Verbs of Creation and Depiction: More Events in the Semantics of English

1 Introduction

This paper addresses some problems about the semantics of two groups of transitive verbs that are intensional in certain ways. One group is that of creation verbs, such as 'assemble', 'bake', 'build', and 'manufacture'. The other is that of depiction verbs, such as 'draw', 'sketch', 'caricature', 'sculpt', 'write (about)', 'imagine', and 'fantasize'. Depiction verbs, and creation verbs in the progressive, can form verb phrases with quantified noun phrase (QNP) complements that are not existentially committing, even when the QNP is existential. For instance, Guercino, in his *The Aldrovandi Dog* (*ca.* 1625), may have drawn a dog without there being any dog he drew,[1] and if Jack was building a house but stopped early enough in the process, there neither was nor is a house which he was building. I will argue that a certain general account of notional readings of verb phrases with more familiar intensional transitives, such as search verbs, can be extended to these less famil-

[1] The curators at the Norton Simon Museum have mounted a wall-label for the painting which claims 'this must be the portrait of a specific dog'. But their reasons seemed weak to me.

iar cases, despite the special problems they pose. In addition, the core idea of this general account helps explain the "definiteness effect" as it manifests itself with depiction verbs. Notional readings of depiction-verb phrases are possible only with a restricted range of determiners: Guercino could have drawn *a* dog, though no specific dog, but on the face of it, if he drew *every* dog, it must be that for every dog in a specific domain, such as Aldrovandi's pets, he drew that dog.

2 Event semantics and the unfinished object problem

A familiar problem about the progressive aspect is to provide it with a semantics that does not license the inference from progressive to non-progressive. For instance, from 'Agatha was crossing St. Charles Avenue' it should not follow that Agatha crossed St. Charles Avenue, since Agatha may have decided to board a convenient streetcar when she reached the neutral ground in the middle.[2] In Terence Parsons' event-based semantics for English, the special meaning of the progressive is accounted for by introducing a distinction between an event's *holding* versus its *culminating* (Parsons 1990:170–1). For 'Agatha was crossing St. Charles Avenue' to be true, there must have been a holding of a crossing of St. Charles by Agatha, but holding is one thing, culminating is another, and the former implies nothing about the latter. So if these concepts are explicitly present in the relevant semantic analyses, troublesome inferences will be blocked. For 'Agatha was crossing a street' we have

[2] See (Parsons 1990:167–170) for exposition of this "imperfective paradox".

(1) (some *e:* crossing(*e*))[agent(*e*, Agatha) ∧ (an *x:* street(*x*))
[theme(*e*, *x*)] ∧ held(in progress(*e*))].[3]

Replacing 'held(in progress(*e*))' with 'culminated(*e*)' produces the semantics of 'Agatha crossed St. Charles':

(2) (some *e:* crossing(*e*))[agent(*e*, Agatha) ∧ (an *x:* street(*x*))
[theme(*e*, *x*)] ∧ culminated(*e*)].

(2), as required, is not a consequence of (1).

But (1) implies the existence of the theme. While this is not objectionable in (1) itself, it becomes so if we replace 'cross' with a verb of creation: if Jack *was building* a house when he died and did not get very far, there is and was no house he was building, but if he *built* a house before he died, there is or was a house he built. There is also a use of depiction verbs as verbs of creation, when they are followed by a term for a geometric shape, and in this use they behave in the same way: if Jack was drawing a circle when he died and he had not put more on paper than a semi-circle, there is and was no circle he drew. However, if we repeat the pattern of (1) for these cases, we get:

(3) a. Jack was building a house
b. (some *e:* building(*e*))[agent(*e*, Jack) ∧ (an *x:* house(*x*))[theme(*e*, *x*) ∧ held(in progress(*e*))]]
c. Jack was drawing a circle

[3] I follow the prepositional criteria for thematic roles of (Parsons 1995): Agatha is agent of the crossing because the crossing is *by* her, and St. Charles is theme of the crossing because the crossing is *of* St. Charles. 'In progress' is from (Parsons 1990:171) where it is (almost) recommended.

d. (some *e:* drawing(e))[agent(e, Jack) $\wedge$ (an *x:* circle(x))[theme(e, x) $\wedge$ held(in progress(e))]].

(3b) and (3d) are as committed to a house that was being built and a circle that was being drawn as (1) is to a street that was being crossed.

Parsons' response to this problem is to reject the claim that 'building' and 'drawing' as they are used in (3a,c) are existence-neutral. He writes:

> In northern California one can visit Jack London State Park and see the house that Jack London was building when he died. At least this is what the tourist guides say. It isn't much of a house – only a foundation and parts of some walls. But native speakers of English call it a house…people describe unfinished houses as houses, and my analysis assumes that this is correct usage. (1990:174)

I do not think we can be satisfied with this response. How much has to have been built for an unfinished house to be a house is a vague matter: if someone describes a foundation and parts of some walls as a house, and if nothing of importance turns on whether we say 'house' or 'beginnings of a house', we will be happy to allow 'house'. But accommodation has its limits. The process of building a house starts when the ground is broken: at that point, 'Jack is building a house' is true (or if not at that point, at least when the first brick is laid). However, we would not, except in jest, point to empty ground, or a single brick, and say "there's the house Jack was building when he died".

Secondly, there may be objects for which there is not much vagueness about when they come into existence. 'Circle' has a precise definition, and it might reasonably be insisted that you haven't drawn a circle until you are near to closing the

circumference. It shouldn't be built into the semantics of 'drawing a circle' that this is incorrect, and certainly not that "a semi-circle isn't a circle" is incorrect.

Thirdly, even if we accommodate one description of what the agent is up to, there may be true, *more detailed*, descriptions for which the corresponding existential commitment is implausible. Jack could truly have said "I'm building a three-storey house" if the plans he was intentionally following were for such a house, he had assembled appropriate materials, had the relevant skills, and so on. But on the assumption that the parts of the walls he left do not rise above the knee, I doubt we would say that there is a three-storey house in Jack London State Park. There would have to be something three-storeyish about the standing house-parts to justify this claim.

So it would be preferable to have an account of the progressive which is neutral on existential neutrality, neither requiring it nor forbidding it.[4]

3 Creation verbs as part-time intensional transitives

The behavior of creation verbs in the progressive is reminiscent of the behavior of intensional transitive verbs like 'want', 'need', 'lack', 'seek', and 'owe'.[5] Some inten-

[4] The various semantics for the progressive in (Asher 1992; Glasbey 1998; Landman 1992) embody the idea that the progressive is correct, at least with verbs for goal-directed activities, only when the action described has a modal outcome-property of some sort. For example, in Asher's account, the action has to be of a kind that *normally* leads, in circumstances of the same sort, to an outcome describable with the appropriate non-progressive. So the proposal is to explain the progressive in terms of the corresponding non-progressive. Szabó (forthcoming) goes in the opposite direction, taking the progressive as the basic form (his paper also contains a good critical discussion of Landman 1992). Modal outcome accounts have a built-in solution to the unfinished-object problem, but I do not believe they give a *semantics* for the progressive. However, this is a complicated debate which I will not detour into here.

sional transitives create contexts that resist substitutivity ('want' and 'seek', but not 'need', 'lack' or 'owe').[6] This makes them *hyperintensional*. Some intensional transitives allow complement quantified noun phrases to take a notional rather than a *relational* sense, a distinction that is the main topic of this paper.[7] For example, Gertrude might be looking for a Pharaoh's tomb, but no particular one. This would be made true by mental states of hers which she can be in without any information-link to a specific tomb. Hence she might be looking for a Pharaoh's tomb even if there are no such things (suppose Pharaohs were cremated and their ashes scattered on the Nile). So there is a parallel with Jack, who can be building a house without there yet being a particular house he is building, and thus there need not exist a house he is building. Though it has different grounds, existence-neutrality is a common factor in these cases, which motivates investigating whether the commonality can be exploited.[8]

[5] The idea that creation verbs are intensional transitives is advanced in (Bennett 1977) and given Montagovian flesh in (Zucchi 1999). In (Richard 2001:104), creation verbs are classified as intensional transitives 'in the progressive'.

