.

This turns out to be a mistake. Though logic often cares about global quantifiers, it has been observed for some time that they do not really do a good job of capturing ordinary context dependence. The background domain M is not a normal contextual feature. The main points are due to Westerståhl (1985a) and I discussed them in Glanzberg (2006). Westerståhl offers two principles that distinguish background domains from contextually restricted ones:

- WP1: Background domains are large. Contextually restricted domains can be small.

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

[7] For local results see van Benthem (1986) and Keenan & Stavi (1986). For overviews on the many global results about generalized quantifiers see the surveys of Peters & Westerståhl (2006) and Westerståhl (1989). A few noteworthy papers include Hella et al. (1996), Hella et al. (1997), and Westerståhl (1985b).

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

(13) Nobody cared that nobody came.

(Example (13) is from Stanley & Williamson (1995).) In (12) we see that the contextually restricted domain is just the members at the faculty meeting, which is small compared to a background domain. In (13) we see two different domains in the same sentence, one for each occurrence of *nobody*.

If M is not the source of ordinary context dependence for quantifier domains, what is? The pioneering work on this was done by von Fintel (1994), and then Stanley & Gendler Szabó (2000) and Stanley (2000, 2002).[8] There are a lot of technicalities that are of linguistic importance but not important to us here. One way or another a contextual factor needs to restrict the domain of a quantifier, i.e. the first argument of a quantifying determiner. Here is an option following Stanley and Szabó: put a contextual parameter in the nominal. So where we have input A corresponding to an NP, and we have in addition a contextual parameter D^c:

(14) a. Every bottle is empty

b. $[\![\text{every}]\!]^c_M(D^c \cap [\![\text{bottle}]\!]^c, [\![\text{is empty}]\!]^c)$

D^c is a contextually fixed set of elements of M.[9]

What is important is that it gives us a compositional way to restrict one of the arguments of a quantifying determiner. We do so without changing the meaning of the determiner itself, but rather restrict its input.

Let us try to apply this to a UCU quantifier:

(15) Everything is F.

a. $D^c = [\![\text{thing}]\!]^c = M$.

b. True iff $M \subseteq [\![F]\!]^c$.

Our context-dependent parameter D^c is semantically fixed to be all of M. Hence, we do not find any context dependence. Or at least, we do not unless

[8] Much interesting discussion ensued from their work. See, among many references, Breheny (2003), Collins (2018), Giannakidou (2004), and Martí (2002).

[9] There was a lively debate over whether domain restrictors are represented in the syntax of sentences. I have sided with the view that they are, but it is not really important here. King & Stanley (2004), Stanley (2000) and Stanley & Gendler Szabó (2000) are among those that said they are. Bach (2000), Carston (2002), and Recanati (2004) said they are not.

M varies with context. Westerståhl's Principles showed us that M is not a contextual parameter. It is the domain of a model, and the background relative to which contextual domain restriction happens.

So now our problem is clear. To account for contextual variability for UCU quantifiers, it seems we must allow M to function as a contextual parameter. Technically, we can do that. We can work with global quantifiers as the semantic values of determiners in contexts, and treat M as a contextual paramater. But doing so goes against the lessons we learned.

Call the more standard version of quantifier domain restriction we just reviewed *D^c-dependence*. Let us call the option of treating M as a contextual paremeter *M-dependence*. We have seen that M-dependence is not like D^c-dependence. D^c is a separate parameter whose value composes with the value of NP by intersection:

(16) $D^c \cap [\![\mathrm{NP}]\!]^c$

It thus functions more like a hidden variable (or pronominal element). But this makes no sense for M-dependence. There is no semantic value available that can be restricted by intersection with M, as any such restriction would be trivial for the background domain. No composition of M with any semantic value will result in the kind of relativity to background domain that is needed.

As a form of context dependence, M-dependence appears to be extraordinary. We cannot treat M as a separate parameter, whose value composes with the semantics of determiners. Rather, we have to build it in as a feature of the semantics of determiners themselves. Formally this looks like just using global generalized quantifiers. But it is not just that. It treats the subscript M as indicating a distinct feature of the meaning of a determiner that makes it context dependent, and it treats M as a feature of context (and not merely the domain of the model for a global generalized quantifier). This makes determiners in a way like indexicals like *I* and *now*, 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 that M-dependence should be labeled a form of *extraordinary context dependence*. There are at least two ways that this option requires an extraordinary kind of context dependence. First, it makes M part of the context, that can shift as context shifts. We already observed that in ordinary cases, M is not part of context.[10] Second, the required

[10]A little more precisely, we have already observed from Westerståhl's arguments that

M dependence works differently from the ordinary D^c dependence. There is no distinct parameter that composes to restrict the domain of a quantifier; rather, the context dependence is built right into the meaning of the determiner itself.

