Nominal Restriction

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Extra-linguistic context appears to have a profound effect on the determination of what is expressed by the use of linguistic expressions. For a bewildering range of very different linguistic constructions, adhering to relatively straightforward linguistic intuition about what is expressed leads us to the conclusion that facts about the non-linguistic context play many different roles in determining what is said. Furthermore, that so many different constructions betray this sort of sensitivity to extra-linguistic context understandably leads to pessimism about rescuing the straightforward intuitions while preserving any sort of systematicity in the theory of meaning.

A presumption motivating the pessimistic inclination is that, if we accept the ordinary intuitions, what appear to be very different ways in which context affects semantic content in fact are different ways in which context affects linguistic content. Pessimism is a natural reaction to those who adopt this presumption, because if appearance is a good guide to the facts in this domain, then there are just too many ways in which context affects semantic content to preserve systematicity. One common and natural reaction to these facts is, therefore, to deny the semantic significance of the ordinary intuitions, thereby relegating the project of explaining the apparent effects of extra-linguistic context on semantic content to a domain of inquiry outside the theory of meaning proper. So doing removes the threat context poses to the systematicity of semantic explanation, but at the cost of reducing the interest of the semantic project.

In this paper, I explore a different reaction to the situation. My purpose is to undermine the presumption that what appear to be very different effects of context on semantic content are very different effects. My challenge is of necessity rather limited, since it is too implausible to trace all effects of extra-linguistic context on semantic content to the very same source. Rather, I will take, as a case study, three superficially very different effects of context on semantic content, and show that they are due to the very same mechanism, what I call Nominal Restriction. I thereby hope to provide
convincing evidence of the promise of the project of reducing all apparent effects of context on semantic content to a small number of sources.

In the first section, I introduce an account of the phenomenon of quantifier domain restriction due to Stanley and Szabo (2000), and provide two novel defenses of it. In the second section, I turn to a discussion of comparative adjectives. As I argue, the theory introduced in the first section, which I call the Nominal Restriction Theory, also provides an explanation for some mysterious facts about how context determines the comparison class for uses of comparative adjectives. In the third section, I turn to another, apparently very different sort of effect of extra-linguistic context on semantic context, and show how it too is smoothly explicable on the Nominal Restriction Theory. I then draw some consequences from the discussion for some issues in the theory of reference.

I. Domain Restriction

The sentence “Every bottle is empty” can be used to communicate many different propositions. For example, if John is about to go shopping, and is wondering whether he should buy something to drink. Hannah can utter “Every bottle is empty” to communicate the proposition that every bottle in the house is empty. In this section, I describe and defend what I believe to be the best account of how sentences containing quantified noun phrases such as “every” and “some” can be used to communicate propositions about a restricted domain of entities. In the rest of the paper, I draw out some consequences of the account for other constructions.

The account I will defend is first presented in the final section of Stanley and Szabo (2000). The simplest version is that each nominal expression is associated with a domain variable. Relative to a context, the domain variable is assigned a set. The semantic relation between the extension of the nominal expression and the set is set-theoretic intersection. A sentence such as “Every bottle is empty” can communicate the proposition that every bottle in Hannah’s house is empty, because, relative to the relevant context, the domain variable associated with “bottle” is assigned the set of things in Hannah’s house. “Every bottle is empty” communicates the proposition that every bottle
in Hannah’s house is empty, because, relative to this context, it semantically expresses this proposition.

This is the theory in its simplest form. Details need to be filled in, and modifications added. To explain some of them, I will have to introduce some modest syntax. Let us call the output of the syntactic process that is visible to semantic interpretation a **logical form**. A logical form is a lexically and structurally disambiguated ordered sequence of word types, where word types are individuated both by semantic and syntactic properties. Logical Forms are phrase markers. An example of such a phrase marker, for the sentence 'Hannah loves Sue' is as follows:

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S
 NP      VP
  N    V    NP

Hannah loves Sue
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The nodes in this diagram are the points labeled either with syntactic categories or lexical items. So, 'Hannah' labels a node, as does 'N', 'VP', and 'V' (we shall also talk of labels of nodes as *occupying* these nodes). The nodes are connected by branches, which are the lines in the diagram. We say that a node X **dominates** another node Y in a phrase marker if there is a path of branches leading downward in the tree from X to Y. We say that a node X immediately dominates another node Y in a phrase marker just in case X dominates Y, and there is no node Z between X and Y. Nodes that dominate other nodes are called **nonterminal nodes**. Nodes that dominate no other nodes are **terminal nodes**. The nodes labeled with lexical items such as 'Hannah' or 'loves' are always terminal nodes. These are the objects that we assume are interpreted by semantic theories.

In the theory I have sketched, nominal expressions are associated with domain variables. By ‘association’, I mean that nominal expressions, such as “bottle”, co-habit a terminal node with a domain variable. So, on this account, the logical form of a sentence such as “Every man runs” is:
On this view, domain variables are independently meaningful expressions that incorporate with nouns. Thus, domain variables are not, on this account, expressions that occupy their own terminal nodes.

One reason to think that this is the right syntactic treatment of domain variables is that it is difficult to find sentences containing pronouns that are anaphoric on domain variables.\(^1\) Similarly, expressions that are incorporated with other expressions often do not license anaphoric relations. For example, as Irene Heim (1982, p. 24) has pointed out, (2) easily allows a reading where the pronoun ‘it’ is anaphoric on ‘bicycle’, whereas (3) does not:

(2) John owns a bicycle. He rides it daily.
(3) John is a bicycle-owner. He rides it daily.