[6] By substitution-resistance, I mean resistance to substitution of expressions denoting the same object or property; e.g., if you are dehydrated you need water, and therefore need H_2O. But you may want water without wanting H_2O. This definition of 'substitution-resistance' is stronger than resisting substitution of expressions with merely the same extension. Larson (2001: 232) is surely right that if Max is a theater producer assembling the cast of a new musical, he could need more singers and not need more dancers, even if in fact all who sing, dance, and conversely. Being a singer is not the same thing as being a dancer.

[7] I am not giving a unified account of 'intensional'; this would take a separate paper (see Saul 2002). The relational/notional distinction was originally drawn in (Quine 1956), most famously in his comment on '$(\exists x)$(x is a sloop and I want x)' as a regimentation of 'I want a sloop', that 'If what I seek is mere relief from slooplessness, [this regimentation] gives the wrong idea' (1956:185).

[8] There are dissimilarities too. If Gertrude finds a Pharaoh's tomb, there is no inclination to say that it was *that* tomb she was looking for. But in the case of drawing a circle or building a house, if the process is successfully completed, perhaps it was *that* circle one was drawing, or *that* house one was building, at least from the point at which a unique product is determined, which may be earlier than the point at which it exists.

The suggestion is that, for V a standard intensional transitive, the aspect of the semantics of notional readings of V-QNP phrases that permits them to be existentially neutral should be duplicated for V-QNP phrases where V is a creation verb in the progressive. Whether this is feasible depends on what the semantics of notionality is, but I have a particular candidate in mind, for which the proposal *is* feasible. Generalizing an idea of Goodman's (1976), I take notional readings of intensional transitive VP's to be readings that involve a *classification* of some item as an item of a certain kind determined by the QNP, a classification based on general features that are independent of the identities of specific things. Goodman's example of classification is 'picture of a man', which he proposes to construe as 'man-picture', and he writes (p. 22) 'a picture may be of a certain kind—be…a man-picture—without representing anything' (so its being a man-picture is not owed to any specific thing's being a man). However, we need to modify Goodman in two ways. First, the determiner in 'picture of *a* man' cannot be dropped: we want 'a-man picture', not 'man-picture', since 'picture of two men' and 'picture of three men' will be 'two-men picture' and 'three-men picture' respectively. Secondly, Goodman urges (p. 21) that such expressions as 'man-picture' be regarded as 'unbreakable one-place predicates'. But surely the meaning of 'three-men picture' is determined by the meanings of 'three', 'men', and 'picture', together with their (unobvious) mode of combination.

When it is a verb phrase, say, 'seeks a man', rather than a nominal which is in question, the items undergoing classification, or as I shall say, *characterization*,

are typically provided by event-based semantics.[9] Since 'search' is an action verb, this semantics says that "Gertrude searched for a Pharaoh's tomb" makes a claim about a certain event. On Goodman's account of notional readings, the claim is classificatory: a certain search, of which Gertrude is agent, can be classified as being an at-least-one-Pharaoh's-tomb search. Using the standard higher-order analysis of first-order quantifiers, this means, in turn, that it is characterized by the property of being a property of at least one Pharaoh's tomb.[10] Similarly, ascriptions of wants or needs, when notionally understood, characterize a subject's state of desire, or need, in terms of second-order properties.

This combination of event semantics and Goodman's hypothesis allows us to say that a search can have the at-least-one-Pharaoh's-tomb character without any commitment to there being a specific Pharaoh's tomb it is for, or even to there being any Pharaohs' tombs at all. It may sometimes be enough, for instance, that the agent's searching be controlled by an intention that is general *vis à vis* Pharaoh's tombs, an intention expressible by "I am going to find at least one Pharaoh's tomb". (We return to this issue in Section 8.)

To say that an event *e* is characterized by the property of being a property of a Pharaoh's tomb, we introduce a functor **char** which accepts properties of proper-

[9] This semantics is originally proposed in (Davidson 1967); as indicated, I am following the outlines of the implementation in (Parsons 1990), despite the disagreement about unfinished objects.

[10] From the higher-order perspective, "at least one Pharaoh's tomb has been discovered" attributes, to the property of being discovered, the property of being a property of at least one Pharaoh's tomb. For if the property of being discovered has the property of being a property of at least one Pharaoh's tomb, then it *is* a property of at least one Pharaoh's tomb, which means at least one Pharaoh's tomb has been discovered.

ties (the meanings of quantifiers) and produces properties of entities, the entities being events in this case.

(4) a. Gertrude searched for a Pharaoh's tomb

b. **(some(search))λe.agent(gertrude, e) and char(e, a(Pharaoh's tomb)) and culminated(e)**

c. **(some(search))λe.agent(gertrude, e) and (a(Pharaoh's tomb))λx.for(e, x) and culminated(e)**

(4b) is the notional reading of (4a), (4c) the relational.[11] Note that there is nothing "opaque" about the position of **(a(Pharaoh's tomb))** in (4b): **char** does not induce substitution-resistance, for the relational/notional distinction is not the same as the transparent/opaque distinction. There is a transparent reading of 'Gertrude is looking for some water, but no particular water', on which it entails that she is looking for some H_2O, but no particular H_2O, and an opaque reading, on which it does not.[12]

If (5a) below gets a semantics following (4b), then it is consistent with there not being any house Jack built, the desired result:

(5) a. Jack was building a house

[11] In (4b,c) we write **p and q** for **and(q)(p)**, and use familiar relational notation for atomic formulae: **R(x, y)** in place of $\mathbf{f_R(y)(x)}$. Strictly, (4c) implies the Pharaoh's tomb in question still exists, but we will not bother with the niceties needed to avoid this. The contrast between (4b) and (4c) shows that the ambiguity in (4a) is not a scope-ambiguity at the "sub-atomic" level (Parsons 1990:8–9), though it may be at the "atomic" level.

[12] See further (2000:165–7; Recanati 2000:130–33). Opacity requires the presence of a hidden indexical which makes a deferred ostension *via* a word to a way of thinking. The extra complexity incurred by adding this apparatus would be pointless here, so all our notional readings are transparent.

b. **(some(building))λe.agent(jack, e) and char(e, a(house)) and held(in_progress(e))**

This says that Jack is the agent of a building event characterized by the property of being a property of a house: an at-least-one-house building, for short. One can be the agent of such an event without there ever existing any house that was built. On the other hand, the *relational* reading of (5a) follows (4c), except that in place of the relation **for** that is idiosyncratic to search verbs, we use the standard thematic relation **theme**, and (5b)'s conjunct **char(e, a(house))** is replaced with **some(house)λx.theme(x, e)**. According to this account, the characteristic feature of the notional reading is that the transitive verb's complement is no longer associated with a thematic relation.

One feature of (4b) which facilitates its generalization to (5a) is that there is no function in (4b) whose lexical meaning is in tension with the meaning of its argument. In a purely Montagovian approach to intensional transitives, whether that of (Montague 1974) or a version with flexible types, such as (Partee 1987), the quantifier meaning is itself the argument to the verb meaning in notional interpretations. In effect, this puts Gertrude in the searching relation to a property of properties (as opposed to an ordinary object). Extending this to (5a) puts Jack in the building relation to a property of properties, as in (Zucchi 1999:187–190). These consequences of the semantics are not necessarily nonsensical, but they do raise the question how a material object and a property of properties can equally be what a search is for or a building-event is of.[13] A philosophical explanation is

required of "what it is" to stand in the searching relation or the building relation to a property of properties, one that makes it credible that 'search' and 'build' are used univocally with both singular and quantified NP complements.[14] But our (4b) and (5b) avoid any hint of such equivocation, since in them the syntactic complement of the verb is not interpreted as specifying a filler of a thematic role.

According to (5b), one part of (5a)'s notional semantics reflects the presence of the progressive, namely, **held(in_progress(e))**, while a different part, **char(e, a(house))**, allows for existential neutrality in (5a)'s QNP-complement. This is *not* an excess of apparatus. The progressive *per se* does not bring with it a potential for neutrality, as (1) shows: if Agatha was crossing a street, there must have existed a street which she was crossing. Nor is the potential for neutrality *restricted* to the progressive form, as standard intensional transitives show, for instance in (4a).

There remains a question about logical relationships between progressive and corresponding non-progressive sentences. (5a) appears to be some kind of consequence of 'Jack built a house', and the same would be true for any verb whose associated events are non-instantaneous (whatever that excludes – even 'the red ball collided with the green ball' seems to entail its progressive counterpart). And

[13] Zucchi (1999:189–90) introduces the extensional counterpart $\mathbf{theme}_*$ of **theme** to state the semantics of non-progressives. But for progressives he still employs the puzzling $\mathbf{theme(\lambda P.\mathcal{Q}(P), e)}$.