We thus might conclude, as I did before, that the paradoxes force us to embrace extraordinary context dependence. The contextualist response to paradoxes needs context relativity for UCU quantifiers. But we have seen that this can only be M-dependence. We have also seen that this is an extraordinary form of context dependence, unlike the ordinary D^c-dependence. Thus, we are left with an extraordinary kind of context dependence if we are to provide a contextualist solution to the paradoxes.

This is, at best, disappointing. We can argue that the need for M-dependence is just one of the lessons of the paradoxes; and ordinary or not, it is simply a bullet we must bite. But part of the appeal of contextualism as response to paradoxes is supposed to be that it motivates and explains its solutions by appeal to ordinary linguistic phenomena. If the context dependence at work is extraordinary, that appeal is weakened. And moreover, the idea that there are two contextual mechanisms, M-dependence and D^c-dependence is also a linguistic claim. That might seem to be beyond what the paradoxes can directly show. We might conclude that nonetheless, we must have it. But this is especially disappointing if we had hoped that natural language would make contextualism appealing.

3 Ordinary Reconsidered

So far, in spite of my having defended contextualist responses to the paradoxes in a number of works, I have been very pessimistic. I have suggested, as I did before, that the appeal to context dependence in natural language as a motivation for contextualism appears weak, as what is needed is an extraordinary kind of context dependence. As I said, we might bite the bullet and accept that, but it is much less appealing than what contextualism originally promised.

In this section, I shall argue that this pessimism is too extreme. Though a number of questions and problems remain, a more nuanced view of the semantics of determiners shows us ways that the needed context dependence might not be so extraordinary after all.

M is not the source of ordinary context dependence for quantifier domains.

Let me begin with a new observation that will help motivate the points to come. Semantically, M-dependence does not look much like D^c-dependence, but there is another perspective from which they look much more alike. Any time we have context dependence, we have something about the context that fixes the needed contextual input. Consider how this might work for quantifier domain restriction:

(17) a. Every philosopher is smart (= every philosopher around here, in our group).

b. Everything gets bigger and better (= UCU).

For (17a), we might suppose there to be some sort of intention of the speakers to pick out some particular group of philosophers. This is what we often now call a *metasemantic* claim. Metasemantics tells us what fixes the semantic values of expressions, rather than what the values are. For context-dependent expressions, metasemantics tells us what fixes their values in contexts. I offered a rough and ready intentional account of the metasemantics of quantifier domain restriction. This is controversial. We might, for instance, imagine that something about the external environment rather than speakers' intentions is involved. But I think the intentional idea sounds natural, and illustrates a plausible metasemantics.[11]

Whatever we say about the metasemantics of (17a), we can say much the same about (17b). There seems to be a similar intention to talk about M, i.e. 'EVERYTHING' (e.g. Rayo, 2003). So, in contexts, we fix that we are talking about all of M in more or less the same ways we fix that we are talking about some smaller domain D^c for cases like (17a). So metasemantically, M-dependence and D^c-dependence seem on par.

So there are some ways that M-dependence is not so extraordinary. We saw above many ways it seems to be extraordinary. But with this illustration in mind, we should re-evaluate them. In particular, the idea that M-dependence is extraordinary relied on some common assumptions about the semantics of quantifiers, which are built into generalized quantifier theory. Those are common, but have often been re-assessed. And re-assessing them, we will find that things look rather different.

Here is one illustration of the linguistic reasons to re-assess the assumptions of generalized quantifier theory. Some quantified determiner phrases

[11] Actually, I think that speakers' intention works with other contextual factors (Glanzberg, 2007, 2020). A thoroughly intentionalist account is given by King (2014). Gauker (1997) holds that external factors rather than intentions are involved.

act a lot more like context-dependent referring expressions than others, and a lot more like them than standard generalized quantifier theory explains. A good example is *both*. We can give *both* a fairly standard generalized quantifier semantics (Barwise & Cooper, 1981):

(18) both (generalized quantifier version)

a. Presupposes a salient two element set A, with $A \subseteq [\![\text{NP}]\!]^c$

b. $[\![\text{both NP}]\!]^c = \{X \colon A \subseteq X\}$.

But notice that the generalized quantifier format here is not really doing very much. We can interpret *both* as talking about the elements of A, so long as we do so distributively. I shall return to distributivity in a moment. But putting it aside, we can also give *both* a simpler, non-generalized quantifier interpretation:

(19) both (distributive-referential version)

a. Presupposes a two element plural object A.

b. $[\![\text{both NP}]\!]^c = A$

There is a lot more to say about the presuppositions involved. (See Glanzberg (2008) for a full presentation.) Also note that in the Beghelli & Stowell (1997) classification, *both* is a distributive-universal. It is, but I have called it referential to highlight the difference between the two semantics.

