THE ARGUMENT FROM BINDING[*]

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1 Introduction

In some utterances, some material does not seem to be explicitly expressed in words, but nevertheless seems to be part of the literal content of the utterance rather than an implicature. I will call material of this kind *implicit content*. The following are some relevant examples from the literature.

(1) Everyone was sick.
(2) I haven't eaten.
(3) It's raining.

In the case of (1), we are supposed to have asked Stephen Neale how his dinner party went last night (Neale, 1990, pp. 94–95) and received this as the reply. Obviously, we do not take Neale to be saying that everyone in the world was sick; we interpret him as saying that everyone who attended his dinner party was sick. How, then, do we come to incorporate the property of attending Neale's dinner party into the proposition expressed, when it does not seem to be the denotation of any overt lexical items in the utterance? In uttering (2), I might be asserting that I have not eaten dinner today (Bach 1994, pp. 135–136), even though I do not use any audible words meaning 'dinner' or 'today'. (I might thereby intend to create an implicature to the effect that we should go to a restaurant.) And in saying (3), I might be claiming that it is raining at 11.59pm on Halloween 2008 in Arkham, Massachusetts, even though I do not appear to mention any time or place (Perry 1986; Stanley 2000; Recanati 2002, 2004, 2007; Martí 2006; Neale 2007).

There are really four problems here. The first is the problem of whether the content of utterances like this is determinate (Wettstein 1981; Schiffer 1995; Neale 2004; Buchanan and Ostertag 2005). Is it the case, for example, that Neale meant 'Everyone who attended my dinner party was sick' as opposed to 'Everyone who dined in my dining room was sick'? (The two might give equivalent results for

some cases, of course, in the sense that the same people would be claimed to be sick; but they would not in the case where Neale holds a dinner party in his kitchen, and so two different propositions are clearly in play.) I will not focus on this question in this article.

Suppose that at least some utterances of this kind have determinate content. Perhaps the speaker, in some cases, has a particular thing in mind, which constitutes the content, and the hearer is left with the task of working out what the speaker has in mind, as Neale (2004, p. 76) proposes. Then, and this is the second problem, there is the question of how the hearer manages to work out what the relevant content is. I will not address this question either.

The third problem is slightly more modest than the last one. It is the question of the level of representation at which implicit content first makes its presence felt. Are there unpronounced items in the syntax of the sentence uttered whose semantic value is implicit content? If so, what are their syntactic properties? Or does implicit content leave no trace, as it were, in the syntax but appear only in conceptual representations or the language of thought?

The fourth problem might be called the problem of the logical form of implicit content. How does it combine with the content provided by the overt constituents in the syntax? I will distinguish two approaches to this latter problem: the global approach and the local approach. The global approach says that the content derived from the overt constituents in the syntax is asserted to be true only of a restricted spatiotemporal part of the world. The local approach says that implicit content can be interwoven with the content provided by overt constituents in the syntax: it could be the value of unpronounced variables in the syntax, as just mentioned, or it could be added to the language of thought constituents that indicate (or *are*) the semantic values of items in the syntax.

In this paper, after rejecting the global approach by means of standard argumentation (section 2), I will distinguish four variants of the local approach (section 3); these variants differ, among other things, on whether they claim that the syntax is crucially relevant, as described in the third question. Stanley (2000, 2002a) and Stanley and Szabó (2000a,b) have put forward an argument known as the *argument from binding* that they claim supports their variant of the local approach over others; in section 4, I try to show that the argument from binding does not do the work that Stanley and Szabó want it to do. However, I then go on, in section 5, to present a variant of the argument from binding that constitutes evidence against Stanley and Szabó's position and against some other variants of the local approach. Section 6 concludes.

2 The Global Approach

The global approach[1] to the problem of implicit content says that the sentences in question are to be understood as making claims only about spatially and temporally delimited parts of the world. Such parts of worlds are called

situations. The originator of this approach is sometimes taken to be Austin (1961), who said that a statement is true when the situation to which it refers is of the type described by the statement.

Barwise and Perry (1983, p. 161), spelling out this idea in more detail, proposed that the semantic value of an utterance is an *Austinian proposition*. An Austinian proposition is a pair of a topic situation (that the speaker is trying to refer to or say something about) and a set of possible situations. An utterance will be true if the topic situation is a member of the set of possible situations it is paired with.

So if someone asks John Perry who made the cheesecake they are eating, Perry can reply with (4), which has the denotation in (5) in the theory in question.

(4) I am the cook.
(5) $\langle s^*, \{s \mid \text{John Perry is the unique cook in } s\}\rangle$

Here, given the context, we can assume that the topic situation s^* that Perry is referring to is the temporally and spatially extended situation that encompasses all and only the actions involved in cooking the cheesecake in question. If Perry is indeed the only cook in that situation, he has spoken truly. Similarly, Neale's utterance of *Everyone was sick* makes a claim only about the situation that contains his dinner party last night and nothing else. Within this small part of the world, it is true.

However, Westerståhl (1985) and Soames (1986) pointed out that this theory does not seem able to deal with sentences like the following:

(6) Everyone is asleep and is being monitored by a research assistant.