Thus, the fact that it is difficult to have anaphora on domain variables is to be predicted, given representations such as (1).\(^2\)

In the theory I have sketched, quantifier domain restriction is due to the presence of domain variables in the actual syntactic structure of sentences containing quantified noun phrases. But syntactic structure cannot simply be postulated on semantic grounds. Rather, evidence of a syntactic sort must be available for the existence of domain variables. The main source of syntactic evidence comes from the fact that domain variables interact in binding relations with quantifiers.

Here is the evidence from bindability. Consider the sentence:

(4) Everyone answered every question.

(4) can express the proposition that everyone x answered every question on x’s exam. What this indicates is that there is a variable accessible to binding somewhere in the quantified phrase “every student”. There are many other examples of this phenomenon, such as:

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\(^1\) Thanks to Herman Cappelen for emphasizing to me the difficulty of finding natural examples of anaphoric dependence on a domain variable.
(5) a. In most of his classes, John fails exactly three Frenchmen.
   b. In every room in John’s house, he keeps every bottle in the corner.

In all of these cases, the domain associated with a quantified noun phrase varies as a function of the values introduced by a previous quantified noun phrase. For example, (5a-b) intuitively mean something like:

(6) a. In most of his classes x, John fails exactly three Frenchmen in x.
   b. In every room x in John’s house, he keeps every bottle in x in the corner.

On the assumption that binding is fundamentally a syntactic phenomenon, such examples provide evidence for a variable somewhere in the syntactic structure of quantified noun phrases.³

There is therefore syntactic evidence for the existence of domain variables in sentences containing quantifier expressions. But to treat examples such as (4) and (5a-b), however, the simple theory presented above must be modified. The quantifier “everyone” in (4) and the quantified expressions in (5a-b) range over objects. But quantifier domains are sets, rather than objects. For example, the quantifier domains associated with the quantified noun phrase, “three Frenchmen” in (5a) are, for each class John teaches, the set of students in that class. Similarly, the quantifier domains associated with the quantified noun phrase, “every bottle” in (5b) are, for each room x in John’s house, the things that are in x. To reflect the kind of dependence at issue, we must adjust the syntax and semantics of quantified sentences. Instead of representations such as:

(1)      S
   NP     VP
   Det    N    V
   Every  <man, i> runs

We require representations such as:

(7)      S
   NP     VP

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² Thanks especially to Tom Werner for discussion here.
³ Farkas (1997) provides a sophisticated discussion of examples such as (4) and (5). However, Farkas does not share our assumption that binding is fundamentally a syntactic phenomenon. Instead, she provides her own semantic account of scope and binding, which she uses to explain the bound readings of (4) and (5).
Every \(<\text{man}, f(i)\rangle\) runs

The value of ‘i’ is an object provided by the context, and the value of ‘f’ is a function provided by the context that maps objects onto quantifier domains. The restriction on the quantified expression ‘every man’ in (7), relative to a context, would then be provided by the result of applying the function that context supplies to ‘f’ to the object that context supplies to ‘i’.

Adopting the by now standard generalized quantifier treatment of quantifiers such as 'every', whereby they express relations between sets (cf. Barwise and Cooper (1981), Westerståhl (1989)), the semantic clauses for quantifiers such as 'every' and 'some' are as in (8):

\[
\begin{align*}
(8) & \quad (a) \text{Every } A \text{ iff } A \subseteq B. \\
& \quad (b) \text{Some } A \text{ iff } A \cap B \neq \emptyset.
\end{align*}
\]

On this account, the initial noun phrase determines the first argument of a quantified expression, and the second argument is determined by the verb phrase. For example, in the case of a sentence such as (7), the first argument would then be the set of men, and the second argument would be the set of runners.

No adjustment is required to extend the standard generalized quantifier treatment to interpret structures such as (7). But we do need to say something about the interpretation of expressions such as '\(<\text{man}, f(i)\rangle\)'. Since we are taking quantifier domains to be sets, relative to a context, what results from applying the value of ‘f’ to the value of ‘i’ is a set. Relative to a context, ‘f’ is assigned a function from objects to sets. Relative to a context, ‘i’ is assigned an object. The denotation of '\(<\text{man}, f(i)\rangle\)' relative to a context c is then the result of intersecting the set of men with the set that results from applying the value given to ‘f’ by the context c to the value given to ‘i’ by c. That is (suppressing reference to a model to simplify exposition), where '[\alpha]_c$ denotes the denotation of \alpha$ with respect to the context c, and ‘c(\alpha)’ denotes what the context c assigns to the expression \alpha:

\[
(9) \quad [<\text{man}, f(i)>]_c = [\text{man}] \cap \{x: x \in c(f)(c(i))\}
\]
In the case of (7), the resulting set is then the first argument of the generalized quantifier 'every'.

Here is how the theory works with sentences such as the ones in (4) and (5). Consider first:

\((4')\) Everyone answered every question.

Intuitively, the interpretation of this sentence in the envisaged scenario is ‘everyone x answered every question on x’s exam’. According to the theory just outlined, ‘every question’ is of the form ‘every <person, f(i)>’. The variable ‘i’ is bound by the higher quantifier ‘everyone’. Context supplies ‘f’ with a function from persons to the set of problems on that person’s exam, yielding the desired interpretation.

Let’s consider one more example, for instance:

\((5)\) a. In most of his classes, John fails exactly three Frenchmen.

Here is how the theory just sketched treats (5a). The intuitive interpretation of this sentence is ‘In most of his classes x, John fails exactly three Frenchmen in x’. According to the theory just outlined, ‘three Frenchmen’ is of the form ‘three <Frenchmen, f(x)>’. The variable ‘x’ is bound by the higher quantifier ‘most of his classes’. Context supplies ‘f’ with a function from that takes a class and yields the set of students in that class. This set is then intersected with the set of Frenchmen, to yield the first argument of the generalized quantifier ‘three’.