[14] In the standard textbook on Montague Grammar, Dowty *et al.* (1981), the authors betray some discomfort with this aspect of the semantics. They write (216–7): 'The formula…asserts that John stands in the "**seek**-relation" to, *as it were* [my emphasis], the property of being a property that some unicorn has. We must now try to understand exactly what the interpretation of this formula is…Why does this semantical object have to be such an incredibly abstract thing…?' Initially, it seems the authors are going to face the univocality problem, but as the last query indicates, they slide into mere repetition of the technical reasons why Montague took the quantifier meaning to be the semantic complement of the verb.

if we have

(6) a. Jack built a house

b. **(some(building))λe.agent(jack, e) and (a(house))λx.theme(x, e) and culminated(e)**

we see that the inference from (6a) to (5a) is not purely logical, as the need to allow for the possible case of instantaneous events suggests it should not be. Rather, we require a meaning postulate which says that whatever culminates was in progress (or, whatever culminates and had duration was in progress).[15]

But this is not enough: we also need a way of converting the relational thematic role assignment in (6b) into the notional characterization of (5b). We need to be able to say, for example, that if some event of building culminates in the creation of a house, then that event is an a-house building. But it might be objected that the outcome of an event of building could be a mismatch for the intentions driving it. Perhaps Jack was trying to build a fence, and somehow a house resulted. In a more realistic case, perhaps he was trying to draw a circle and an oval resulted. Would these not be cases where the event culminates in the creation of an *F*, while the event itself does not possess the *an-F* character, but is characterizable in an incompatible way?

This is not an issue we should feel obliged to settle. For if someone holds that a drawing event can be characterized by the property of being a property of a cir-

[15] See (Szabó 2003) for a more general discussion of inference from non-progressive to corresponding progressive forms.

cle, even though it results in the creation of an oval, they should *also* object to the inference pattern exemplified by (6b)-to-(5b): an oval was drawn, but the agent wasn't drawing an oval, rather a circle. So the dispute over the correctness of a meaning-postulate relating items in our semantics for (5b) and (6b) turns out to be matched exactly by a dispute about the correctness of the ordinary language inference (6a)-to-(5a). That this parallel exists is some vindication of the semantics proposed in (5b).

4 Depiction verbs: propositionalism

The use of depiction verbs as creation verbs in the way illustrated by (3c) is a special use. One who draws a circle thereby brings a real circle into existence, but one who draws a dog does not thereby bring a real dog into existence.[16] What is actually involved in depiction is a complicated question that we will not go into here.[17] But depiction verbs appear to be intensional transitives quite unrestrictedly. They are even hyperintensional, granted that to caricature Jekyll is not to caricature Hyde (Peacocke 1987:399–400). However, our focus is on the relational-notional distinction, on what it means to say, for example, that Guercino drew a dog, but no particular dog. It will turn out that the case of depiction verbs in the

[16] A *drawing* of a dog may be brought into existence. It is presumably for this reason that Moltmann (1997:48–49) includes depiction verbs in her class of creation verbs. Also, depiction verbs would be creation verbs if the notional meaning of 'Guercino drew a dog' is literally 'Guercino drew an image of a dog', a view I do *not* hold ('a dog' still needs to be explained).

[17] According to (Peacocke 1987), an *F*-depiction is something which, when viewed in appropriate conditions, is presented in a region of the visual field experienced as similar in relevant respects (for instance, shape) to one in which it is possible for an *F* to be presented. Agree or disagree with the details of this, its level of complexity is likely unavoidable.

progressive forces certain complications on the general analysis, given our proposed treatment of the existential neutrality induced by the progressive in creation verbs. But before pursuing this, I consider a semantics of depiction verbs based on a very different overall approach to intensional transitives than the one illustrated in (4).

According to this account, 'transitive' is a misnomer. If we use such a verb to ascribe an attitude, the ascription we make is really a *propositional* attitude ascription: though the syntactic complement of the verb may appear to be a noun phrase, there is covert material which, when made explicit and combined with NP, forms a complement clause that we can associate with a complete proposition. Let us call this view *propositionalism*. Recent versions of it are advanced in den Dikken *et al.*, 1996; Parsons 1997; Larson 2001; and Fodor and Lepore 2002. The original version is Quine's (1956) proposal that my seeking a unicorn is my trying to find a unicorn, or in non-Quinean lingo, my trying to make-true the proposition that I myself find a unicorn. On this view, then, notional readings of V-NP combinations correspond to logical forms in which the NP-meaning is a constituent of the proposition that is the genuine semantic complement of the verb.

Whatever the merits of Quine's account of search verbs (*cf.* note 21), the obvious challenge in extending it to depiction verbs is to say what the covert material is which, along with the visible QNP, makes a clause with which a complete proposition can be associated. On the face of it, such a project for mental depiction verbs is wrong-headed, since it appears to demand a reduction of imagistic imag-

ining to propositional.[18] But we should look at the details of specific proposals.

Clearly, we do not want the covert material to constitute a *philosophical analysis* of depiction, since this would create an excess of both structure and conceptual sophistication (*cf.* note 17). The candidate *invisibilia* must be quite simple. In addition, they must be straightforwardly third-person accessible if certain epistemological and semantic constraints are to be satisfied. This accessibility requirement causes problems for a proposal in (Larson 2001:233), that for verbs of depiction, "the transitive form typically corresponds to a 'small clause' construction containing an overt subject and a bare predicate". Larson illustrates this with 'visualize':

(7) a. Max visualized [a unicorn].
b. Max visualized [a unicorn in front of him].

Here the small clause 'a unicorn in front of him' can be associated with the proposition that a unicorn is in front of Max. But Max could just as well have visualized a unicorn above him, beneath him, or to the side of him (*cf.* 'imagine an aeroplane'), and only Max will know which is the correct description of his visualization. So if he informs his audience 'I am visualizing a unicorn', the audience cannot grasp what he is saying, since it does not know which proposition is the full semantic complement of 'visualize'. But in the normal case, an audience *would* know that Max is saying that he is visualizing a unicorn.[19]

[18] In discussion, Barbara Partee remarked that she could not imagine a five-dimensional cube, but imagining that *p*, for some propositions *p* mentioning a five-dimensional cube, seemed feasible.

The semantic constraint has to with negation. If the covert material is not accessible to the audience, that likely means that there are genuinely different alternatives. But then negation will be mishandled. For instance, the sentences in (8),

(8) a. Max is not imagining an aeroplane
b. Max is not imagining an aeroplane in front of him

clearly do not mean the same, since (8b) is true if Max is imagining an aeroplane above him, but (8a) is false in that case.

One response to these problems is to make the covert material much more general (to handle the negation problem) and accessible (to handle the epistemological problem). For instance, we might replace (8b) with 'Max visualized [a unicorn [spatially related to him]]'. Parsons (1997:376) makes a proposal about 'imagine' that is of this type, equating the statements in (9):

(9) a. Mary imagined a unicorn
b. Mary imagined a unicorn to be.[20]

This does appear to deal with the epistemological problem, since every compe-

[19] The covert material must also have some kind of determinacy, which can be lacking even in cases which are at first sight easier for the propositionalist. If Max expects a bus, does he expect a bus to *appear* or to *arrive* or to *materialize out of thin air?* If we see him peering into the distance when he says he expects a bus, we would choose 'appear', but the propositionalist must say that without such clues, we cannot fully understand his "I'm expecting a bus". A proposal in Den Dikken *et al.* (1996:336) might get round this, since in effect they interpret 'Max expects a bus' as 'Max expects some event involving a bus to occur'. But if Max expects a bus to dematerialize into thin air, then he is expecting some event involving a bus to occur, yet 'Max is expecting a bus' is not made true by his expecting a bus to *de*materialize.

[20] Parsons has indicated (p.c.) a preference for the formulation 'Mary imagined there to be a unicorn', which has the advantage of being grammatical for mental depiction verbs, if not for physical ones (? 'sculpted there to be a unicorn'). I believe the objections I raise here to (9b) also apply to this alternative formulation.

tent speaker may implicitly know about the covert infinitive. But the proposal does not handle the semantic problem. The statements in (10),

(10) a. Mary didn't imagine a unicorn
b. Mary didn't imagine a unicorn to be

do not have the same content, since (10b) leaves it open that she imagined a unicorn without imagining it to be. With other depiction verbs, this may even make immediate sense: it could be clear from a painting entitled 'Mary imagining a unicorn' that the depicted unicorn is a figment of Mary's imagination, and so it is not drawn *as existing*. It is implausible that the semantics of depiction verbs makes 'drawn, but not drawn as existing' contradictory.