Let us pause to highlight some of the features of these analyses. Both analyses note that *both* carries a presupposition, that ties it to an element A provided by the context. The generalized quantifier analysis then give *both* a 'principal filter' analysis, i.e. all the supersets of A, as we see in $\{X \colon A \subseteq X\}$.[12]

A principal filter like $\{X \colon A \subseteq X\}$ is generated by A. But semantically, once you have the generator set A, you have everything you need. There is no additional information stored in the filter. So, if we are careful, we can think of a quantifier with a principal filter semantics as really referring to its generator set.

Let us see if we can apply this to *every*, which is our typical example for UCU quantification. Now in fact, $[\![\text{Every NP}]\!]^c$ is a principal filter quantifier:

(20) every (generalized quantifier version)

[12]Principal filters have sometimes been seen as linked to definiteness (e.g. Barwise & Cooper, 1981; Heim, 1991). The Montagovian treatment of names as quantifiers also generates a principal filter (Montague, 1973).

a. Generator $[\![\text{NP}]\!]^c$

b. $[\![\text{every NP}]\!]^c = \{X\colon [\![\text{NP}]\!]^c \subseteq X\}$

When we write in domain restriction as D^c-dependence, we have:

(21) $[\![\text{every NP}]\!]^c = \{X\colon [\![\text{NP}]\!]^c \cap D^c \subseteq X\}$

So, just as with *both*, we can think of *every* as in effect referring to its generator set, either contextually restricted, or just restricted by NP (distributively, of couse).

Putting these together, we can think of a contextually restricted use of *every NP* as simply picking out a principal filter with a more narrow generator: $\{X\colon A \subseteq X\}$. And, then, as with *both NP*, we can think of it as simply having value A.

This connects nicely to the intentional metasemantics we discussed a moment ago. What speakers intend to talk about is A, the generator set. This is fixed by an intention to pick out a contextually given subset of $[\![\text{NP}]\!]^c$. When viewed this way, the importance of finding a compositional way to implement domain restriction via D^c appears much less important. Speakers intend to talk about a group, which is the generator set. We can see this as being built compositionally from D^c, but we can also think of the semantics as simply providing a generator set $A \subseteq [\![\text{NP}]\!]^c$, and our intentions give the metasemantics of how to pick out that set.

The main difference between *every* and *both* is in terms of presuppositions. *Both* presupposes a salient two-element set. *Every* does not. (It is sometimes said to carry a presupposition that A is non-empty, but we will not worry about that here.) We do need a salient A or D^c to be provided by context in cases of restriction, but that is not a presupposition coded into *every*.

Like *both*, *every* gives us a principal filter, and the generator set is the group of individuals speakers intend to quantify over. So, like *both*, we may give *every* a distributive-referential analysis where it picks out the generator set as its semantic value. But as I mentioned, we also need to make sure these quantifiers are interpreted distributively (hence, I labeled the analysis 'distributive-referential'). This is needed to ensure that we get universal quantificational force. Again, the main observation here is that we do not need the apparatus of generalized quantifiers to do this.

To quickly review, recall that some DPs can occur with both collective and distributive readings, but *every NP* is always interpreted distributively:

(22) 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).

For *the* and *all*, we can get a reading where the boys carried together (collective), or where each one carried separately (distributive). The collective reading is not available for *each* or *every*.[13]

Quantifiers like *every* and *each* are distributive-universal. We have seen that this allows them to contribute their generator sets A (or, if we like $[\![\text{NP}]\!]^c \cap D^c$) as semantic values, making them more or less referential. Their universal force comes from a distributivity. Hence, a sentence like *Every boy carried the piano* is understood as having the form $P(A)$. A is a plurality (represented as a set). P is a predicate that applies to the plurality, but must do so distributively. That means that it says of each member $a \in A$ that $P(a)$, i.e. a carried the piano. Hence, we have universal force.

There are some complications about how to formally implement this idea. Ultimately, we need something that looks like a distributivity operator:

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

(See Lasersohn (1990) and Schwarzschild (1996), who also discuss some other formal options.) But this still leaves open a question: where does the *Dist* operator come from? If determiners like *every* and *both* contribute their generator sets, we need to explain that. This is a technical linguistic question, relating to how semantics maps to syntax. So, I shall not really go into any depth. But there are two obvious options. One, very common in the plurals literature, is that distributivity comes from predication itself, and the ways plurals are marked. One idea is that plural predication is standardly distributive, and absent anything to change that, we simply get distributivity whenever we have plural predication (e.g. Landman, 1989; Link, 1998).[14] If we accept that, the semantics of a distributive-referential determiner is simple. It takes a generator set from context, and passes it up for plural predication. It can be as simple as:

[13] See Beghelli & Stowell (1997) and Szabolcsi (1997) for more extensive discussion. As they note, there are some important differences between *each* and *every*, and the claim that *every* is always distributive is more delicate than I am making it appear here.