We might imagine this being said as a response to an inquiry about what stage an experiment on sleep has reached. Presumably the research assistant, in the midst of the monitoring task, is not asleep. So there is no spatiotemporal area such that everyone is asleep there and the research assistant is monitoring everyone there. So there can be no topic situation of the required kind.[2]

3 The Local Approach

The local approach to the problem of implicit content says that the missing material is present in the form of unpronounced additions to material already contained by the sentence or the sentence's semantic representation. Such additions are made locally, to particular words or word meanings. By contrast, the global approach consisted of a global restriction on the part of the world in which the sentence was supposed to hold true.

3.1 The Syntactic Relation Variable Approach

Four versions of the local approach are prominent in the literature. The first is what we might call the *syntactic relation variable approach*. According to this theory, there are unpronounced variables in the syntactic structure of the sentence. The content of these variables is established by whatever mechanism fixes the content of overt indexicals. Perhaps it is supplied by the linguistic intentions of the speaker and worked out by the hearer on the basis of their best guess at the intentions of the speaker (Neale, 2004, pp. 76–77). The positioning of such variables is in principle subject to syntactic constraints. Theories of this kind have been advocated by von Fintel (1994, 1998), Stanley (2000, 2002a,b), Stanley and Szabó (2000a,b), Martí (2003, 2006) and Pelletier (2003).

Here is an example of the syntactic relation variable approach. Suppose that determiners can come with an unpronounced pair of a relation variable and an individual variable (von Fintel, 1994, pp. 30–31). Determiners take this pair as their first argument and then take the overt nominal. In the case of (7), we would have a syntactic structure like that in (8).

(7) The table is covered with books.
(8) [[[the [f_1 v_2]] table] [is covered with books]]

In this example, we might imagine that v_2, the individual variable, has as its value a particular room, the one containing the table in question. Let *a* be a name for this room. The relation variable might be assigned a meaning equivalent to that of *in*. In the semantics, the denotation of the definite article would take two arguments and intersect them. On this occasion, they would be the property of being in *a* and the property of being a table. So the definite description ends up meaning 'the table in *a*'.

Of course we could have arrived at a meaning like 'in *a*' just with a property variable. Why do we need a combination of an individual variable and a relation variable? The following sentence (due to Heim (1991)) is a good reason why (von Fintel, 1994, p. 31). (9) seems to have the reading in (10). This means that we can use the apparatus we have introduced as shown in the simplified syntactic structure (11).

(9) Only one class was so bad that no student passed the exam.
(10) Only one class *x* was so bad that no student in *x* passed *x*'s exam.
(11) [only one class] λ_2[t$_2$ was so bad that no f_1 v_2 student passed the f_3 v_2 exam]

I follow Heim 1993 and Heim and Kratzer 1998 in positing a λ-operator in the syntax, below the subject. The individual variable v_2 is bound by this operator, as is the trace t$_2$; f_1 once again means 'in', and f_3 will be assigned a value

something like 'of', in the sense of 'belonging to' or 'associated with'. This will produce the attested meaning.

   Stanley and Szabó (2000a) propose a variant of von Fintel's theory whereby the silent variables appear on nouns rather than on determiners. So (12) would have the syntactic structure in (13); (14) would have the simplified syntactic structure in (15).

   (12) The table is covered with books.
   (13) [[the [table [f_1 v_2]]] [is covered with books]]
   (14) Only one class was so bad that no student passed the exam.
   (15) [only one class] λ_2[t$_2$ was so bad that no student f_1 v_2 passed the exam f_3 v_2]

When two syntactic constituents denoting properties appear as sisters, as in the present examples, their semantic values will be intersected. Apart from the difference in placement of the variables, Stanley and Szabó's theory works like von Fintel's.

3.2 The Pragmatic Enrichment Approach

   The second version of the local approach to implicit content can be called the *pragmatic enrichment approach* (Sperber and Wilson 1986, p. 189). According to varieties of this theory, the output of the semantics is an object in a conceptual system or language of thought (Fodor 1975).[3] Supplementation of this object occurs in the language of thought to obtain the mental object that corresponds to (or *is*) the literal content of the utterance. For example, suppose that John and Mary have guests, John enters the house noisily and Mary says (16) to him.

   (16) Everyone is asleep!

From the conceptual representation in (17), John (or some aspect of John's inferential faculties) proceeds to (18).[4]

   (17) EVERYONE IS ASLEEP
   (18) EVERYONE WHO IS A GUEST OF MINE IS ASLEEP

The syntax, then, is not involved, in contrast to the syntactic relation variable approach. Theories along these lines have been advocated by Sperber and Wilson (1986), Carston (1988, 2002), Recanati (1993), Bach (1994, 2000, 2005) and Bezuidenhout (1997).

   Importantly, these theories do not generally incorporate any syntactic restrictions on where in a language of thought object this supplementation can take place (using *syntactic* now to refer to the hypothesized syntactic qualities

of the language of thought—see Fodor 1975): Sperber and Wilson, for example, say that this kind of enrichment "involves the application, not of special-purpose decoding rules, but of general-purpose inference rules, which apply to any conceptually represented information" (1986, p. 176); they suggest only a pragmatic principle (their *principle of relevance*) for arriving at appropriately disambiguated and enriched propositional representations (1986, p. 184). Theories of this kind, then, are potentially vulnerable in the following way: if a reading turns out to be unavailable for a given sentence, they cannot avail themselves of syntactic constraints to explain its absence, unlike the theories that belong to the syntactic relation variable approach; and they will face real difficulty if the reading in question can be argued to be pragmatically plausible. It is this vulnerability that I attempt to exploit in section 5 of this paper.