There is also some evidence against the presence of 'to be' as proposed in (9b) for (9a). For when it is explicitly present, it generates attachment ambiguities that are not detectable when it is supposed to be implicitly present. Thus, in

(11) a. Mary imagined a unicorn yesterday
b. Mary imagined a unicorn to be yesterday

we find a Parsonian reading for (11b) that is unavailable for (11a), namely that the content of what Mary imagined was that there were unicorns in existence yesterday. Notionally interpreted, (11a) must mean either that her act of imagination took place yesterday, or that, perhaps earlier today, she imagined a unicorn as one was yesterday (which, we may suppose, was a good day for unicorns). And this last reading is not available for (11b). This is not a conclusive objection, of course.

When readings are absent though they might be expected in the light of a proposed semantics, the semantics can always be defended by giving a plausible explanation of *why* they are absent. However, the "missing readings" problem is one which arises in many areas for propositionalism, and I am not aware of a convincing solution to it in any of its manifestations.[21]

Another way to abstract the problematic specificity of the likes of (7b) is to generalize existentially. If there is syntactic structure in V-NP corresponding to V [NP XP], perhaps the semantic correlate of XP is a second-order variable bound by an existential quantifier. There are different ways of implementing this idea:

(12) a. Mary imagined a unicorn
b. Mary imagined a unicorn being some way
c. **imagined(mary, (some)λX.a(unicorn)(X))**

[21] 'Ernest was trying to find lions before lunchtime' has both *trying-before-lunchtime to find* and *trying to find-before-lunchtime* readings, while 'Ernest was hunting lions before lunchtime' only has the *trying-before-lunchtime to find* reading, which lacks the implication that Ernest had a deadline. Partee (1974:99) takes such absence of ambiguity to be evidence against propositionalism about search verbs. Larson (2002:235–40) replies that there is a syntactic mechanism which explains the absence of ambiguity. Search and desire verbs are said to undergo a process of "incorporation" with the implicit verb, producing the likes of 'want-have' and 'try-find'. But certain examples from German suggest that 'independent temporal specification in the complement' of 'try' is not allowed, and this would explain the absence of the *trying to find-before-lunchtime* reading. According to Wurmbrand (Larson 2002:262), (i) Hans versuchte Maria in zwei Monaten in Wien zu besuchen, i.e., (ii), Hans tried to visit Maria in Vienna in two months, is unacceptable. However, (ii) is not *ungrammatical*, it is simply peculiar, because it is not obvious what action could constitute an attempt made yesterday to visit Maria two months in the future. But suppose Hans has a time machine, which works unreliably. Or, suppose he was trying, as he would put it, to visit Maria on her birthday, not realizing that her birthday is not for two months. The speaker, who does realize this, uses 'in two months' purely referentially. And German speakers whom I have queried tell me that (i) is no more anomalous than (ii). To be sure, there *can* be attachment ambiguities in search-verb phrases, but they do not support propositionalism. 'Hans is looking for a dog in the garden' has a reading that is true if Hans is in the garden, looking for a dog over the fence in the street, and a reading that is true if Hans is in his house, looking through a window for a dog located in the garden. Though we could insist on explaining the latter reading as 'looking to find a dog in the garden', there is no *need* to do so, since 'looking for a dog located in the garden' is available.

d. for some way (of being), Mary imagined a unicorn being that way
e. **(some)λX.imagined(mary, a(unicorn)(X))**.

But is there any reason to believe that this extra quantificational structure is actually present? It is not obvious how to choose between (12c) and (12e), and there is no trace of an ambiguity in (12a) reflecting these alternatives. Similarly, in "Mary didn't imagine a unicorn", there is no ambiguity reflecting different relative scopes for **some** and **not**: we do not have readings with narrow-scope negation. Nor is the original negation problem clearly circumvented with wide-scope **not**. For example, it may be that for no way of being does Mary imagine a unicorn being that way, but it looks as if it needs some argument to get from this to "Mary doesn't imagine a unicorn".

A second complication is that with plural quantifiers, predication may be either distributive, as in (13b), or collective, as in (13c):

(13) a. Mary imagined five unicorns
b. Mary imagined five unicorns running
c. Mary imagined five unicorns around a lion.

But (13a) – which we will assume concerns a single act of imagining – does not have two different senses, reflecting distributive versus collective predication. (12c,e) require distributive predication of (12a). But suppose (13a) is true *because* (13c) is true. If (12e), say, is the general case, it will have to be maintained that whenever one appropriate clausal complement of a depiction verb involves collective predication, there is always another one to hand with distributive predica-

tion. In the case of 'imagine' at least, this makes some assumptions about the determinacy of mental imagery, unless we say a Parsonian candidate always holds, for example, 'Mary imagined five unicorns self-identical'.

Following the pattern of either (12c) or (12e) for (13a) results in the property quantifier taking scope over 'five unicorns'. So there has to be some way all five are imagined as being. Again, we have the option of simply insisting that, even if the thinker claims to be imagining each unicorn different from all the others, there will be one way all five are imagined as being, say, the disjunction of the five ways the thinker might cite. Or perhaps self-identity can come to the rescue again. This gives us a reason to lower **(some)λX**, though the result, like the other candidates in (12), fares no better than (9b) with the attachment problem in (11). There is also a question whether these formulae make much sense, since they appear to identify the unproblematic act of imagining a unicorn with, say, the act of imagining that some property is a property of a unicorn. In other words, the small-clause syntax does not avoid a reduction of imagistic imagining to propositional.[22]

[22] Depiction verbs are not even the hardest case for propositionalism, a title that belongs to the class of *evaluative* verbs, such as 'fear', 'disdain', 'respect', 'admire' and 'worship' (verbs whose corresponding noun can fill the gap in 'worthy of_' or 'merits_'). It is non-trivial to find a clausal paraphrase of the referential NP-complements of 'fear', because vapid predicates like 'is (spatially related to)' and 'is self-identical' obviously do not preserve equivalence (except for the exceptionally timid), and anything more substantial will inevitably fail to be sufficient, since the extra subject-matter will have the potential to displace the referent of NP as the focus of the fear. For example, fearing *x* is not the same as fearing *encountering x*, since you might fear encountering *x* without fearing *x* himself, say if *x* is known to have SARS. Nor is fearing *x* the same as fearing *x* will hurt you, since you may fear *x* will hurt you but not fear *x*, say if *x* is your incompetent dentist. In these cases it is the encounter and the hurt that are the object of the fear, as opposed to the person *x* himself. Though it is always dangerous to wager a blank cheque against the future, I do not see any prospect of a way round this problem for propositionalism.

5 Depiction verbs: a non-propositionalist alternative

Perhaps, to paraphrase Churchill on democracy, propositionalism is the worst semantics for intensional transitives, apart from all the others. But the semantics for creation verbs in the progressive that (5b) illustrates applies with equal naturalness to depiction verbs and their associated relational nouns – indeed, it was for depiction verbs that Goodman made his proposal to construe the notional as classificatory. So as a first approximation, we would have:

(14) a. Guercino sketched a dog (but no particular one)

b. **(some(sketching))λe.agent(guercino, e) and char(e, a(dog)) and culminated(e).**[23]

According to (14b), (14a) means that some act of sketching by Guercino is characterized by the property of being a property of a dog. However, it is dubious that (14a) says that the *sketching* is characterizable in a certain way: intuitively, it is the sketch that has the character, not the sketching. Moreover, in §3 we used event characterization to avoid the implication that processes of creation invoked by creation verbs in the progressive always bring something into existence. And a depiction verb used in the progressive has a similar non-implication: if Guercino was sketching a dog, and gave up sufficiently early on, then no sketch of a dog ex-

[23] For simplicity, I do not put 'but no particular one' explicitly into the semantics, in the form 'no dog is a theme of *e*'. However, there is a good argument that such a clause *is* required, and that (14b) only expresses something *neutral* between a relational construal of 'Guercino sketched a dog' and the explicitly anti-relational (14a), in the way that inclusive disjunction stands between conjunction and exclusive disjunction. Even if you disagree with the Norton Simon curators that *The Aldrovandi Dog* is the portrait of a specific dog, it seems that there is still something (non-disjunctive) that you and they agree on, that Guercino drew a dog. See further (2000:177–179; 2003:§2).

ists. This is quite distinct from the matter of whether or not there is a particular dog he was sketching. But if event-characterization is already reserved for capturing a special feature of the progressive, how will we represent the notionality of (14a)? We cannot do it one way when the progressive is used, but a different way when aspect is perfective.