[14] Especially for Landman and Link, there are some background issues of whether we should be talking about sets, mereological pluralities, or groups. I am ignoring these subtle issues for now.

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

The other option is that determiners contribute the distributivity operator (e.g. Roberts, 1987). If we take this route, we would have the slightly more complicated

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

Either way, we have the main semantic contribution of a universal like *every* being simply its generator set, over which predication distributes somehow.[15]

The kind of analysis for *every NP* we are considering treats it as a lot more like a context-dependent referring expression than the standard generalized quantifier theory does. It treats it as in effect referring to its generator set, with some apparatus to make sure that it is interpreted distributively over that set.

I have not been very thorough about the details of how this analysis works, but one question will come up immediately. What about scope? Universal quantifiers can show highly specific scope behavior, but they do scope, in ways that referring expressions and their cousins do not. For instance:

(26) Two students read every book.

This has two readings, marking two scopes arrangements. On one, for each book, two students read it; on the other, each of two students read all the books. We think of the former as *every book* taking wide scope, even though it appears in surface form in a narrow scope position.

This is not the place to try to review that massive literature and quantifier scope in natural language. (A good place to start is the wonderful Szabolcsi (2010).) All I want to do here is note that scope can be handled in this setting by allowing the *Dist* operator to scope in the right way. To explain the two scopes we see for (26), we need to generate two forms like:

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

[15]There are a number of substantial issues about how to implement these ideas fully. As I mentioned with *both*, presuppositions can be a substantial part of determiner meaning. We also want to explain the various potentials for scope that different determiners show. To capture such data, Szabolcsi (1997) uses a DRT-style framework, while Beghelli & Stowell (1997) use a highly articulated syntax, where there is a DistP functional head that contributes the universal force of distribution. As Szabolcsi mentions, we can also make use of choice functions.

There are more complicated cases, such as one where *every book* varies its value (cf. Stanley, 2000). I shall not go into that here. Suffice it to say that the *Dist* operator can scope, and that means distributive-referential quantifiers analyses can explain scope.

With our distributive-referential analysis of some determiners in hand, let us reconsider the role of D^c in contextual domain restriction. It turns out for such determiners, D^c is not necessary. It is needed neither on the more traditional generalized quantifier principal filter analysis, nor on the distributive-referential one. The crucial thing for domain restriction is the contextually provided generator A. We can take this to generate a generalized quantifier as a principal filter, or simply be the semantic value. But the speakers' intentions, or whatever else determines the domain restriction, picks out A as a salient subset of $[\![\mathrm{NP}]\!]^c$. All that happens then is that A is passed to the semantics. Thus, a separate value D^c plays no independent role in the semantics or pragmatics. If we like, we can still describe A as $[\![\mathrm{NP}]\!]^c \cap D^c$, but in the cases in question, that seems to be inert.

I have offered a non-generalized-quantifier way to handle a collection of quantifiers that are distributive and universal, arguably including our main example of *every*, and *each* and *both* as well. But it should be stressed that this approach does not apply to all quantifiers! There is no known analysis of *most* along distributive-referential lines. That quantifier seems to require a generalized quantifier analysis. This is hardly surprising, as *most* is not universal. There are also delicate issues about negative quantifiers like *no*, and the large variety of indefinites seem to call out for a different analysis than either I have presented here. The view we are considering takes these differences between quantifiers to be important, and seeks semantic analyses that help explain those differences.[16]

In comparing the distributive-referential with the generalized quantifier analysis, one question naturally arises. Why should we pick one over the other? Before moving on to our main task of looking at UCU quantifiers, I shall pause to explore some aspects this question. It is actually quite delicate. For instance, there is one sense in which we might see it as a mere notational issue. Writing the semantic value of *every* as a principal filter or as its generator set is not by itself a substantial issue. But I think there are some

[16]The literature on these issues is large. For an overview, see Szabolcsi (2010), in addition to the already mentioned Beghelli & Stowell (1997) and Szabolcsi (1997). Other important work includes Kratzer (1998), Landman (2004), Reinhart (1997), and Winter (1997).

substantial issues, and they speak in favor of making fine-grained selections of semantics for different determiners. One is what I just mentioned: there are empirical differences among quantifying determiners in natural language, and looking for semantic differences has proved to be a valuable tool in trying to explain them. This is too large an issue to address in this paper.[17] But we can note now that it might have seemed tempting to have a uniform analysis of all such determiners, but empirical differences challenge that idea.

There are some observations we can make with the background we already have at hand. For a determiner like *most*, we need to make genuine cardinality comparisons as part of its semantics. Here, the structure of a full generalized quantifier is really doing something. It is allowing us to make enough cardinality comparisons to capture the meaning of *most* itself. With a distributive-referential quantifier like *each* or *every*, we do not really need that. As I have remarked several times, we only need the generator set, and something to effect distributivity. So, the real strength of a generalized quantifier is not being used. Furthermore, we know that distributivity is a linguistic phenomenon that is independent of determiners. So, we seem to have a better explanation if we select the more tailored semantics, and relate it to other independent phenomena. None of this resolves the issue, but it gives some indication of why the availability of a distributive-referential analysis is a substantial feature of some determiners.