3.3 The Explicit Approach

The third version of the local approach is the "explicit approach" of Stephen Neale (1990, 2004). Here is a description of it (Neale 2004, p. 121):

> The basic idea is explicitly *modal*: the nominal is often shorthand for, elliptical for, an abbreviation of at least one richer nominal the speaker *could have* used and *could* produce if asked to be more explicit. (Hence the name.) Consider the following dialogue:
>
> A: The table is scratched.
> B: Which table?
> A: The table I bought this morning. (*Or*: The one I bought this morning.)
>
> According to the explicit approach, this type of dialogue is suggestive of what is going on when we make felicitous uses of incomplete descriptions. *B* is intended to interpret *A*'s utterance of 'the table' as if it were an utterance of 'the table I bought this morning'. There need not be a unique description that *A* can supply, but there had better be at least one—and one that *B* could reasonably have been expected to construct at that—if the speech act is to be felicitous.

Neale (2004, pp. 122, 167) is emphatic that the explicit approach does not involve syntactic deletion of the kind seen in discussions of VP-ellipsis and NP-deletion in syntactic theory. It is not the case, for example, that the relative clause *I bought this morning* is present in the syntax in *A*'s first utterance above, but just not pronounced.

Is there any difference, then, between Neale's position and what I just referred to as the pragmatic enrichment approach? There is. According to the pragmatic enrichment approach, we act directly on language of thought representations without further reference to the syntax when we understand an utterance that involves implicit content. Neale (2004, pp. 82–83) is content to assume a language of thought and to assume that understanding an utterance involves entertaining a particular language of thought representation. But according to Neale there is a

limit on the kind of enrichment of language of thought strings that is permitted: we have to understand phrases involving implicit content as if they were phrases produced by adding words to the phrases actually uttered. Neale (2004, p. 122) says:

> the basic idea [...] is that sometimes the matrix $\phi(x)$ of a quantified DP is understood, in context, *as if* it were a richer matrix $\phi(x, a)$ containing an additional argument or a conjunction $\phi(x) \bullet \zeta(x)$ which the speaker could readily have produced.

The mention of quantified DPs[5] makes it clear that Neale is talking about phrases in the syntax here. Note that the original nominal $\phi(x)$ is part of the enriched nominal that is understood.

This difference between Neale's explicit approach and the pragmatic enrichment approach makes Neale's theory in a certain respect more constrained. Enrichment in Neale's theory can only yield meanings that could be obtained by syntactically building on the material present in the syntax. No such constraint is present in the pragmatic enrichment theory. As we will see, Neale will be in a position to claim an advantage for his theory because of this aspect of it.

3.4 The Syntactic Situation Variable Approach

The fourth and final version of the local approach that I will consider might be called the *syntactic situation variable approach*. Kuroda (1982), Recanati (1996, 2004) and Kratzer (2004) have proposed that implicit content is provided by each predicate being associated with a situation variable in the syntax, so that different predicates in one sentence can be evaluated with respect to different parts of the world (or even different parts of different possible worlds).

Detailed versions of the compositional semantics of systems like this have been provided by Percus (2000) and Büring (2004).[6] Here is a brief sketch, based roughly on their ideas. A sentence like (19) would have an LF like (20).

(19) Every subject is asleep.
(20) Σ_8 [[every [subject s_8]] [is [asleep s_8]]]

By means of a syncategorematic rule, the operator Σ_8 is interpreted as a lambda operator binding coindexed variables in its scope. A predicate like *subject* or *asleep* will take a situation variable as its argument and return the characteristic function of the set of individuals with the relevant property *in the situation in question*. (Alternatively, depending on the details of the system being used, it might return an intensionalized version of that characteristic function.) So the semantic value of [asleep s_8] might be something like [$\lambda x.x$ is asleep in s_8], where s_8 will end up being bound. (Note the difference between situation variables in

the syntax, written in upright type, and situation variables in the metalanguage, written in italics.) The semantic value of the whole LF (20) will be something like (21).

(21) λs_8. every subject in s_8 is asleep in s_8

Suppose, once more, that the semantic value of an utterance is an Austinian proposition, something like (22).

(22) $\langle s^*, \lambda s_8$. every subject in s_8 is asleep in $s_8 \rangle$

The utterance will be true if the topic situation s^* is a member of the set defined by the lambda-term.

In this initial example, all situation variables are bound by the Σ operator. But at least some of the situation variables in a sentence, according to the current theory, are capable of being referential. They can refer to particular spatiotemporal parts of the world. Take Soames's example (6), repeated here as (23).

(23) Everyone is asleep and is being monitored by a research assistant.

This would have a simplified LF something like the following:

(24) Σ_8 [[every [-one s_1]] [[is asleep s_8] and [is being monitored s_8 by a research assistant s_8]]]

The situation variable s_1 would refer to a (possibly doughnut-shaped) part of the world s_1 that contained the experimental subjects and no-one else, while the variables s_8 would be bound, as before, by the Σ operator. The semantic value of this LF would be as follows:

(25) λs_8. everyone in s_1 is asleep in s_8 and being monitored by a research assistant in s_8

If this function is paired with a topic situation that includes the experimental subjects and the research assistant, the right results, it seems, will be obtained.