The solution is to embed a characterization within a characterization, employing a light 'make' or 'do': to sketch a dog is to *make* a sketch *of* a dog. In the semantics, the light verb becomes a predicate of events, and for the progressive 'be making/doing', this event is characterized by a property of properties. With physical depiction verbs, the property of properties is given by a QNP inside an NP which is headed by a relational noun corresponding to the depiction verb, '[$_{\text{NP}}$sketch [$_{\text{PP}}$of [$_{\text{QNP}}$a dog]]]' for (14a). Semantically, using Goodman's idea, when the embedded PP is understood notionally, we are classifying the sketch as an a-dog sketch. The semantics of 'a-dog sketch' would be straightforward if 'a dog', normally of type $(ib)b$, could shift its type to that of subsectives, $(ib)(ib)$.[24] But such a shift could not be defined type-theoretically.[25] Instead, we should use **char**:

(15) a. sketch of a dog

[24] I use i for the type of individuals (e is reserved for events) and b for the boolean type of truth-values. A (first-order) QNP takes a property of individuals and produces a truth-value in accordance with the rule for the determiner of the QNP. For instance, **a(dog)** maps **λx.sing(x)** (or just **sing**) to $\top$ iff $\{\text{dogs}\} \cap \{\text{singers}\} \neq \emptyset$. The input **sing** is of type ib and the output **(a(dog))sing** is of type b, so **a(dog)** is of type $(ib)b$. A subsective adjective, such as 'small', combines with a nominal, such as 'elephant', to make a complex nominal, such as 'small elephant'. 'Small elephant' and 'elephant' are both of type ib – each maps individuals to truth-values – so 'small' takes an ib into an ib, and is therefore of type $(ib)(ib)$.

[25] See (Partee 1987) for a general discussion of NP type-shifting. In this context a subsective meaning for 'a dog' would be in the same territory as Peacocke's account of depiction (*cf.* note 17).

b. sketch which is characterized by the property of being a property of a dog

c. **[which(λx.char(x, a(dog)))](sketch)**.

λx.char(x, a(dog)) is of type *ib*, and maps to ⊤ exactly those things *x* which are characterized by the property of being a property of a dog. **Which** accepts inputs of type *ib* and produces outputs of subsective adjectival type (*ib*)(*ib*);[26] this output, when applied to **sketch**, maps to ⊤ exactly those sketches which are characterized by the property of being a property of a dog; that is, those sketches of a dog, but no particular dog. Thus there is no need to defend Goodman's 'unbreakable monadic predicate' thesis, for we have a compositional account of the prenominal modifier use of the QNP, one which easily accommodates conjunctions and disjunctions of QNP's.

With physical depiction verbs in progressive aspect, **char** will be used twice, to characterize the event of making and the item made. For example, the notional reading of 'Guercino is sketching a dog' (= 'Guercino is making a sketch of a dog') says Guercino is the agent of a making which is characterized by the property of being a property of the following: a sketch which is characterized by the property of being a property of a dog.

(16) a. Guercino is sketching a dog

b. **(some(making))λe.agent(guercino, e) and char(e, a([which (λx.char(x, a(dog)))](sketch))) and holds(in_progress(e))**

c. Guercino sketched a dog

[26] See the discussion of **rel** in (Carpenter 1997:200–206).

d. **(some(making))λe.agent(guercino, e) and a([which (λx.char(x, a(dog)))](sketch))λy.theme(y, e) and culminated(e).**

(16d) has the appropriate existential commitments, to the sketch that was made, but not to any dog that was sketched: it says only that a sketch which was characterized by the property of being a property of a dog was a theme of the making.

Perhaps it seems unlikely that the same semantic device, **char**, can capture the special features of creation verbs in the progressive as *well* as those of intensional transitive VP's notionally interpreted. But it is not so improbable when one bears in mind that, e.g., neither (4a), "Gertrude searched for a Pharaoh's tomb", nor (5a), 'Jack was building a house', is made notionally true by some specific entity standing in a thematic relation to an event of searching or building. In both cases, merely action-guiding intentions of the agents can make the events ones of, respectively, searching for a Pharaoh's tomb and building a house.

Char should also be used for notional readings of mental depiction-ascriptions. But for these, it seems a simpler approach suffices. That is, 'Guercino imagined a dog' would be interpreted by (14b) with **imagining** in place of **sketching**. This reflects the fact that it is only with physical depiction verbs that we require two *loci* of characterization to allow for extra existential neutrality deriving from use of the progressive: 'Guercino imagined a dog' has no existence entailment that 'Guercino was imagining a dog' lacks.[27]

[27] The same holds for 'Mary was looking for a dog'. With other groups of intensional transitives, either progressive uses or notional readings are hard to come by. For example, the evaluative 'Mary is admiring a dog' appears to lack a notional reading, while 'Mary owes me a dog', like statives in general, does not have a natural progressive counterpart.

A predictable objection to (16b,d) is that they are extensional, and so, for instance, **char(a(P))(x)** = **char(a(Q))(x)** if it happens that **P** = **Q** (**phoenix** = **manticore**, so a drawing of a phoenix is a drawing of a manticore). This is undesirable, but can be avoided in many ways. To pursue the details would take us too far afield, but one strategy is to "intentionalize" the semantics of the formulae in (16) using the intentional logic of (Thomason 1980); see further (2000).[28]

A more pressing objection is whether the dethematized function we are imputing to the quantifier in (16b,d) is consistent with the types of unbound anaphora that are evidently possible for notional readings. For most intensional transitives, such anaphoric pronouns must themselves be in an intensional context. Thus we can have (17a) but not (17b) if 'seeks a gorgon' is read notionally:

(17) a. Perseus seeks a gorgon. It must be mortal, because he has to kill it.
b. Perseus seeks a gorgon. It is mortal.

(17b) is an acceptable discourse, but if 'it' is anaphoric upon 'a gorgon' then a relational reading of 'Perseus seeks a gorgon' is forced. By contrast, with depiction verbs, pronouns anaphoric on NP's in notional readings may occur extensionally:

[28] Another objection is that an account that focusses on singular indefinites does not generalize to quantifiers for pluralities. There are two different types of situation that would make 'Guercino drew several dogs' notionally true: in one he makes a drawing which has several dogs in it, in the other, he makes some drawings, none of which has several dogs, but there are several collectively (if necessary for notional readings, assume he never drew the same dog twice). This distinction seems to correspond to a semantic ambiguity in notional 'Guercino drew several dogs', and our current approach only works for the one-drawing-of-several reading. However, we can capture the multiple-drawings truth-condition by saying that these drawings are cumulatively or collectively characterized by the property of being a property of several dogs, or a related property of higher type, for which we would introduce a non-distributive version of **char**. The details would depend on exactly what account of collective predication we adopt.

(18) Guercino drew a dog (he just made one up). It was a boarhound.

So there are two issues. One is whether a QNP that is an argument to **char** can anchor a pronoun, as the acceptability of (17a) requires. The other is how we account for the special feature of depiction verbs illustrated in (18).

To avoid being bogged down in extraneous issues about unbound anaphora, I will simply follow (Evans 1977) in taking an unbound anaphoric pronoun to have its interpretation given by a definite description recoverable from context, though with examples like (17a) in mind, I will suppose that the description does not merely fix the reference of the pronoun, but gives its meaning (see Neale 1990:188). However, I will also take it that the interpreting descriptions are all of the form 'the N in question' or "the N's in question" or "the N or N's in question", competent speakers (somehow) knowing which is right for which cases. To illustrate: in Neale's kinder, gentler, rural world (1990:226*ff.*), every farmer who owns a donkey vaccinates it, and on the assumptions just adopted, this means that every farmer who owns a donkey vaccinates the donkey or donkeys in question. In general, for N the interpreting descriptions use the head noun of the anchoring QNP, and the 'in question' is spelled out in different ways in different examples, in accordance with principles whose systematic formulation will not be attempted here.