On the other hand, there are some interesting properties of quantifiers that are natural to explore with generalized quantifier treatments, and seemingly cannot be captured on the distributive-referential approach. The most striking are logical properties that only make sense for global generalized quantifiers. For overviews of these, see for instance Peters & Westerståhl (2006) and Westerståhl (1987). I particularly have in mind such properties as isomorphism closure and extension, but I shall leave interested readers to find out about these from other sources. Suffice it to say that generalized quantifier theory offers a powerful way to look at the space of potential determiner meanings, and to explore their logical properties. The distributive-referential analysis, focused on capturing differences between different determiner meanings, does not lend itself to that investigation.[18]

With that aside, let us return to our main task of assessing how ordinary

[17] See the references in note 16 above.

[18] Thanks to Julien Murzi and an anoymous referee for pressing these issues. I discuss some further issues about what makes something a quantifier in Glanzberg (2008). Again see also Landman (2004) and Szabolcsi (2010).

or extraordinary context dependence for UCU quantifiers must be. As we have been exploring, the distributive-referential analysis gives a distinctive kind of context dependence to determiners like *every*, which is different from what we find with e.g. *most*. To repeat once more: semantically, all that we require (modulo some embedding issues) is a contextually salient set of individuals. Domain restriction is then just a matter of selecting the right salient set. We have no need for a distinct element like D^c to compose. Rather, the meaning of *every* does the selecting. But it must be stressed that on the distributive-referential analysis, this is entirely ordinary. This is how all contextual domain restriction works for determiners like *every*, *each*, and *both*, according to this view.

With all that background in hand, we can finally return to my main claim of the paper. The distributive-referential analysis gives *every* a distinctive form of ordinary context dependence. This analysis makes the context dependence needed for UCU uses of *every* seem much more ordinary. Let us consider how this might work. Take an example:

(28) Five people considered everything.

This is actually fairly simple. On the UCU reading, the value of *everything* does not vary. We simply need one salient set. And of course for the UCU reading, the value is simply M: the background domain. We can see UCU *everything* as simply intending to refer to the background domain M (and distribute over it), which is what the context sees as everything.

What we find is that the context dependence for UCU *Everything* is really ordinary after all. Assume $[\![\text{thing}]\!]^c = M$, i.e. the NP is vacuous. Then the semantic value of *everything*—$[\![\text{everything}]\!]^c$—is any appropriately salient set. An intention to make a UCU use is an intention to pick out the background domain M. But this is not different in kind from an intention to pick out any other salient set.

(29) 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 on the part of speakers to pick out a salient set provided by context. It is just that in one case the set is small, and in the other it is the biggest one available, i.e. M.

The Argument from Paradox and the Basic Conclusion require more than this. They require that background domains shift, as we seem to see in paradoxical reasoning. Our current analysis has a straightforward account of this. If such a shift occurs, a new UCU use of *every* simply picks out the new background domain, by the same mechanism. There is no puzzle about how the semantics of the quantifier, or the metasemantics, allows this to happen. The context dependence involved seems ordinary.

Well, almost ordinary. Westerståhl's Principles remind us that M behaves very differently metasemantically from a small generator set A or D^c. It shifts rarely, and is distinctively marked as the universe (in a given context). So, why and how M shifts is still special. I tried to tell a story about how it can expand in other work (Glanzberg, 2006). In the end, the Argument from Paradox is part of that story. Paradox forces M to expand, and that is not so ordinary after all. My main claim here is that we have no further linguistic or semantic problem. The semantics and metasemantics of *every* allows it to be M-dependent. If M does indeed shift, we can account for how this affects UCU uses of *every*.

4 Further Issues and Questions

I have now argued for my main conclusion. Perhaps I was too pessimistic in calling the context dependence needed for contextualist solutions to the paradoxes extraordinary. At least, the semantic and metasemantic mechanisms needed have solid, ordinary linguistic foundations. This was always part of what made contextualist solutions appealing, and so to the extent my conclusion is right, it supports contextualism. My conclusion is limited, in that it still relies on the Argument from Paradox, which is not an appeal to ordinary linguistic observations. But to the extent we can convince ourselves that the Argument from Paradox really requires domain-relativity for UCU uses, we can go on to explain how the domain relativity connects to the semantics of quantifiers. Thus, we have a limited defense of contextualism, but I hope an improved one.

There are several ways this conclusion is limited, and also tentative. I relied on some substantial linguistic claims about how various quantifiers work. These are well-supported, but remain controversial. But let me mention some more important points that still remain contentious.