Here is how the theory works with a simpler example. Suppose I say:

\((10)\) Every fireman goes to Jack’s bar.

Presumably, I intend to be speaking about firemen associated with a particular town or location; what I am asserting is that every fireman associated with location l goes to Jack’s bar. On the theory just sketched, ‘every fireman’ is of the form ‘every <fireman, f(i)>’. My intentions (for example) determine a location as the value of the variable ‘i’. Furthermore, they determine a function from locations to sets of things that generally occupy those locations, which is the value of ‘f’. 4 This function, applied to the location l,

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4 In some cases, it may be implausible to suppose that speaker or participant intentions determine both an object and a function from objects to properties. In such cases, we may suppose that context supplies a set as value to ‘i’ and the identity function as a default value to the function variable ‘f’ (cf. section III of Stanley (2000) for a similar suggestion involving tense). Thanks to Brett Sherman for discussion here.
yields the set of things generally occupying l. This set is then intersected with the set of firemen, to yield the first argument of the generalized quantifier ‘every’.

According to this theory of quantifier domain restriction, it is due to the fact that each nominal co-occurs with variables whose values, relative to a context, together determine a domain. Thus, if it is right, ‘quantifier domain restriction’ is a misleading label; better would be ‘nominal restriction’. Accordingly, I will call this theory, the Nominal Restriction Theory.

In the rest of this section, I will provide arguments in support of the controversial aspects of the Nominal Restriction Theory [henceforth NRT]. There are two controversial properties of NRT. The first property is that quantifier domain indices are associated with common nouns such as ‘fireman’ and ‘person’, rather than, as one might more naturally expect, determiners such as ‘every’ and ‘some’. The second property is that quantifier domain restriction does not merely involve the contextual provision of a property or a set as the value of an element in the syntactic structure of quantified sentences. Rather, it involves the provision both of an object and a function from objects to sets to an individual variable and a function variable that occur along with every nominal expression. In the rest of the section, I will defend each of these two controversial commitments.

According to NRT, the intuitive restriction on quantificational determiners such as ‘every’, ‘some’, and ‘most’ is not due, as may seem obvious, to a restriction on the quantificational expressions themselves, but rather to a restriction on the nominal complements of these determiners. This is an unintuitive feature of the theory, one that needs a justification. In Stanley and Szabo (2000), several arguments are advanced in support of the conclusion that quantifier domain variables occur with nominals rather than determiners. I will not repeat those arguments here. Rather, I want to present a different argument for the conclusion, due to Delia Graff (p.c.).

Suppose that the domain-restricting index occurred on the determiner, rather than the head noun. Here is how the syntax and semantics would work. Abstracting from the complexity involving the function variable, in this case, the structure of “Every man runs” would be:
The semantic clause for ‘every’ would then be something like:

\[ \langle \text{Every, i} \rangle \quad A \quad B \iff A \cap c(i) \subseteq B. \]

So, the semantic clause would intersect the first argument of the generalized quantifier with the set provided to ‘i’ by context.

This theory works well for examples such as “Every man runs”. But Graff’s argument demonstrates that theory has problems with slightly more complex constructions, such as:

\( \langle \text{The, i} \rangle \quad A \quad B \iff |A \cap c(i)| = 1 \quad \& \quad (A \cap c(i)) \cap B = 1 \)

If we apply this theory to the relevant occurrence of (12), it follows that the first argument of the generalized quantifier ‘The’ is the singleton set containing Jan, and the value of ‘i’, relative to the envisaged context, is the set of students at Cornell. But since Jan is not at Cornell, the theory of quantifier domain restriction in question predicts that, relative to the envisaged context, (13) is false (or perhaps truth-valueless).

It is clear what has gone wrong. In evaluating ‘tallest person’, one does not select the tallest person in the world. Rather, one selects the tallest person in the contextually
relevant domain. But this demonstrates that the domain is associated with the head noun, rather than with the determiner.\textsuperscript{5,6}

The second controversial feature of NRT is that, according to it, quantifier domain restriction is due not to the provision of a set or property, but rather to the provision of an object and a function that yields a set or property for that object as value. Indeed, the account involves the postulation of a function variable in the logical form of quantified sentences, whose values, relative to contexts, are functions whose values are quantifier domains. As we have seen, there is a large amount of syntactic evidence, both from bindability and weak crossover, for the existence of object variables in the syntactic structure of quantified noun phrases. But one might wonder whether there is evidence of a non-semantic sort for the existence of the function variables postulated by NRT.\textsuperscript{7}

How does one argue for the existence of a variable? One syntactic feature of variables is their capacity to be bound by quantificational expressions. So, one way to argue for the existence of a variable in a certain construction is to produce examples of that construction in which a higher operator binds the postulated variable. We have exploited this strategy already in arguing for the existence of object variables in quantified noun phrases. In what follows, I use it again in providing evidence for the existence of function variables in quantified noun phrases.

It is difficult to find natural examples in which the function variable that NRT postulates in nominal expressions is bound. The reason for the difficulty, of course, is

\textsuperscript{5} One way to attempt to evade Graff’s argument is to formulate semantic rules that take the domain index on the determiner and intersect it with the nominal head of the complement of the determiner. Such rules are relatively straightforward to formulate. However, they violate in a quite drastic manner what Larson and Segal (1995, p. 78) call strong compositionality. Strong compositionality is the thesis that the interpretation of each node in a syntactic tree is a function only of the interpretation of the nodes it immediately dominates. Despite the name given to it by Larson and Segal, it is a principle that in fact is significantly weaker than the principle of compositionality that is presupposed in other textbooks (e.g. Heim and Kratzer, 1998).