On the face of it, our semantics for notional readings accommodates the anaphora in (17a). For there is nothing especially problematic about

(19) Perseus is agent of an a-gorgon search. The gorgon in question must be mortal.

In (17a) and (19), 'must' expresses a necessity operator which can see only worlds in which Perseus' search culminates successfully ('has to' is a similar deontic necessity). Within the scope of this operator, the interpreting description would be 'the gorgon in question', alluding to the gorgon that is the theme of the finding that concludes the search successfully in the world of evaluation.[29] But since there is no intensional context in the second sentence of (17b), then in any evaluation of the whole discourse, 'the gorgon in question' must interpret the pronoun with respect to the world of evaluation of the first sentence. Hence the obligatory relational reading.

Things seem to be different with (18). Since no particular dog is drawn, *which* dog is the dog in question? One might take the second sentence to say that the dog-image in question is an a-boarhound image, an image characterized by the property of being a property of a boarhound. But the second sentence of (18) says nothing directly about images. A better account exploits another respect in which depictive acts are creative. Not only is a physical depiction brought into existence, but something we can call *the world of the picture* is created by the artist. The first sentence in (18) tells us that Guercino made an a-dog drawing. This tells us that in the world of his drawing, there is a dog. It is *that* dog that is the dog in question.[30] Of course, in the world of the picture there may be many dogs, but for the use of 'it' to be successful in the context in which the discourse occurs, one of those dogs

[29] See (Ludlow 1994) for a general approach to modal subordination along similar lines.

[30] This accounts predicts, it seems correctly, that we should have no problem with the discourse 'Guercino drew a dog yesterday. He drew it again today' in which the first sentence is understood notionally. Yesterday he made up a dog. Today he reproduced the dog he made up yesterday.

must have some kind of salience. A similar account works for a discourse beginning 'Guercino imagined a dog', since we can speak of the world of Guercino's imagination. 'Seeks' makes nothing similar available for (17b); at best we might suppose that Perseus keeps a mental image of the visual appearance of the type of gorgon he would like to find in the forefront of his mind as he searches. But then the interpretability of the pronoun in combination with a notional reading of 'Perseus seeks a gorgon' is based on the contents of an imaginary world, as in the case of depiction.

6 Negative quantifiers

In (16b,d) the quantifier **some making** has wide scope, requiring depictive activity on Guercino's part. An obvious question is whether such an analysis can be extended to notional readings featuring QNP's with negative (right-downward-entailing, 'RDE' for short) determiners. (16d) is suggestive of

(20) a. Guercino sketched no dogs[31]

b. **(some(making))λe.agent(guercino, e) and a([which (λx.char(x, no(dogs)))](sketch))λy.theme(y, e) and culminated(e).**

But according to (20b), (20a) requires that Guercino have *made* a sketch in which no dogs figure. Therefore, if he never sketched anything in his entire life, (20a) is false. But isn't (20a) rather *entailed* by Guercino's not ever having sketched any-

[31] The notional reading (intended) implies that dog-figures are absent from the sketch; the relational reading merely says that no dogs in the domain are reproduced in the sketch, which is insufficient to make the sketch dog-figure-free (insufficient to make **char(the sketch, no dogs)** true).

thing? Other examples include 'Max bet no money' (Richard 2001) and 'Max worships no false gods'; or most clearly, 'Guercino sketched no dogs, he just froze', which, on the pattern of (20b), is a contradiction.

These examples motivate a treatment of the determiner 'no' on which it decomposes into 'not…some', where 'not' has scope over the intensional verb. (20a) is then equated with "Guercino didn't sketch a dog/any dogs":

(21) **not[(some(making))λe.agent(guercino, e) and a([which (λx.char(x, a(dog)))](sketch))λy.theme(y, e) and culminated(e)].**

(21) is true if Guercino never sketched anything at all, and true on a specific occasion if on that occasion he just froze.[32] Apparently, then, 'no' makes for no fundamental problem for our approach.

But problems arise with other RDE determiners. In view of the fact that 'no A are B' entails 'no more than *n* A are B' for every natural number *n*, we might expect the overall semantics to justify such inferences as

(22) Guercino sketched no dogs, therefore, Guercino sketched no more than one dog.

But if the semantics of the conclusion in (22) follows the pattern of (20b), with a leading **some(making)** and a constituent **char(x, no more than one dog)**, then the conclusion will not follow from the premise on the premise's proposed decomposition in (21).

[32] As this surfacing of 'occasion' indicates, context generally imposes restrictions on which events "count" as far as truth-value is concerned, but I am suppressing the contextual parameter.

We might advocate different approaches to 'no' and other negative determiners, abandoning inferences like (22) when premise and conclusion are read notionally. But it is hard to believe that 'sketched no (more than zero) dogs' fails to entail 'sketched no more than one dog' though the latter does entail 'sketched no more than two dogs'. Extending the decompositional approach to other RDE determiners seems like a better idea.

However, Richard has shown that decomposition of negative determiners (equivalently, raising the 'not' of 'not more than') in notional readings is not meaning-preserving. In his 'Literary Example' (2001:113–4), such decomposition is shown to lead to contradiction:

(23) a. Odile seeks a man who has read Proust and a man who has read Gide, but is indifferent between finding one man who has read both versus two men who have each read a different one
b. Odile seeks more than one man
c. Odile seeks no(t) more than one man
d. Not: Odile seeks more than one man.

Given the indifference clause in (23a), it follows that (23b) and (23c) are both false. But by decomposition, (23c) and (23d) mean the same. Therefore (23b) and (23d) are both false, which is impossible.[33]

[33] With depiction verbs the closest analogous examples involve indeterminacy rather than indifference. Thus 'Stevenson wrote about at least two men' and 'Stevenson wrote about at most one man' would both be untrue if nothing in the story indicated whether or not Jekyll is Hyde and if Stevenson had not decided himself. And we can imagine a cubist still-life, not based on an arrangement of real things, in which there is no fact whether one bottle or two is on the table, the artist not having decided either. With these cases, however, we have the option of a non-classical indeterminacy which can be the status of both p and $\neg p$.

The lesson of the case is that (23d) does not entail (23c): (23c) is false *ex hypothesi*, and (23d) is true since it is the negation of (23b). Our semantics is well-positioned to explain this lack of entailment, since (23d) shares an overall form with (21), and (23c)'s non-decompositional semantics is like (20b). The example shows, therefore, that a higher negation cannot be lowered into a quantifier which is first argument to **char**. (The negation in (23d) has widest scope, but there are other places where boolean negation can be inserted in (16d), and lowering from these is ruled out as well.)

However, rejecting decomposition for RDE determiners *tout court* would not automatically secure such inferences as notional (22). The problem is that when a quantifier occurs as the higher-order argument to **char** we cannot apply ordinary quantificational logic to its determiner (this holds for all determiners, not just negative ones). Instead, we need a special meaning-postulate. One which suffices in this context is that for every property of properties $\mathcal{Q}$, if **char(x,** $\mathcal{Q}$**)** and $\mathcal{Q} \subseteq \mathcal{Q}'$, then **char(x,** $\mathcal{Q}'$**)**. Extensionally, properties of properties are sets of sets, so this produces the desired results: the set of all sets containing no dogs is a subset of the set of all sets containing no more than one dog, so (22) is validated.[34]

Finally, we need to address the intuitions that originally motivated decomposition of 'no dog', that if Guercino never sketched/wagered/worshipped anything, he sketched no dog, bet no money, and worshipped no false gods.

[34] Depiction verbs do not permit "conjunctive-force" readings of disjoined-QNP complements, so the closure principle suggested here is as much as we need right now. But something more complicated is required for a uniform treatment of all groups of intensional transitives within Thomason's intentional logic. See (2003) for discussion.