It is sometimes thought that UCU uses of *everything* require no intention, as the nominal *thing* already sets the domain. We have seen that the analysis under consideration here does require an intention, or whatever else fixes a domain in context. It can be a very easy condition to satisfy. You need not specify individual members of the domain. You need only intend it to be the largest one available. As the background domain M is relatively stable, that should be easy to do, via whatever means. The ease with which we default to M might make it seem like there is no intention. But I claim rather that there is one, but one that is easy to form.

Let me also mention a more technical linguistic concern. I relied on the distributive-referential analysis of *every*. But in a few cases, *everything* and *everyone* seem like they might allow collective readings:

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

Each is uniformly distributive. *Every* seems to strongly prefer distributive readings, but at least sometimes allows the reading we see here.[19] There are a number of questions about this observation that I shall not pursue here. Is this really a collective reading for *every*? For instance, in conversation it has been suggested to me that what appears to be a collective reading is more about plurals and pairing, but that needs further investigation. More importantly for our purposes, it remains unclear to me if the (purportedly) collective readings can really be UCU. At best such a reading is pragmatically odd, but it may be that we require a salient subset of M to support a collective reading. The issue is certainly delicate.[20]

Next, let me turn to a question which I think is central to the success of my strategy here for defending contextualism. I have offered an analysis of UCU *everything* that offers a more ordinary analysis of domain restriction for it. But does this work for other quantifiers? A good comparison is with *most*, which is usually taken to require a generalized quantifier analysis. Unlike *every*, which can rely on distributivity, *most* makes a genuine cardinality comparison. Repeating (3b):

(31) $[\![\text{most NP}]\!]^c = \{X\colon |[\![\text{NP}]\!]^c \cap X| > |[\![\text{NP}]\!]^c \setminus X|\}$

This is not amenable to the kind of treatment of universals I have sketched here. As far as I know, the only available semantics for *most* is this generalized quantifier one.[21]

[19]See Moltmann (2003, 2004) on other aspects of *thing*.

[20]As mentioned above, Beghelli & Stowell (1997) discuss a great deal of the subtle behavior of *every*.

[21]Again, see Landman (2004) and Szabolcsi (2010) for extended discussion.

So, if we can find UCU uses of *most*, my defense of contextualism will be highly limited. But, it is not at all clear to me if there really are UCU uses of *most*. Consider:

(32) Most things are concrete.

No doubt uses of this are often highly general. But there are two concerns. One is technical. A genuine UCU reading would presumably involve all sets and more, so it is unclear how we can make the needed cardinality comparison between $|[\![\text{thing}]\!]^c \cap X|$ and $|[\![\text{thing}]\!]^c \setminus X|$ on a genuine UCU reading. But more pressing is that it is just hard to find a context that clearly distinguishes a genuine UCU reading from highly general but non-UCU one. The fact that any use is talking about most but not all things allows leaving some things out. So, it is unclear what could really force a genuine UCU use? And, if a speaker had intentions to make a UCU use, how could we tell, and could those intentions be satisfied? To my own ear, there is no need to make these genuinely UCU, but I shall leave it as a question whether that is really right. It is an important one for how far my defense of contextualism really goes.

Finally, let me briefly mention existentials, which seem to naturally allow UCU uses. I have not discussed them at any length, but a non-generalized quantifier analysis would be needed to allow similar conclusions to the ones we reached for *every*. Fortunately, choice function analyses can do just that.[22] So, though I shall leave that discussion for another time, I am optimistic that existentials are not a substantially new problem.

To conclude, I tentatively suggest that a contextualist response to the Argument from Paradox enjoys more linguistic support than it might have seemed, and than I said in earlier work. It is still not a straightforwardly linguistic thesis, but I have offered a way that a contextualist treatment of UCU *every* can fit with some well-justified linguistic views. More investigation of other quantifiers is needed to see if this defense of contextualism succeeds.

References

Adger, D. (2003). *Core Syntax*. Oxford: Oxford University Press.

[22] As explored by many authors, including Kratzer (1998), Reinhart (1997), Schwarzschild (2002), and Winter (1997).

Bach, K. (2000). Quantification, qualification, and context: A reply to Stanley and Szabó. *Mind and Language*, 15, 262–283.

Barwise, J. & Cooper, R. (1981). Generalized quantifiers and natural language. *Linguistics and Philosophy*, 4, 159–219.

Beall, J., Glanzberg, M., & Ripley, D. (2018). *Formal Theories of Truth*. Oxford: Oxford University Press.

Beghelli, F. & Stowell, T. (1997). Distributivity and negation: The syntax of *each* and *every*. In A. Szabolcsi (Ed.), *Ways of Scope Taking*, pp. 71–107. Dordrecht: Kluwer.

van Benthem, J. (1986). *Essays in Logical Semantics*. Dordrecht: Reidel.