\textsuperscript{6} Graff’s argument presupposes that the superlative adjective is to be interpreted in its entirety in situ. Some linguists, however, give a treatment of superlative constructions in which the superlative operator ‘est’ detaches from the adjective and either takes scope over the whole noun phrase, or incorporates with the determiner. Adoption of such a framework may undermine Graff’s argument.

\textsuperscript{7} I am grateful to Jeff King, in particular, for stressing the need for a non-semantic justification for the function variables postulated by NRT.
that it is difficult to find natural language constructions that involve quantification over functions. One kind of construction that arguably does involve quantification over functions involves the so-called ‘functional reading’ of questions. Here is an example of a functional reading of a question:

(15) Q: What does every author like?
A: Her first book.

On a ‘functional question’ account of (15), its semantics involves quantification over functions. In particular, the question is interpreted as:

(16) What function f is such that for every author x, x likes f(x).

Interpreting the question in (15) in this manner is advantageous. For it allows us to capture the intuition that the answer to the question is a proposition concerning a function, while maintaining the standard semantics for questions, according to which the semantic value of a question is the set of its (contextually relevant) good answers.\(^8\)

One might be skeptical of functional readings of questions, on the grounds that they are really just ‘pair-list’ readings. (15), for example, also has a pair-list reading. On this reading, the answer to the question in (15) would be a list of authors and what they like, as in (17):

(17) Q: What does every author like?

One might think that there is no genuine semantic difference between functional readings and pair-list readings, and on this ground deny that (15) involves quantification over functions.

However, there is good evidence against running together functional readings of questions with pair-list readings (cf. Groenendijk and Stokhof (1984, Chapter 3)). For example, (18) has a functional reading, but no pair-list reading:

(18) Q: What does no author like?

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\(^8\) One excellent discussion of functional readings is in Groenendijk and Stokhof (1984, Chapter 3). Two other sources are Engdahl (1986) and Chierchia (1993).
Hannah doesn’t like her first book, Paula doesn’t like her first book, and Matt doesn’t like his first book.

In general, when a wh-phrase (a word such as ‘who’, ‘what’, or ‘which’) takes scope over a downward-monotonic quantifier, then pair-list readings are disallowed, but functional readings are not. So, functional readings of questions simply cannot be assimilated to pair-list readings.

Here are two other arguments against assimilating functional readings to pair-list readings (from Elisabet Engdahl (1986, pp. 167-8)). First, it would seem that (19) could be true, even if John is not acquainted with every author in the world:

(19) John knows which book every author in the world likes the least, namely her first.

However, if we suppose that functional readings were a special case of pair-list readings, then (19) could not be true in this situation. For then (19) would be equivalent to:

(20) John knows, of every author in the world, which book she likes the least.

But (20) is clearly false if John is not acquainted with every author in the world.

Secondly, if functional readings were a special case of pair-list readings, then one would expect (21) to be contradictory:

(21) John knows which woman every Englishman admires most, namely his mother, but he doesn’t know who the women in question are.

But (21) (Engdahl’s (39)) does not seem contradictory; indeed, it could very well be true.

These three arguments together provide powerful evidence in favor of the thesis that questions admit of a distinct functional interpretation. But, as I now demonstrate, if there are such readings, then there are clear examples in which the function variables postulated in nominal expressions by NRT are bound.

Suppose that John and Bill are arguing about which branch of the armed forces is the best. Bill has been arguing that the Navy is superior. John, an advocate of the marines, somewhat rhetorically asks:

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9 A quantifier Q is downward monotonic if and only if, where QA, then for all B such that B⊆A, QB.
(22) But what is every person truly proud to belong to?

Where the intuitive answer is supposed to be ‘the marines’. So, (22) has the interpretation:

(23) What x is such that every person y ∈ x is truly proud to belong to x?

It is a functional reading of a certain variation of examples such as (22) that will provide us with the evidence for a bound reading of the function variable postulated by the account of domain restriction outlined above. One example of this kind is (24):

(24) Q: In every country, what is every person proud to belong to?

The interpretation of the question in (24) is:

(25) In every country c, what function f is such that every person x ∈ f(c) is proud to belong to f(c)?

(24), so interpreted, is one example that provides evidence for the syntactic reality of the function variable postulated in nominal expressions by NRT. For according to NRT, ‘person’ co-occurs with a function variable ‘f’, and an object variable ‘x’. The interpretation given in (25) is one in which the object variable associated with ‘person’ is bound by the quantifier ‘every country’, and the function variable is bound by ‘what’, which here has the force of an existential quantifier over functions.

Of course, this example is rather complex. But the reason it is complex is simply because it is difficult to find examples of natural language constructions involving quantification over functions. It is striking that the linguistically most compelling case of such quantification provides straightforward examples in support of NRT.

The two most controversial properties of NRT are, first, that quantifier domain indices are associated with nominal expressions rather than with quantificational determiners, and second, that it postulates function variables in the syntactic structure of sentences containing quantified noun phrases. In this section, I have argued that both of these properties are independently motivated.

If NRT is correct, then quantifier domain restriction is an effect of nominal restriction. But quantifier domain restriction is not the only effect of nominal restriction. In the next two sections, I want to explore other effects of nominal restriction. This will
complete my argument for the thesis that many superficially distinct kinds of dependence of semantic value on context are due to the same source.