4 The Argument from Binding

Stanley (2000, 2002a,b) and Stanley and Szabó (2000a,b) allege that the syntactic relation variable approach is superior to the pragmatic enrichment approach because of cases where there seems to be a bound variable in the

implicit material. Examples are (26a) and (27a), which have the readings in (26b) and (27b) respectively.

(26) a. In every room in John's house, every bottle is in the corner.
    b. Every room x in John's house is such that every bottle in x is in the corner of x.

(27) a. Every student answered every question.
    b. Every student x answered every question on x's exam.

Stanley (2002a: 153) gives the following summary of the force that these data are supposed to have:

> One characteristic syntactic feature of pronouns is their capacity to be bound by variable-binding operators. By demonstrating the existence of bound readings of quantifier-domain variables, one provides evidence of behavior that is explicable on the assumption that there is an unpronounced pronominal element, and difficult to explain otherwise.

In itself, then, the argument from binding does not show that other theories, such as the pragmatic enrichment approach, cannot handle the data in question. But Stanley (2002a) attempts to show that the pragmatic enrichment approach, in particular, cannot deal with the data in question without encountering serious problems.[7] I will now review these arguments.

    Stanley (2002a) begins the relevant section of his paper by sketching a pragmatic process that could in principle allow speakers to communicate propositions with implicit content including bound variables, without corresponding bound variables occurring in the syntactic structure of the sentence uttered. Here is what he says (Stanley 2002a, p. 160):

> Suppose that interpreters, when they hear a sentence whose semantic content in context is either less than fully propositional or expresses a proposition that the speaker clearly does not intend to communicate, quite automatically replace the uttered sentence by another one, one that contains additional words. This more complicated sentence, relative to that context, would semantically express the proposition the speaker intends to communicate, and the interpreter in fact grasps. But the recovery of this more developed sentence, although often fairly automatic and almost always unconscious (or tacit), is still a pragmatic process.

    Two remarks are worth making about the theory sketched in this passage: one, although Stanley does not say this, it is seemingly indistinguishable from Neale's (1990, 2004) explicit approach, since it talks about the proposition obtained by adding more words to the original sentence uttered; and two, it does not take account of the resources that the advocates of the pragmatic enrichment approach have at their disposal, since these latter can say that a bound variable is added at the relevant place in a language of thought string with no reference to

the syntactic structure of the original sentence (Carston 2002, pp. 198–200). We will want to distinguish carefully between points Stanley makes that affect only Neale's explicit approach and points he makes that are relevant for the pragmatic enrichment approach too.

Stanley's first criticism is relevant only to Neale's explicit approach. Stanley (2002a, p. 162) claims that on this theory it is mysterious why vacuous quantification causes ungrammaticality. Why, Stanley asks, should the following sentences be ungrammatical?

(28) *Everyone$_j$ who John ran, he likes.
(29) *Everyone has had the privilege of having John greet.

After all, if there was a process that allowed an interpreter to replace the uttered sentence with a different one obtained by adding more lexical material, including bound variables, an interpreter should be able to hear (28) and (29) and replace them with the (30) and (31), respectively.

(30) Everyone$_j$ who John ran by x_j, he likes.
(31) Everyone has had the privilege of having John greet her.

Why should the new sentence not alleviate the ungrammaticality of the original one, as well as providing it with a particular meaning?

To this criticism, I think we can very well answer "Why should it?" The kind of process postulated by Neale and criticized by Stanley is one whose purpose is to provide interpretations, not alleviations of ungrammaticality. Perhaps in judging the grammaticality of an utterance we judge what was uttered rather than our pragmatically triggered modification of it.

The next part of Stanley's (2002a) criticism of pragmatic enrichment theories is relevant both to Neale's explicit approach and the pragmatic enrichment theories themselves. Stanley (2002a, p. 164) points out that many ungrammatical sentences are nevertheless interpretable. He claims that, even if the theories in question do not predict (28) and (29) to be *grammatical* with the meanings of (30) and (31), they do nevertheless predict them to be *interpretable* with the meanings of (30) and (31). He maintains, however, that (28) and (29) are "well-nigh impossible to interpret" (Stanley 2002a, p. 164), which would be mysterious on the hypotheses under investigation.

I fear, however, that Stanley has not given (28) and (29) enough of a chance. The standard examples of implicit content generally only have the readings they do when placed in a suitable context, often a fairly rich one. Let us see what happens if we attempt to place (28) and (29) in a suitable context. (29), repeated here as (32), seems to me to respond particularly well to this treatment:

(32) *(John is a fantastically eminent and good-looking movie star. A speaker of an object-drop language with an imperfect command of English sees him*

greeting an adoring woman, leaving behind him a trail of further flustered and appreciative recipients of his salutations. Gesturing towards this group of women, he says the following.) *Everyone has had the privilege of having John greet.

In this context, it seems to me, we can perfectly well interpret (29) as having the meaning of (31), "Everyone has had the privilege of having John greet her," even though it is obviously not grammatical. Imagine further a scenario in which John, out jogging, stops and has animated and friendly conversations with several people along his route. Our non-native speaker of English could, I think, gesture towards this group and say (28) and be interpreted as meaning what would more naturally be expressed by (30).

The final part of Stanley's (2002a) critique is a generalization of the last one. Referring to the pragmatic enrichment approach, he says the following (Stanley 2002a, pp. 164–165):

For if there were the sort of pragmatic processes postulated by the hypothesis, then there are countless examples of sentences that speakers should be able to use, without consciously and obviously flouting Gricean maxims, to communicate propositions that they in fact cannot thereby communicate.