To begin with, it is worth noting that some examples naturally go the other way. A boxing referee who wants no biting seems not merely to lack the desire that the contestants bite each other, but to have a positive preference for a clean fight. So not wanting anything would not entail wanting no biting, on this construal.[35]

The most likely resolution of all the evidence is that sentences such as (20a) and (23c) are semantically ambiguous. They have readings on which the negative determiners remain part of a QNP that characterizes some event or state, and they have decomposed readings. A reading of the first sort for (23c) is promoted by the conditions of Richard's case: it is given that Odile is making a search, and the question is how to characterize it. In other examples, the decomposed reading will be strongly favored, especially when it is difficult to make sense of the non-decomposed one. For example, minimalism apart, it is not clear how 'Guercino sketched nothing' could be a literally true description of a sketch he did, so we interpret it as 'Guercino didn't sketch anything' and hear it as entailing 'Guercino sketched no dogs': when the premise is decomposed, it is natural to do the same with the conclusion. In fact, arguments like (22) are logically valid when premise and conclusion are decomposed, and semantically valid (not refuted by any model satisfying the meaning-postulates) when neither is; they fail only when premise and conclusion are treated differently.

In this respect, notional readings are like relational ones and analogous cases

[35] This example is debatable. Seuren (1974:184) takes it that "I don't want any biting" is ambiguous between a positive preference reading and a wide-scope negation reading. I am assuming that decomposition would give the wide-scope negation reading, otherwise no decomposition has taken place. See also (Horn 2001:308–330).

with extensional verbs, where one possible reading asserts the occurrence of an event and the negative quantifier says what is not its theme, while the other reading involves an initial negation with scope over the event existential. For example, 'Mary touched nothing' can be interpreted in the second way as 'Mary didn't touch anything' ($\neg\exists e \ldots \exists x \ldots$), or equivalently, 'nothing is such that Mary touched it' ($\neg\exists x \exists e \ldots$). But a reading in which an existential event-quantifier has widest scope ($\exists e \ldots \neg\exists x \ldots$) is unlikely, since there cannot be an event of touching in which nothing is touched. On the other hand, such a reading is available for 'Mary telephoned no-one', since there can be acts of telephoning in which the number dialled is unassigned, so no-one is called.[36] "Guercino drew none of Aldrovandi's dogs" is like the latter example, and in an appropriate context could be understood as asserting that some drawing made by Guercino is of no dog owned by Aldrovandi (perhaps it is of some of his cats).

7 Depiction verbs and the definiteness effect

One puzzling behavior of depiction verbs is that it is only with a restricted range of QNP's that they form VP's that sustain notional readings, whereas with other groups of intensional transitives, for example, search verbs and desire verbs, there is no such restriction. Comparing the two groups in

(24) a. Gertrude seeks exactly two Pharaohs' tombs
b. Gertrude seeks another Pharaoh's tomb

[36] See also the discussion of 'Regina sang to nobody' in Herburger (2000:22–23).

c. Gertrude seeks every Pharaoh's tomb

(25) a. Gertrude sketched exactly two Pharaohs' tombs
b. Gertrude sketched another Pharaoh's tomb
c. Gertrude sketched every Pharaoh's tomb

we see that all the cases in (24) have non-generic notional readings which are not hard to hear, but that (25c) is naturally interpreted relationally, as saying that Gertrude made a sketch such that each actual Pharaoh's tomb is in it (I settle on the one-sketch-of-every reading; *cf.* n.28). Relational readings are also strongly preferred with certain other determiners in place of 'every': 'most', 'neither', and 'the', for instance. And this phenomenon is robust across a range of languages.[37]

I would suggest, and will provide theoretical grounds for saying, that it is not just a matter of the relational readings being preferred: there *are* no notional readings of depiction-verb phrases when the complement is an *every*-NP. Apparent counterexamples dissolve on closer inspection. For instance, there are two angels in Verrocchio's *Baptism of Christ*, but it is likely that his pupil Leonardo painted one of them. Yet even if we agree that neither of them painted any particular angels, the claim 'Verrocchio painted every angel' made in the context of a dispute about attribution would not demand a notional reading. In such a context we are relationally quantifying over the angel-images, or the angels in the world of the picture (a similar quantification seems to occur in 'Verrocchio painted every angel praying'). In the same vein, Perseus, mistakenly thinking that gorgons are real,

[37] Including all those represented at Logica 2003 in the Czech Republic.

may make an artist's impression of Euryale, Medusa and Stheno, based on stories he has heard about them that he wrongly thinks are factual. So Perseus drew every gorgon/drew the three gorgons, and this must be notional, it might be said, since gorgons don't exist. But although it is true that he drew no *real* gorgons, it is not true that he drew no *particular* gorgons. He wasn't just making them up: he drew particular fictional ones. In 'Perseus drew every gorgon' the quantifier is therefore relational, over fictional characters.[38]

For a different kind of case, suppose Audubon is preparing a field guide to birds. Then we may say that he *drew every bird*, even if there were no particular birds he drew. But 'he drew every bird' implicitly involves quantification over *types* of bird: we are saying that for each type of bird, he drew a token (no particular token) of that type. Here we have a relational universal and a notional indefinite. Similarly, for some drawings there may be a number *n* such that there ought to be *n F*'s in the drawing, and if *n F*'s are drawn, we can say the artist drew every *F*. For instance, in a drawing of a spider from above, there ought to be eight legs, and if there are, the artist has *drawn every leg*. But this is like the previous case: for each type of leg (front left, front right, first middle left, etc.), the artist drew a token (no particular token) of that type.[39] Absent more convincing examples, therefore, I

[38] The quantifier can even be over quantifiers. In discussion, Tomis Kapitan asked about 'Gertrude sketched everything Mary did', on the reading that is not automatically true if Mary never sketched any specific object. According to the semantics in (16), this means that for every property of properties $\mathcal{Q}$, if Mary made a sketch characterized by $\mathcal{Q}$, so did Gertrude.

[39] Timothy Williamson suggested the case of a flower with rotational symmetry which normally has exactly eight petals. Here there is no ordinary notion of petal-type, but I think the universal-existential analysis is still applicable. Perhaps we can say that there is some admissible petal-arrangement in which every petal position is taken by a token petal (but no particular token).

propose that notional interpretations of depiction VP's with *every*-QNP's or the others mentioned above are simply unavailable.

What might explain this? It appears to be the determiner that is crucial, and there is a striking match between the determiners that force relational readings on depiction VP's and those that do not occur naturally in existential contexts such as 'there is/are' and 'there must be':

(26) a. There are exactly two Pharaohs buried here
b. There is no Pharaoh buried here
c. There are more obscure than famous Pharaohs buried here
d. ?There is every Pharaoh buried here[40]
e. ?There are most Pharaohs buried here
f. ?There is some but not every Pharaoh buried here.

So one way of accounting for the contrast between (24c) and (25c) would be to use the explanation of the "definiteness effect" exhibited in (26) as a pointer.

A persistent idea, going back to (Milwark 1977), is that the determiners which are natural in existential contexts are not really quantificational. For instance, Reuland and ter Meulen (1987:14) contrast NP's which are used to "modify" the conversational domain – these are non-quantificational – and those whose meanings may be defined as generalized quantifiers over the current conversational domain. The indefinite NP 'a Pharaoh' is a non-quantificational domain-modifier – 'a Pharaoh is buried here' adds to the conversational domain – while the universal

[40] There is a special "list" usage that allows 'every' and (perhaps) 'most' (Milwark 1977:n.1) and there are idiomatic exceptions for 'every', as in 'there is every reason to believe/doubt/expect'.

'every Pharaoh' is simply quantificational. It is claimed that only non-quantificational NP's are natural in existential contexts. But discourse-theoretic criteria are *prima facie* extensionally incorrect. RDE determiners such as 'no', 'at most three' and 'very few' pattern with existential determiners as regards acceptability in existential contexts – see (26b) – but are not used to modify the conversational domain. For example, in terms of file-change semantics (Heim 1983), an assertion of 'a Pharaoh is buried here' will start a new card, whereas 'no Pharaoh is buried here' will not.[41]

Avoiding this objection requires adoption of the decomposition strategy discussed in the previous section, on which, for instance, (26b) would become 'not: there is at least one Pharaoh is buried here' (see McNally 1997:102–3, 106–7). This allows us to explain the acceptability of (26b) on the grounds that it is only the non-quantificational 'at least one' that is in the scope of 'there is'. With 'there must be', expressing, say, epistemic necessity, Richard-style cases can arise: 'there must be more than one Pharaoh buried here' and 'there must be no more than one Pharaoh buried here' can both be false. But this time decomposition can be accommodated by breaking 'there must be' into a necessity operator and an existential operator, the former having scope over the latter. Decomposition of 'no more than

[41] However, Kamp and Reyle (1993:333, 458–61) seem to want to treat RDE determiners as domain modifiers: such determiners introduce a discourse referent that is neutral between being an individual and being a set, and a cardinality condition is placed on this discourse referent. This seems to me to be an unintuitive extension of the notion of discourse referent, and I note that such referents fail to support anaphora: 'There are no/few/at most two Pharaohs buried here, because they couldn't afford a Pyramid' is unsuccessful, though a pronoun of laziness standing for 'Pharaohs' is acceptable: '…because they preferred to be inside a Pyramid.'

one' can then take place within the scope of the necessity operator.[42]

However, this strategy will have to be generalized to all other RDE determiners, for some of which it is not semantically plausible:

(27) a. There must be few Pharaohs buried here
b. It must be that there aren't more than few Pharaohs buried here
c. It must be that there aren't more than roughly *n* Pharaohs buried here.