II. Adjectives and Comparison Classes

There are several ways in which sentences containing comparative adjectives, such as “small”, “tall”, “heavy”, and “large” are sensitive to context. One salient way involves the provision of a comparison class. Consider predicative uses of a comparative adjective, such as:

(26) That building is small.
(27) That basketball player is short.
(28) That flea is small.

On one natural reading of (26), the building in question is not being said to be small for an object in general (whatever that may mean). Rather, the building is being said to be small for a building. Similarly, on a natural reading of (27), the basketball player in question is not being said to be small for a person, but only for a basketball player. Finally, (28) shows that there is an equally natural reading of these constructions in which the comparison class is not provided by the sentence. For, on a natural reading of (28), what it expresses is that the flea in question is small for an animal.

On what is perhaps the classical account of predicative uses of comparative adjectives (e.g. Parsons (1972, p. 139), Siegel (1975)), (26-8), on these interpretations, are elliptical for (29-31):  

(29) That building is a small building.
(30) That basketball player is a short basketball player.
(31) That flea is a small animal.

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10 (29)-(31) are themselves ambiguous between what is sometimes called the intersective reading and the non-intersective reading (for a useful discussion, cf. Section 1.0 of Larson (1998)). For example, “Mugsy is a short basketball player” can mean either that Mugsy is short for a basketball player (the non-intersective reading) or (for example) that Mugsy is short for a human being and Mugsy is a basketball player. According to the view I am defending, (26)-(28) are elliptical for (29)-(31), in their non-intersective use. I will not address the intersective readings of sentences such as (29)-(31).
On this account, the context-sensitivity of (26-8) is resolved by postulating logical forms in which the comparison class is the denotation of a nominal expression provided by context.

However, many linguists reject this classical account of predicative uses of comparative adjectives. Perhaps the central reason for abandoning the classical account is that, as Hans Kamp has written, in arriving at a comparison class, “…the noun is not always the only determining factor” (Kamp (1975,p. 152)). Consider, for example:

(32) Smith is a remarkable violinist.

(33) Fred built a large snowman.

As Kamp (Ibid., pp. 152-3) notes, (32) may be true “…when said in comment on his after-dinner performance with the hostess at the piano, and false when exclaimed at the end of Smith’s recital in the Festival Hall –even if on the second occasion Smith played a bit better than on the first.” Similarly, suppose that Fred is a seven-year-old child. An occurrence of (33) may still be true, if Fred has built a snowman that is large for a snowman built by a seven-year-old child. That is, the comparison class for “large” in (33) is not just given by the denotation of the nominal “snowman”. Similarly, the comparison class for “remarkable” in (32) is not just given by the nominal “violinist”. Rather, the comparison classes are considerably narrower than the extensions of these nominals.

According to the classical account of predicative uses of comparative adjectives, they are elliptical for constructions in which the nominal complement of the comparative adjective is present. However, providing a nominal does not yet specify the comparison class. Furthermore, one might expect that any satisfactory account of this ‘extra’ context-dependency would be up to the task of supplying the entire comparison class on its own, without postulating a hidden nominal. Therefore, it seems, this traditional account should be rejected.

Appeal to NRT saves the classical account of predicative uses of comparative adjectives. For NRT straightforwardly predicts the readings we find in (31) and (32). According to NRT, each nominal co-occurs with a domain index. That is, according to the theory, the following are rough guides to the relevant aspects of the logical forms of (32) & (33):

(34) Smith is a remarkable <violinist, f(i)>.
(35)  Fred built a large <snowman, f(i)>.

Consider Kamp’s example. In both of Kamp’s envisaged scenarios, context assigns to ‘f’ a function from locations to people who have played instruments at those locations, and ‘i’ is assigned the salient location. In the context of the dinner party, the value of ‘i’ is the location of the dinner party. In the context of the London Festival Hall, the value of ‘i’ is the stage at the London Festival Hall. (32) is true relative to the first of these contexts, because Smith is remarkable compared to the violinists who have played in the past at the location at which the dinner party occurs. That is, where f is a function from locations to the people who have played instruments at those locations, and l is the location of the dinner party, Smith is remarkable compared to the members of the intersection of {x: violinist (x)} and {y: y∈ f (l)}. (31) is false relative to the second of these contexts, because Smith is not remarkable compared to the violinists who have played in the past at the location of the London Festival Hall. The case in which Fred is a seven-year-old child is similar. Relative to the envisaged context, ‘i’ could be assigned, for example, Fred, and ‘f’ a function from people to the set of structures that have been built by people of that age. Relative to a context in which ‘i’ and ‘f’ are assigned these values, (33) has the desired interpretation, that Fred built a snowman that is large for a snowman built by a seven-year-old child.

Now, let us turn back to predicative occurrences of comparative adjectives. The worry about the classical analysis of predicative occurrences of comparative adjectives was that the nominal by itself does not determine the comparison class. So, claiming that (26-8) are elliptical for (29-31) does not explain the existence of a contextually provided comparison class. But according to NRT, each nominal is really of the form <N, f(i)>.

Combining NRT with the classical account of predicative occurrences of comparative adjectives results in logical forms for (26-8) roughly like:

(36)  That building is a small <building, f(i)>.

(37)  That basketball player is a short basketball <player, f(i)>.