Stanley gives one further example. If the pragmatic processes in question existed, he claims (2002a, p. 165), then speakers should be able to say (33) and communicate a content that would be expressed more fully by either (34a) or (34b).[8]

    (33) Everyone likes Sally.
    (34) a. Everyone likes Sally and himself.
           b. Everyone$_i$ likes Sally and his$_i$ mother.

I agree that (33) cannot be used with the content of (34a) or (34b). But I still see room for an advocate of the pragmatic enrichment approach to maneuver. A possible generalization that would rule out this case is the following:

    (35) *Generalization*
          When the result of translating the sentence uttered into a language of thought string is fully propositional, it is not possible in pragmatic enrichment to add extra arguments to those contributed by items in the syntax.

I do not know of any counterexamples to this generalization. Typically, implicit content, when it affects arguments of predicates at all, makes it clear who or what an argument present in the syntax actually refers to or ranges over, as when we

understand *everyone* in (1) to be equivalent to *everyone present at Neale's dinner party last night*.

It might be objected that the principle just postulated on behalf of the pragmatic enrichment approach is rather ad hoc. This is a fair comment. But presumably the different varieties of the pragmatic enrichment approach would be able to bring their various pragmatic theories to bear in order to try to derive this principle from deeper and more general ones. Bach, for example, says that when the result of translating the sentence uttered into a language of thought string is fully propositional, enrichment is "needed if the speaker cannot plausibly be supposed to mean just what the sentence means" (Bach 1994, p. 139). One could strengthen that to "possible if and only if the speaker cannot plausibly be supposed to mean just what the sentence means" and then argue that every time one might plausibly be supposed to mean (34a) or (34b) one might also plausibly be supposed to mean (33). I am not sure that this strategy in particular would work, although I do not see why it should not. But I think it is clear by now that Stanley has not produced a compelling argument against the pragmatic enrichment approach. At worst, he has forced the advocates of this approach to start thinking of ways to derive the plausible generalization in (35) from their pragmatic theories.

Overall, then, I do not think that Stanley and Szabó's argument from binding is very compelling.

5 A New Argument from Binding

In this section, I outline a new argument from binding. It shares certain characteristics with Stanley and Szabó's: in particular, it involves a sentence that lacks a bound reading that the pragmatic enrichment approach would appear to predict to be possible. But it also rules out certain other varieties of the local approach, including Stanley and Szabó's own.

As I have pointed out before in a slightly different context (Elbourne 2001b; 2005, p. 114), definite descriptions made with Saxon genitives (*John's hat, Mary's cat*) do not seem to be able to be bound. Let us consider (36) first, in order to be clear about the reading in question. (36) has the reading in (37), among others.

(36) John fed no cat of Mary's before it was bathed.
(37) There does not exist an individual x such that x is a cat of Mary's and John fed x before x was bathed.

In other words, *no cat of Mary's* can bind *it* here. A truth-conditionally identical reading is possible (for most speakers) when we substitute the definite description *the cat of Mary's* for *it*:

(38) John fed no cat of Mary's before the cat of Mary's was bathed.

(39) There does not exist an individual x such that x is a cat of Mary's and John fed x before the cat of Mary's identical to x was bathed.

But when we put *Mary's cat* in the same place, the bound reading is not possible for any speakers:

(40) John fed no cat of Mary's before Mary's cat was bathed.

(40) cannot have the reading in (39). We must see whether the theories we have been examining can explain this fact.

Let us begin with the pragmatic enrichment approach. If it were possible to add bound variables and other material freely in the language of thought, as this approach contends, we would surely be able to convert the representation of *cat* in *Mary's cat* from CAT to CAT IDENTICAL TO x, passing from the representation in (41) to the one in (42).

(41) NO CAT OF MARY'S x . . . MARY'S CAT WAS BATHED
(42) NO CAT OF MARY'S x . . . MARY'S CAT IDENTICAL TO x WAS BATHED

Indeed, if the pragmatic enrichment approach is to be used to handle incomplete descriptions at all, its advocates will have to admit that CAT can be converted to CAT IDENTICAL TO x, or something similar, in the case of (38); otherwise they would not be able to analyze that example. But then they would seem to have no way to prevent the same transformation occurring, contrary to fact, in the case of (40). As mentioned above, the pragmatic enrichment approach cannot appeal to syntactic considerations to rule out readings that must be disallowed. And the unavailable reading of (40) does not involve new arguments being added to those provided in the overt syntax, as was the case in (33) and (34); it involves something for which there is a precise parallel in (38). I conclude that the pragmatic enrichment approach overgenerates.

Let us turn to the syntactic relation variable approach. Can the syntactic relation variable approach deal with the Saxon genitive data? It can, but only if it is supposed that the silent variables are attached to determiners, as proposed by von Fintel (1994) and others. Then we could suppose that, as a matter of idiosyncratic subcategorization properties, *the* can host one and *Mary's* cannot. The two cases would look like this, where R is a relation variable and pro is an individual variable:

(43) [DP [the [R pro]] [NP cat of Mary's]]
(44) [DP Mary's cat]

The syntactic relation variable approach can appeal to particular syntactic properties of the lexical items involved, unlike the pragmatic enrichment approach.