Boolos, G. (1999). Reply to Charles Parsons' "Sets and classes". In R. C. Jeffrey (Ed.), *Logic, Logic, and Logic*, pp. 30–36. Cambridge: Harvard University Press. Orignally written in 1974.

Breheny, R. (2003). A lexicalist account of implicit (bound) context dependence. *SALT*, 13, 55–73.

Burge, T. (1979). Semantical paradox. *Journal of Philosophy*, 76, 169–198. Reprinted in Martin (1984).

Carston, R. (2002). *Thoughts and Utterances*. Oxford: Blackwell.

Collins, C. (2018). Quantifer domain restriction as ellipsis. *Glossa*, 3, 1–7.

Ferrier, E. (2018). *Quantification and Paradox*. Ph.D. dissertation, University of Massachusetts at Amherst.

von Fintel, K. (1994). *Restrictions on Quantifier Domains*. Ph.D. dissertation, University of Massachusetts at Amherst.

Florio, S. & Shapiro, S. (2014). Set theory, type theory, and absolute generality. *Mind*, 123, 157–174.

Gauker, C. (1997). Domain of discourse. *Mind*, 106, 1–32.

——— (2006). Against stepping back: A critique of contextualist approaches to the semantic paradoxes. *Journal of Philosophical Logic*, 35, 393–422.

Giannakidou, A. (2004). Domain restriction and the arguments of quantificational determiners. *SALT*, 14, 110–128.

Glanzberg, M. (2001). The Liar in context. *Philosophical Studies*, 103, 217–251.

——— (2004a). A contextual-hierarchical approach to truth and the Liar paradox. *Journal of Philosophical Logic*, 33, 27–88.

——— (2004b). Quantification and realism. *Philosophy and Phenomenological Research*, 69, 541–572.

——— (2006). Context and unrestricted quantification. In A. Rayo & G. Uzquiano (Eds.), *Absolute Generality*, pp. 45–74. Oxford: Oxford University Press.

——— (2007). Context, content, and relativism. *Philosophical Studies*, 136, 1–29.

——— (2008). Quantification and contributing objects to thoughts. *Philosophical Perspectives*, 22, 207–231.

——— (2015). Complexity and hierarchy in truth predicates. In T. Achourioti, H. Galinon, J. Martínez Fernández, & K. Fujimoto (Eds.), *Unifying the Philosophy of Truth*, pp. 211–243. Berlin: Springer.

——— (2020). Indirectness and intentions in metasemantics. In T. Ciecierski & P. Grabarczyk (Eds.), *The Architecture of Context and Context-Sensitivity*, pp. 29–53. Berlin: Spriner.

Heim, I. (1991). Artikel und definitheit. In A. von Stechow & D. Wunderlich (Eds.), *Semantics: An International Handbook of Contemporary Research*, pp. 487–535. Berlin: de Gruyter.

Hella, L., Luosto, K., & Väänänen, J. (1996). The hierarchy theorem for generalized quantifiers. *Journal of Symbolic Logic*, 61, 802–817.

Hella, L., Väänänen, J., & Westerståhl, D. (1997). Definability of polyadic lifts of generalized quantifiers. *Journal of Logic, Language, and Information*, 6, 305–335.

Higginbotham, J. & May, R. (1981). Questions, quantifiers and crossing. *Linguistic Review*, 1, 41–79.

Keenan, E. L. & Stavi, J. (1986). A semantic characterization of natural language determiners. *Linguistics and Philosophy*, 9, 253–326. Versions of this paper were circulated in the early 1980s.

King, J. C. (2014). The metasemantics of contextual sensitivity. In A. Burgess & B. Sherman (Eds.), *Metasemantics: New Essays on the Foundations of Meaning*, pp. 97–118. Oxford: Oxford University Press.

King, J. C. & Stanley, J. (2004). Semantics, pragmatics, and the role of semantic content. In Z. G. Szabó (Ed.), *Semantics vs. Pragmatics*. Oxford: Oxford University Press.

Kratzer, A. (1998). Scope or pseudoscope: Are there wide-scope indefinites? In S. Rothstein (Ed.), *Events and Grammar*, pp. 163–196. Dordrecht: Kluwer.

Landman, F. (1989). Groups, I. *Linguistics and Philosophy*, 12, 569–605.

——— (2004). *Indefinites and the Type of Sets*. Oxford: Blackwell.

Lasersohn, P. (1990). *A Semantics for Groups and Events*. New York: Garland.

Lindström, P. (1966). First order predicate logic with generalized quantifiers. *Theoria*, 32, 186–195.

Link, G. (1998). *Algebraic Semantics in Language and Philosophy*. Stanford: CSLI Publications.

Linnebo, Ø. (2013). The potential hierarchy of sets. *Review of Symbolic Logic*, 6, 205–228.

Linnebo, Ø. & Rayo, A. (2012). Hierarchies ontological and ideological. *Mind*, 121, 269–308.