(38)  That flea is a small <animal, f(i)>.
As we have seen, given the semantics provided in the previous section, instances of the schema ‘<N, f(i)>’ do, relative to a context, determine the entire contextually salient comparison class for a comparative adjective.\(^\text{11}\)

It has been standard in the literature on comparative adjectives to maintain that, even in attributive readings of adjectives, the nominal complement of a comparative adjective does not by itself determine the comparison class. What we have seen in this section is that this conclusion results from an inadequate grasp of the true syntax and semantics of nouns. Once NRT is adopted, one mystery about the ‘extra’ context-dependency associated with the determination of comparison classes vanishes. The ‘extra’ context-dependency in question is simply due to unrecognized structure in the noun, the very same structure that accounts for the phenomenon of so-called ‘quantifier domain restriction’.

III. Mass expressions

We have seen that NRT explains two apparently very different effects of context on linguistic interpretation. In this section, I discuss yet another apparently very different effect of context on linguistic interpretation that is explained by NRT. Consider the sentence:

\[(39) \quad \text{That puddle is water.}\]

Suppose the puddle in question consists of muddy water. *Prima facie*, relative to certain contexts, (39) is true. However, *prima facie*, relative to other contexts, (39) is false. For example, suppose we are attending a conference of companies that market bottled water.

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\(^{11}\) I have not here discussed degree theoretic approaches, despite their evident promise in yielding a unified account of adjectives and comparatives (degree theoretic approaches are first discussed with rigor in Cresswell’s classic (1976), and have recently been given new life in Kennedy (1997)). However, such approaches, as yet, have yielded no satisfactory analysis of predicative uses of adjectives. For example, the semantics for such constructions given in Kennedy (1997, pp. 123ff.) is non-compositional; the degree provided by context simply appears in the semantic derivation at the level of the degree phrase (for a discussion of the non-compositionality of such rules, see Stanley and Szabo (2000, p. 255-6)). A correct compositional treatment of predicative uses of adjectives will, I suspect, attribute the provision of the degree to the ellided nominal in such constructions.
Relative to such a context, it might be false that the stuff in the puddle counts as water. Indeed, relative to such a context, nothing less pure than the least pure bottled water might legitimately count as water. Finally, even more drastically, consider a context in which chemists are discussing the molecular structure of water. Relative to such a context, even the stuff in Evian bottles might not count as water.

Let us consider the denotation of ‘that puddle’ to be fixed across contexts. One natural reaction to the prima facie truth of (39) relative to some contexts, and the prima facie falsity of (39) relative to other contexts, is to argue that, fixing the reference of the demonstrative expression ‘that puddle’, the truth of (39) does not vary from context to context. Relative to contexts in which ‘that puddle’ refers to the relevant quantity of matter, (39) is either always false or always true. The impression otherwise is due to pragmatics, and not to semantics. Call this the pragmatic account.

One worry I have with the pragmatic account is that I do not see even the outlines of how a pragmatic account of these facts would proceed. For example, suppose that we take the view that each member of the relevant class of occurrences of (39) expresses a false proposition. I do not see how to provide a systematic, compelling Gricean derivation of the true proposition communicated from the false proposition expressed. Of course, Kent Bach and others have provided influential arguments that pragmatics also involves adding propositional constituents to the semantic content of an expression relative to a context, a process Bach calls ‘Implicature’ (e.g. Bach, 1994). But even setting aside my worries about Bach’s notion of implicature (cf. Stanley (forthcoming)), it is not clear to me how to provide an account based on implicature in defense of the pragmatic account of the above sort of context-dependency. In short, I worry that the pragmatic account puts too great of a strain on existing theories of pragmatics.

Of course, the countervailing worry is that incorporating this sort of contextual phenomenon into the semantics places too great of a strain on existing syntactic and semantic theories. There are two different ways to pose this worry. First, one might worry that incorporating the phenomenon into the semantics compromises the systematicity of semantic explanation in some deep fashion. Secondly, one might worry that there is no independent evidence for the resources needed to treat this sort of context-dependence. If
so, then postulating the mechanisms needed to treat this sort of context-dependence in the semantics may seem ad hoc.

The pragmatic account would be a fruitful avenue to explore if either of the above worries were legitimate. But, as it turns out, these worries are not legitimate. The resources needed to treat this sort of context-dependency are already in place. For NRT provides a smooth explanation for this sort of effect of context on semantic interpretation. NRT is independently motivated, and does not compromise the systematicity of semantic explanation.

According to NRT, each common noun co-occurs with a domain index. Now, as is well known, each count noun can be ‘transformed’ into a mass expression. For example, ‘sailor’ and ‘chicken’ have mass-occurrences, as in (40a-b):

\[(40)\]
\[\text{a. John had sailor for dinner. (John is a cannibal)}\]
\[\text{b. Hannah had chicken for dinner.}\]

There is no reason to think that in using an expression that typically has count occurrences as a mass expression, one thereby drops the domain index. That is, there is no \textit{prima facie} reason to think that, in (40a-b), the mass expressions do not co-occur with domain indices.

Furthermore, examination of mass quantification shows that there is just as much justification for the claim that each mass expression comes with a domain index as there is in the case of count quantification. For example, suppose that Pastor Hannah is concerned about the fact that someone has been drinking the holy water in her church on warm summer days. In a discussion with John, John confesses:

\[(41)\] I drank a little water last week.

What John expresses is the proposition that John drank a little of the church’s holy water the week before the utterance was made. That is, (41) is only true if John drank a little holy water, and not if he just drank a little unholy water.

We should expect any account of count quantifier domain restriction to generalize straightforwardly to the case of mass quantifier domain restriction. NRT, of course, does exactly this. With Helen Morris Cartwright, let us take an occurrence of a mass expression, relative to a circumstance of evaluation, to denote a set of quantities. According to NRT, the rough logical form of (41) is:
I drank a little <water, f(i)> last week.