One might object at this point by pointing out that it is possible for definite descriptions built from Saxon genitives to be improper, as we see in (45).

(45) *(We are taking care of one of Mary's many cats. We return to see a vase knocked over.)* Mary's cat must have done that.

It might seem that the syntactic relation variable approach must, *ex hypothesi*, admit that definite descriptions built from Saxon genitives can include a relation variable and an individual variable in order to deal with this. But if they did, they could surely be bound, contrary to what appears to be the case from (40).

There is an alternative analysis, however. Perhaps the definite determiner in *Mary's cat* already takes a relation variable and a lexical item of type e, but the item of type e is *Mary*. In other words, the syntactic structure pronounced *Mary's cat* would be a configuration like that in (46), where THE is a silent definite article:

(46) [$_{DP}$ [THE [R Mary]] [$_{NP}$ cat]]

So there would be no room for a bindable individual variable. In the case of (45), R could mean something like "temporarily residing in this house and owned by." In other occurrences, R would take on other values, as suggested in work on the semantics of the genitive by Barker (1995) and others.

A corollary of this reasoning is that Stanley and Szabó must be incorrect when they say that their silent variables attach to NP in a structure [D NP]. Their position, like the pragmatic enrichment approach, is unable to distinguish between *the cat of Mary's* and *Mary's cat*. According to their theory, these phrases should be able to receive syntactic representations like these:

(47) [$_{DP}$ the [$_{NP}$ [cat of Mary's] [R pro]]]
(48) [$_{DP}$ Mary's [$_{NP}$ cat [R pro]]]

These syntactic structures would of course result in both phrases being able to be bound.

Since this difficulty for their theory has arisen, we should examine the arguments in favor of placing the silent variables on NP that have been advanced by Stanley and Szabó. Two arguments are to be found in their writings. The first one (Stanley and Szabó 2000a, p. 257) involves the sentence in (49), which they claim has the two readings in (50).

(49) Most people [GESTURE TOWARDS VILLAGE A] regularly scream. They are crazy.
(50) a. "... The people in A are crazy."
    b. "... The people in A who regularly scream are crazy."

Stanley and Szabó seem to assume that the definite description paraphrases in (50) mean that we are dealing with a descriptive or D-type pronoun (Sommers 1982; Neale 1990) and that, as is arguably necessary in such cases, the descriptive content of *they* is to be obtained from the descriptive content of constituents in the linguistic environment (Heim 1990; Neale 1990). They point out that if a pair of variables [R pro] is attached to *most* in (49), there is no constituent there that has as its value the set of people in the village. But if we have [people [R pro]], with pro referring to A and R meaning "living in," there is such a constituent. This would mean that the pronoun *they* could look back to this constituent and pick up its descriptive content from there, accounting for the reading in (50a).

The reading in (50b), Stanley and Szabó continue, can be derived on the basis of the first sentence of (49) from an independently motivated algorithm for dealing with D-type pronouns devised by Stephen Neale (1990):

(51) If x is a pronoun that is anaphoric on, but not c-commanded by, a non-maximal quantifier '$[Dx : Fx]$' that occurs in an antecedent clause '$[Dx : Fx](Gx)$', then x is interpreted as '$[\text{the } x : Fx \,\&\, Gx]$'.

Applying this algorithm to the present case, and assuming that the variables are adjoined to *people*, we get the following as a possible translation for the pronoun in Neale's semi-formal language:

(52) $[\text{the } x : \text{People-in-A}\,(x) \,\&\, \text{Regularly-Scream}\,(x)]$

This does indeed represent the reading in (50b). So having the variables on the nominal, not on the determiner, easily accounts for both available readings. Having the variables on the determiner, Stanley and Szabó claim, would give no evident way to obtain these readings.

It is possible to counter this argument, however. Even if we accept that *they* in (49) must be a descriptive pronoun and that it must look to constituents of the previous sentence in order to obtain its descriptive content, we have not seen an argument that its descriptive content must be obtained only from there. Let us temporarily assume, with many theorists, that pronouns are, or at least are sometimes, determiners (Postal 1966; Elbourne 2001a, 2001b, 2005; Neale 2006). In previous work, I have argued that descriptive pronouns are definite articles followed by Noun Phrases that have undergone phonological deletion (Elbourne 2001a, 2001b, 2005). If that is correct, then the word *they* in (49) could be a determiner followed by an unpronounced occurrence of *people*, elided on the basis of its occurrence in the previous sentence. The determiner *they*, moreover, could take a pair of a relation variable and an individual variable in the style of von Fintel (1994). So we would have the configuration in (53).

(53) [[they [R pro]] people]

The variables [R pro] would be free to pick up salient values freely, as is normally the case, and would not be tied to assuming the values of constituents in the linguistic environment. So pro could refer to village A and R could mean either "who live in" or "who regularly scream and live in" as the case may be. Thus the two readings in (50) would be obtained. This combination of material that undergoes NP-deletion and salient content picked up more freely has proven to be independently useful in the analysis of donkey anaphora (Elbourne 2005, Chapter 4).

Stanley and Szabó have a second argument to draw upon to show that their variables must be placed on Noun Phrases. Stanley (2002b) argues that definite descriptions involving nouns modified by superlative adjectives do not pick out the right things unless the LF variable is on the head noun. He proposes the scenario and example sentence in (54).