Martí, M. L. (2002). *Contextual Variables*. Ph.D. dissertation, University of Connecticut.

Martin, R. L. (Ed.) (1984). *Recent Essays on Truth and the Liar Paradox*. Oxford: Oxford University Press.

McGee, V. (2000). 'Everything'. In R. Tieszen & G. Sher (Eds.), *Between Logic and Intuition: Essays in Honor of Charles Parsons*, pp. 54–78. Cambridge: Cambridge University Press.

Moltmann, F. (2003). Nominalizing quantifiers. *Journal of Philosophical Logic*, 32, 445–481.

——— (2004). Nonreferential complements, derived objects, and nominalizations. *Journal of Semantics*, 13, 1–43.

Montague, R. (1973). The proper treatment of quantification in ordinary English. In J. Hintikka, J. Moravcsik, & P. Suppes (Eds.), *Approaches to Natural Language*, pp. 221–242. Dordrecht: Reidel. Reprinted in Montague (1974).

——— (1974). *Formal Philosophy: Selected Papers of Richard Montague*. New Haven: Yale University Press. Edited by R. H. Thomason.

Mostowski, A. (1957). On a generalization of quantifiers. *Fundamenta Mathematicae*, 44, 12–36.

Murzi, J. & Rossi, L. (2018). Reflection principles and the Liar in context. *Philosophers' Imprint*, 18, 1–18.

Parsons, C. (1974a). The Liar paradox. *Journal of Philosophical Logic*, 3, 381–412. Reprinted in Parsons (1983).

——— (1974b). Sets and classes. *Nous*, 8, 1–12. Reprinted in Parsons (1983).

——— (1983). *Mathematics in Philosophy*. Ithaca: Cornell University Press.

Peters, S. & Westerståhl, D. (2006). *Quantifiers in Language and Logic*. Oxford: Clarendon.

Rayo, A. (2003). When does 'everything' mean everything. *Analysis*, pp. 100–106.

Rayo, A. & Uzquiano, G. (Eds.) (2006). *Absolute Generality*. Oxford: Oxford University Press.

Recanati, F. (2004). *Literal Meaning*. Cambridge: Cambridge University Press.

Reinhart, T. (1997). Quantifier scope: How labor is divided between QR and choice functions. *Linguistics and Philosophy*, 20, 335–397.

Restall, G. (1993). How to be *Really* contraction free. *Studia Logica*, 52, 381–391.

Roberts, C. (1987). *Modal Subordination, Anaphora, and Distributivity*. Ph.D. dissertation, University of Massachusetts at Amherst. Published in revised form by Garland, New York, 1990.

Schwarzschild, R. (1996). *Pluralities*. Dordrecht: Kluwer.

——— (2002). Singleton indefinites. *Journal of Semantics*, 19, 289–314.

Simmons, K. (1993). *Universality and the Liar*. Cambridge: Cambridge University Press.

Stanley, J. (2000). Context and logical form. *Linguistics and Philosophy*, 23, 391–434.

——— (2002). Making it articulated. *Mind and Language*, 17, 149–168.

Stanley, J. & Gendler Szabó, Z. (2000). On quantifier domain restriction. *Mind and Language*, 15, 219–261.

Stanley, J. & Williamson, T. (1995). Quantifiers and context dependence. *Analysis*, 55, 291–295.

Studd, J. P. (2019). *Everything, More or Less: A Defense of Generality Relativism*. Oxford: Oxford University press.

Szabolcsi, A. (1997). Strategies for scope taking. In A. Szabolcsi (Ed.), *Ways of Scope Taking*, pp. 109–154. Dordrecht: Kluwer.

——— (2010). *Quantification*. Cambridge: Cambridge University Press.

Uzquiano, G. (2015). Varieties of indefinite extensibility. *Notre Dame Journal of Formal Logic*, 56, 147–166.

Westerståhl, D. (1985a). Determiners and context sets. In J. van Benthem & A. ter Meulen (Eds.), *Generalized Quantifiers in Natural Language*, pp. 45–71. Dordrecht: Foris.

——— (1985b). Logical constants in quantifier languages. *Linguistics and Philosophy*, 8, 387–413.

——— (1987). Branching generalized quantifiers and natural language. In P. Gärdenfors (Ed.), *Generalized Quantifiers: Linguistic and Logical Approaches*, pp. 269–298. Dordrecht: Reidel.

——— (1989). Quantifiers in formal and natural languages. In D. Gabbay & F. Guenthner (Eds.), *Handbook of Philosophical Logic*, vol. IV, pp. 1–131. Dordrecht: Kluwer.

Williamson, T. (2003). Everything. *Philosophical Perspectives*, 17, 415–465.

Winter, Y. (1997). Choice functions and the scopal semantics of indefinites. *Linguistics and Philosophy*, 20, 399–467.