In the context at hand, we may suppose ‘f’ to be assigned a function that takes a location to a set of quantities. Furthermore, ‘i’ is assigned Hannah’s church. Relative to this context, ‘f’ yields the set of quantities of holy liquids in the church. This set is then intersected with the set of all quantities of water, yielding the desired interpretation.

Furthermore, there is evidence that the object variable in structures such as (41) can be bound, as in:

(43) In every church, the pastor drinks a little water during the weekly ceremony.

(43) can express the proposition that every church c, the pastor of c drinks a little of the holy water of c during the weekly ceremony. Thus, as one might expect, there is the same sort of evidence for mass quantifier domain variables in logical forms as there is for count quantifier domain variables.

According to NRT, then, (44) is a rough guide to the relevant aspects of the logical form of (39):

(44) That puddle is <water, f(i)>.

Relative to a circumstance of evaluation, ‘water’, in (39), denotes the set of all quantities of water. Relative to a context, ‘f’ is assigned a function that takes an object of some kind and yields a set of quantities of matter, one appropriate to intersect with the denotation of ‘water’. Relative to a context, ‘i’ is assigned an object that serves as an input to the denotation of ‘f’.12

If NRT is true, then the sort of context-dependence at issue in examples such as (39) is easily explicable. Consider the context of the bottled water conference. In this case, context assigns to ‘f’ a function that takes a location and yields a set of quantities, and context assigns to ‘i’ the bottled water conference. The result of applying the value of ‘f’ to the bottled water conference will be, for example, the set of quantities of liquids

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12 One might worry that the value of ‘f(i)’, relative to a context, is not a plausible mass denotation, since it is not closed under sums (a property, according to Quine (1960, p. 91, that is constitutive of mass-denotations). However, I doubt that mass denotations are closed under sums. One example, due to George Boolos, is ‘dust’. Not every sum of quantities of dust is dust. Another example, due to Zsofia Zvolensky, is ‘liquid’. There might be two liquids that, when combined, turn into a gas (however, in this latter case, one might respond by denying that a sum is a mixture).
that are sufficiently pure to be sold in bottles in supermarkets in the United States. The
denotation of ‘<water, f(i)>’ is then the result of intersecting the denotation of ‘water’
with this set of quantities. Similarly, the context in which chemists are discussing the
molecular structure of water may be one in which the set of contextually provided
quantities contains all and only those quantities q such that q is constituted by molecules
of the same type. Finally, the context in which (39) counts as true is one in which the
domain is all quantities whatsoever, so the denotation of ‘water’ is unrestricted.

So, NRT provides a straightforward explanation of the sort of context-dependence
in examples such as (39). There is thus evidence from a wide variety of constructions for
the truth of NRT. Furthermore, given NRT, many apparently distinct effects of extra-
linguistic content on what is asserted are traceable to the same source.

It is worthwhile noting a few consequences of this analysis that are of general
philosophical interest. According to the analysis we have given, and supported by
syntactic and semantic evidence from a wide variety of constructions, the reading on
which (39) is true is one according to which ‘water’ occurs unrestricted. That means that
the denotation of an unrestricted use of ‘water’ includes quantities that are very far from
pure H20. Exactly parallel considerations govern all other mass expressions that are so-
called ‘natural kind terms’, such as ‘gold’.

In the theory of reference, it is often assumed that ‘water’ denotes H20. The first
consequence of our analysis is that this assumption is incorrect. The denotation of ‘H20’,
namely the set of all quantities of H20, is but a small proper subset of the denotation of
‘water’. Though in some contexts, “Water is H20” expresses a truth, this is not because
the literal meaning of ‘water’ is the same as the literal meaning of ‘H20’. In some
contexts, “Every man is a judo-expert” expresses a truth, but we should not infer from
this that the literal meaning of ‘man’ is the same as the literal meaning of ‘judo-expert’. Neither inference is valid.

A second consequence of note that can be drawn from the foregoing concerns
expressions such as ‘literally speaking’. Perhaps there are true uses of:

(45) Literally speaking, only pure H20 is water.
But if there are, then what it shows is that the function of ‘literally speaking’ is not to
restrain the interpretation of the words used to their literal meanings. The literal meaning
of ‘water’ determines an extension that includes quantities that contain molecules distinct from H2O. The function of ‘literally speaking’ in (45) is to restrict the domain of ‘water’ to a small sub-domain of its extension. In a sense, then, literally speaking is quite far from speaking literally.

One worry one might have about the account I have given is that it makes the extension of ‘water’ implausibly large. For example, one might worry that any substance whatsoever, in some context, counts as water. This worry is misplaced, if one accepts that, for every noun, there is at least one context in which it can be used with its domain maximally wide. In the case of mass expressions, what this means is that, for each mass noun, it is possible for there to be a context in which the domain for the mass noun is the set of all quantities whatsoever. Together with the fact that there is no true use of:

(46) Any quantity of any old substance whatsoever is water.

we may conclude that the literal meaning of ‘water’ does not determine the set of all quantities whatsoever.13

Of course, I have not seriously addressed the question of what fixes the reference of a term such as ‘water’. But the results we have seen should serve to temper any inclinations one may have to draw exaggerated consequences from the view that terms such as ‘water’ have ‘hidden scientific essences’. No doubt, for a quantity of liquid to count as a quantity of water, it must contain a certain portion of H2O molecules. But a quantity of blood may contain a greater percentage of H2O molecules than some quantity of water, without thereby counting as a quantity of water. Spelling out what fixes the reference of a term like ‘water’ is a difficult matter. But, given that the diluted stuff in lakes is water, such a story may very well centrally involve the sort of information available to ordinary speakers competent with the term ‘water’, such as ‘falls from the sky in the form of rain’. This is evidence, albeit from an unlikely source, for an externalist, description theoretic account of the meanings of words such as ‘water’ and ‘gold’.