(54) *(We are talking about Cornell students. The tallest person in the world is not a Cornell student.)* The tallest person is nice.

This occurrence of *the tallest person*, in context, can easily pick out the tallest person among Cornell students. If the relevant variables are attached to *person*, Stanley points out, it is easy to see how this might come about: we have a complex [person [R pro]] that means "person who is a student at Cornell" and then *tallest* combines with it and yields the singleton set containing the tallest person in the set of Cornell students. But, Stanley says, if the variables had to appear on *the* they would do no good: *person* would denote the set of all people in the world and *tallest* would pick out the singleton set containing the tallest one of those; if the [R pro] complex places a requirement on this person that he be a Cornell student, contrary to fact, incoherence will result. So the variables had better go on *person*.

It appears, however, that Stanley is supposing that *tallest* operates as a unit: it picks out the tallest entity from among the set denoted by its nominal sister and gives us the singleton set containing this entity. But it has been proposed in the literature on superlatives that *-est* is a separate operator that takes as arguments a variable, the adjective and the noun (Heim 1999; Farkas and Kiss 2000; Herdan and Sharvit 2006). Two possible structures for this are given in (55), where a simple set variable C is used for simplicity instead of the combination [R pro]; (55b) (Heim 1999) obviously requires some covert movement to take place.

(55) a. [tall [-est C]] person
     b. [-est C] [tall person]

If one of these is the structure we are dealing with, then obviously Stanley's argument does not work. The noun *person* can still pick out the set of all the people in the world, but then restriction to the set of Cornell students comes in with the operator *-est* itself.

I conclude, then, that neither of Stanley and Szabó's arguments in favor of their placement of variables is valid, and that the data in (38) and (40) should make us prefer von Fintel's (1994) version of the syntactic relation variable approach.

Let us move on now to consider Neale's (1990, 2004) explicit approach. The explicit approach can arguably deal with the data in (38) and (40). This approach, recall, maintains that examples of the kind we have been looking at are short for longer English sentences that *could have been uttered*. The sentences in question have to be able to be constructed by adding lexical items to the material already present in the syntax. Suppose now that *Mary's cat*, by itself, does not contain any bindable individual variable. Neale (personal communication) points out that it does not seem to be possible to produce any syntactic extension of *Mary's cat* that would bring about binding. What modifiers can be added to Noun Phrases to produce anaphora? Precious few, and the ones that spring to mind (*said, aforesaid, in question,* relative clauses containing bound variables) are not grammatical when added to *Mary's cat*, as we see in (56).[9]

(56) a. *Mary's said cat
    b. *Mary's aforesaid cat
    c. *Mary's cat in question
    d. *Mary's cat that he was considering

By contrast, all of these modifiers can be grammatically added to *the cat of Mary's*:

(57) a. the said cat of Mary's
    b. the aforesaid cat of Mary's
    c. the cat of Mary's in question
    d. the cat of Mary's that he was considering

So Neale could assume that there is no bindable individual variable in *the cat of Mary's* either and account naturally for the contrast in (38) and (40). Alternatively, he could assume that *the* (but, crucially, not *Mary's*) regularly introduces a bindable individual variable as a matter of syntactic subcategorization (Elbourne 2001b, 2005; Neale 2004).

Let us now turn our attention to the syntactic situation variable approach. We are in a position to make an argument here analogous to the one made about the syntactic relation variable approach. Recall that the version of the syntactic situation variable approach currently advocated (Recanati 1996, 2004; Kratzer 2004) maintains that each predicate comes paired with a situation variable. It could possibly explain the bound reading of (38) by saying that the situation variable paired with *cat* (or *cat of Mary's*) in that sentence is bound.[10] But then its advocates would seem to be forced to admit that there is nothing to stop the

situation variable paired with *cat* in (40) being bound either, even though this would produce a bound reading of (40), contrary to fact.

This, of course, is a criticism precisely analogous to the one made of Stanley and Szabo's (2000a) version of the syntactic relation variable approach, which put the variables on the Noun Phrases. It is worth exploring for a moment the consequences of making a move here analogous to the one I made in my discussion of Stanley and Szabo (2000a). I maintained that the facts in (38) and (40) should make us prefer the theory of von Fintel (1994), which placed the relation and individual variables on the determiners: *the* could host such a pair of variables, whereas *Mary's* could not. We should consider, then, the possibility of producing a variant of the syntactic situation variable approach that makes syntactic situation variables the arguments of determiners. Again, we could say that *the* hosts one and *Mary's* does not.

This will not do, however. Recall from example (45) that it is quite possible for *Mary's cat* and similar definite descriptions to be incomplete. The syntactic situation variables approach must maintain, *ex hypothesi*, that such uses crucially involve situation variables. But if we have a situation variable lurking somewhere in *Mary's cat*, and a system in place that allows binding of situation variables, we seem to predict incorrectly that *Mary's cat* will have a bound reading. The syntactic situation variable approach faces a real difficulty here, then.[11]

Before we conclude, let us consider a possibly novel approach, which I will call the *language of thought relation variable approach*. According to this theory, there are no covert variables in the syntax to do the job of providing implicit content, contra von Fintel (1994) and Stanley and Szabó (2000a). Lexical items in the syntax are translated into objects in the language of thought, as supposed by Sperber and Wilson (1986). Some of these language of thought objects are complexes that include variables that demand values to be assigned, as it were; at this level what this would presumably boil down to would be a requirement that certain language of thought objects be replaced by other, more contentful, ones. So a simplex lexical item *the* might be translated into a language of thought complex THE R PRO, where R PRO consists of a relation variable and an individual variable capable of being replaced by IDENTICAL-TO *x*. But *Mary's* and other Saxon genitives, as a matter of their idiosyncratic meaning, would not be translated into language of thought objects of this kind. In other words, we take von Fintel's (1994) theory and transpose it into the language of thought. I cannot see any disadvantages to this theory at the moment.

6 Conclusion

We started our investigation with the following theories on the table: the syntactic relation variable approach in two versions (those of von Fintel 1994 and Stanley and Szabó 2000a), the pragmatic enrichment approach, the explicit approach, and the syntactic situation variable approach. Add to these

the late-arriving language of thought relation variable approach just described. Examination of the binding possibilities of Saxon genitives has proven to be quite informative. In particular, the only theories that can deal straightforwardly with Mary's cat seem to be the syntactic relation variable approach in von Fintel's version, the explicit approach, and the language of thought relation variable approach. It will be interesting to see if future work can distinguish between these latter theories.

Notes

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1. This is the same as what Neale (1990, p. 95) calls *the implicit approach*. However, I will not talk in terms of Neale's distinction between implicit and explicit approaches, since it does not accommodate some varieties of what I here call the local approach. See the extensive terminological remarks in Neale 2004, and in particular his footnote 126 (2004, p. 159).

2. The global approach is sometimes framed in terms of *domains of quantification* or *discourse universes* (Westerståhl 1985), which are sets of objects over which the quantifiers in a sentence are allowed to range. The arguments of Westerståhl (1985) and Soames (1986) are fatal to this version too, as far as I can see.

3. Bach (1994, p. 157) urges us to consider the possibility that a finer distinction needs to be made: the semantically interpreted output of the grammar is only an input to the language of thought; and supplementation to produce implicit content takes place at the level of the semantically interpreted output of the grammar, rather than in the language of thought proper. Without trying to judge the matter, I will henceforth ignore this possibility and talk as if the relevant kind of supplementation took place in the language of thought.

4. I follow the usual convention of representing language of thought strings as English sentences in capitals. As Stephen Neale (2004, p. 82, footnote 19) says, Mentalese is a cinch if your shift-key works.

5. According to the DP hypothesis (Abney 1987), phrases like *every man* and *the table*, which had previously been known as Noun Phrases (NPs), should really be taken to be projections of a determiner (D) head and thus Determiner Phrases (DPs). The term Noun Phrase (NP) is now used to refer to nouns or to nouns modified by adjectives or relative clauses. I will use the terminology of the DP hypothesis myself in this article, without attaching much importance to it.

6. The system in Elbourne 2005, with its operator s_0 (p. 103), would also deal successfully with the examples considered here.

7. It is worth noting, however, that Stanley does not attempt to show that the syntactic situation variable approach cannot handle the binding data. See Recanati 2004 for an argument that it can.

8. Note that Stanley did not really need to use bound variable examples at this point. It is also impossible for *Everyone likes Sally* to be used with the content of *Everyone likes Sally and Bill*, as far as I know.

9. The inability of definite descriptions constructed from Saxon genitives to take post-nominal modifiers, at least, was noted as far back as Chomsky 1986, p. 188.

10. See Heim 1990, Percus 2000, Elbourne 2001a, 2005, and Büring 2004 for extensive discussion of binding situation variables.

11. I see one possibility for salvaging the syntactic situation variable approach, although I am not sure at the moment exactly how it should be spelled out. A widely accepted principle in discussions of variable binding in natural language is Reinhart's Rule I (Reinhart 1983, 2006; Heim 1993, forthcoming; Büring 2005), which says that bound individual variables have a kind of privileged status. Take a syntactic structure that contains a DP that is not a bound individual variable and does not contain one; roughly speaking, Rule I says that, if it is possible to replace this DP with a bound individual variable without changing the truth-conditional interpretation, then the structure is ungrammatical. It is conceivable, then, that a version of Rule I could be formulated that would rule out the bound reading of (40) under the syntactic situation variable approach on the grounds that *Mary's cat* has the following properties: it does not contain a bound individual variable; it would have a bound reading only by means of a situation variable being bound; but a putative syntactic structure based on (40) and containing *Mary's cat* bound by means of a situation variable would have the same truth conditions if a bound individual variable such as *it* were put in the place of *Mary's cat*. See Elbourne 2005, Chapter 5, for a similar maneuver. In order to prevent the bound reading of *the cat of Mary's* being ruled out incorrectly, such a theory would have to say that this phrase does not rely on a situation variable to be bound but contains a bound individual variable. But there would be two problems with any such theory. Firstly, the formulation of Rule I is a complicated matter, and it is not certain that a version of it could be formulated that would do what is needed here and continue to do the useful work elsewhere that this rule does now; the versions available in the literature at the moment seem not to rule out the bound reading of (40), for various technical reasons that I will not go into. Secondly, it might seem that allowing *the cat of Mary's* to be bound by means of an individual variable ("the cat of Mary's identical to x") risks ceding too much to the syntactic relation variable theory, which, of course, in order to deal with this case, would posit a relation variable with the value "identical to" and a bound individual variable: the syntactic situation variable approach would have to employ some of the resources of the syntactic relation variable approach in order to survive.

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