As we have seen, (non-contextually restricted uses of) terms such as “water” and “gold” do not denote pure chemical kinds. This result supports a view recently advocated by Mark Johnston (1997). According to Johnston, mass terms such as “water” do not

13 Thanks to Tim Williamson for discussion here.
denote chemical kinds such as H20. Rather, they denote what Johnston calls “manifest kinds”. The manifest kind denoted by “water” is not identical to H20. Instead, it is constituted by H20.

For a quantity to count as a quantity of water, it surely must contain some H20. But, as we have seen, it may contain less H20 than a quantity that is clearly not a quantity of water. I am not sufficiently clear about what is meant by “constitution” to be in a position to conclude from the fact that a quantity of water must contain some amount of H20 that H20 constitutes water. However, if this inference is correct, then our discussion provides support for Johnston’s view that water is constituted by, but not identical to, H20.

Furthermore, our discussion provides a decisive rebuttal to one natural response to Johnston’s arguments that “water” and similar mass terms denote ‘manifest’ kinds. According to this response, each such term is ambiguous between a ‘scientific’ use, in which it denotes a chemical kind, and a ‘manifest’ use, where it functions as Johnston describes. However, as we have seen, uses of “water” that denote a set of quantities, each of which is pure H20, do not involve a separate lexical item. Rather, these uses involve the very same lexical item as more ordinary uses of water. However, in these specialized uses, the denotation of that lexical item is contextually restricted. As far as literal meaning is concerned, then, terms such as “water”, “gold”, “copper”, and the like uniformly do not denote chemical kinds.14

IV. Conclusion

There are other constructions the analysis of which is aided by the adoption of NRT. For example, like indefinite descriptions, definite descriptions exhibit quantificational

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14 I should note that discussions with Richard Boyd have made me somewhat uncomfortable with the dichotomy suggested by Johnston’s terminology of ‘manifest’ vs. ‘chemical’ kind. The fact that (non-contextually restricted uses of) “water” and “gold” fail to denote chemical kinds does not entail that (such uses of) these terms do not denote natural kinds. After all, chemical kinds are not the only natural kinds. It is unclear to me that explanation in, say, evolutionary biology, can do without appeal to the kinds denoted by “water” and “gold”, despite the fact that they are not chemical kinds.
variability effects. That is, among the interpretations of (47a-b) are the ones specified in (48a-b):

(47)  
  a. The customer is always right.
  b. Usually, the sailor stops, but the marine goes on.

(48)  
  a. For all x, if customer (x), then right (x).
  b. For most x, y, if sailor (x) and marine (y), then x stops and y goes on.¹⁵

Such effects are surprising, on the supposition that definite descriptions are quantifiers. Indeed, Delia Graff (forthcoming, Section VII) has recently exploited the fact that definite descriptions are subject to quantificational variability effects to argue for the thesis that definite descriptions are not quantifier expressions, but predicates. For if definite descriptions were predicates, one could explain the data in (47) and (48), since the adverb of quantification would then bind a free variable in the predicate expression.

However, NRT reconciles the quantificational treatment of definite descriptions with the existence of quantificational variability effects. For, if NRT is correct, each noun co-occurs with a domain index. That is, according to NRT, the structure of (47a-b) is as in:

(49)  
  a. The <customer, f(i)> is always right.
  b. Usually, the <sailor, f(i)> stops, but the <marine, f(j)> goes on.

Given these representations, NRT smoothly predicts quantificational variability effects. In (47a), the adverb of quantification “always” raises, and binds the variable ‘i’ in <customer, f(i)> . We may suppose then that context supplied ‘f’ with a function from situations to sets such that the intersection with that set of the denotation, relative to a circumstance of evaluation, of ‘customer’, yields a set with one member. Similarly, in (47b), the adverb of quantification “usually” unselectively binds the variables ‘i’ and ‘j’, yielding the desired interpretation.¹⁶ Thus, NRT allows us to explain such effects, without abandoning the thesis that definite descriptions are quantifiers.

However, my point in this paper is not simply to emphasize the virtues of the Nominal Restriction Theory. It appears that the effects of extra-linguistic context on the

¹⁵ I am here ignoring the complexities involved in the proportion problem (see for discussion, e.g. Heim (1982), Reinhart (1986)).
¹⁶ For more on adverbs of quantification and unselective binding, cf. Lewis (1975), Heim (1982).
determination of what is said by the use of a sentence are too diverse and varied to be susceptible of systematization. Appeals to extra-linguistic context are consequently ubiquitous in the work of those who seek to undermine the thesis that linguistic interpretation is largely systematic and rule-governed. However, in this paper, I hope to have shown by example how what appear to be very different effects of context on the determination of what is said can be due to the same source. If, as I believe to be the case, there are only a small number of ways in which extra-linguistic context affects what is said by a use of a sentence, perhaps it is not so clear that extra-linguistic context poses a threat to the systematicity of linguistic interpretation.\footnote{Thanks to Richard Boyd, Herman Cappelen, Richard Heck, Kathrin Koslicki, Ernie Lepore, Kirk Ludwig, Brett Sherman, Anna Szabolcsi, and Zsófia Zvolensky for valuable comments and discussion. I would especially like to thank Delia Graff, Jeff King, and Zoltan Gendler-Szabo for many hours of extraordinarily fruitful discussion about the topics of this paper.}

**Bibliography**


Graff, Delia (forthcoming): “Descriptions as Predicates”, *Philosophical Studies*.