But it is hard to believe that (27b)'s non-eliminative double negative delineates (27a)'s semantics, while (27c) raises new problems about what is required for successful communication and about the sense in which speakers *intend* a specific value of *n* (and if different values of *n* can be equally good, no synonym of (27a) is provided). Additionally, we have already seen that in some contexts, decomposition is outright incorrect: granted the ambiguity thesis of Section 6, only the non-decomposed reading is available for negative quantifiers with search verbs. Conversely, the proposed explanation of the definiteness effect works only if *in situ* interpretation of negative quantifiers is never possible in existential contexts. It is not obvious why this should be so. Indeed, it appears not to be so, since negative exceptives, as in 'there is no Pharaoh except Ramses II buried here', need 'no' to license 'except' if the latter is to be part of the determiner (Moltmann 1997:21). The semantics becomes unnecessarily complicated if we take 'Except Ramses II, it is not the case that there is some Pharaoh buried here' as the basic form.

[42] A propositionalist might try a version of this strategy to avoid the original Literary Example: the raised negative can remain between 'try' and 'find', so that seeking no more than one would be trying not to find more than one. But to my ear, these participial phrases are not even synonymous.

A better way of circumscribing the determiners that are acceptable in existential contexts, due to Keenan (1987, 2003), is as follows.[43] Monadic determiners are regarded as relations between sets, defined in the obvious ways: EVERY(A)(B) iff $A \subseteq B$, NO(A)(B) iff $A \cap B = \varnothing$, and so on. We call A the *restriction* set and B the *coda* set. The main concepts are:

(28) a. Ð is *conservative in first argument* (*cons*$_1$) iff whenever $A \cap B = A \cap C$, ÐAB = ÐAC

b. Ð is *conservative in second argument* (*cons*$_2$) iff whenever $A \cap C = B \cap C$, ÐAC = ÐBC

c. Ð is *cardinal* iff whenever $|A \cap B| = |E \cap F|$, ÐAB = ÐEF

d. Ð is *co-intersective* iff whenever $A \cap \overline{B} = E \cap \overline{F}$, ÐAB = ÐEF

e. Ð is *proportional* iff for finite A, B, E and F,
whenever $|A \cap B|{::}|A \cap \overline{B}| = |E \cap F|{::}|E \cap \overline{F}|$, ÐAB = ÐEF.

These definitions ((a–d) from Keenan) give what he calls 'invariance conditions', from which the more usual linguistic criteria follow. For instance, according to (28a), a monadic Ð is conservative$_1$ iff the truth-value of ÐAB remains the same under all changes to the coda set that preserve its intersection with the restriction set. Hence the difference between B and $A \cap B$ is semantically inert. So we arrive at the standard linguistic criterion for conservativity$_1$, that Ð is conservative$_1$ iff (necessarily) "Ð A's are B" has the same truth-value as "Ð A's are A's that are B", for every A and B. Thus the restriction set contains all domain elements relevant to evaluation of the sentence (if not, putting the narrower "A's that are B" for 'B'

[43] I follow the terminology and definitions of (Keenan 2003).

should affect truth-value in some cases). We say the restriction set is the "local universe" for $cons_1$ determiners (Keenan 2003:200).

Similarly, according to (28b), Ð is $cons_2$ iff the truth-value of ÐAC remains the same under all changes to the restriction set that preserve its intersection with the coda set. The linguistic equivalent of this is that Ð is $cons_2$ iff "Ð A's are C" has the same truth-value as "Ð A's that are C are C". In this case the coda set is the local universe for the determiner.

The determiners which occur naturally in existential contexts are the $cons_2$ determiners (and Boolean compounds thereof).[44] This is easy to check for positive cases. And it is also easy to see that 'all' and 'most' fail to be $cons_2$; for example, it may be that the students who did well and the philosophy majors who did well are the same people, but granted that there are many more students than philosophy majors, perhaps all philosophy majors did well but not all students did ('all' is co-intersective and 'most' is proportional; both are $cons_1$).

8 Why some determiners exclude notional readings

The empirical generalization that is of interest to us is that, for any depiction verb-phrase VÐA, VÐA permits a notional reading iff the determiner Ð is one for which, in sentences of the form ÐAB, the coda set B is the local universe. Since in-

[44] In (26a–c), the $cons_2$ determiners are all cardinal as well, but Keenan argues (2003:202–4) that there are $cons_2$ non-cardinal determiners in natural language, such as 'at least two…besides John'. He gives 'mostly' and 'only' as examples of $cons_2$ non-$cons_1$ determiners. Though these are controversial examples of determiners, classifying them as such means that we need the more general notion of $conservativity_2$.

tensional transitives generally allow notional readings, what needs to be explained is the failure of the determiners for which the coda set B is not the local universe to permit a notional reading. Scoping a QNP complement above its transitive verb is the default in many types of syntax, and intensional transitives are the special case, allowing the *in situ* interpretation that permits semantics such as (16d). But *within* this special case, the behavior of non-cons$_2$ determiners with depiction verbs is an extra quirk, not mere conformity to the default requiring no further comment.

The explanation of the restriction to cons$_2$ determiners has to do with the way in which notional descriptions of depictions are evaluated, and is best presented in terms of a contrast with cases where there is no restriction on the determiners that permit notional readings. Why, for instance, does (24c), "Gertrude seeks every Pharaoh's tomb", have a notional reading? Well, "Gertrude seeks at least one Pharaoh's tomb" certainly has such a reading, and one sort of situation that makes this reading true is one in which Gertrude is the agent of a search that is governed by the intention to find at least one Pharaoh's tomb, the intention she could express with "I will find at least one Pharaoh's tomb." But if this is granted, then it must also be granted that Gertrude might be the agent of a search that is governed by the intention to find *every* Pharaoh's tomb, the intention she could express with "I will find every Pharaoh's tomb." And if the former sort of situation is a truthmaker for a notional reading of "Gertrude seeks at least one Pharaoh's tomb", there can hardly be any obstacle to the latter sort of situation being a truthmaker

for a notional reading of "Gertrude seeks every Pharaoh's tomb." A similar case can be made for a notional reading of "Gertrude seeks most Pharaoh's tombs." It is the generality of the intention, marked by the QNP in its expression, that the notional reading captures.

By contrast, in depiction-verb phrases, the use of non-cons$_2$ determiners makes it hard to see what kind of truthmaker a notional reading could have. For the truth of (29a), we require both (29b) and (29c):

(29) a. Guercino drew a dog
b. there is a drawing, or part of a drawing, of which Guercino is sole author
c. a dog is in that drawing, or part thereof

(henceforth we drop the qualification about part). The relational-notional ambiguity in (29a) is matched by an ambiguity in (29c). (29c) has a reading in which 'a dog' functions as a quantifier over the domain of the context, and a situation in which this reading is true, along with (29b), is a truthmaker for the relational reading of (29a). But (29c) also has what we will call a "pure inventory" reading, in which there is no implication that the drawing is of some specific dog. (In the case of *The Aldrovandi Dog*, a pure inventory would list, among other things, a dog, a castle, a tower, more than three trees, and so on.) The idea is that a pure inventory can be made on the basis of inspection of the picture by someone who has the relevant recognitional capacities for the types of thing depicted, but who need not have any particular capacity to recognize specific objects (exactly Goodman's notion of classification). On the pure-inventory reading of (29b), (29b) and

(29c) jointly characterize truthmakers for the notional reading of (29a).[45]

A truthmaker for (30a) on the one-drawing-of-every scope-disambiguation would be a state of affairs in which (30b) (= (29b)) and (30c) are both true:

(30) a. Guercino drew every dog
b. there is a drawing of which Guercino is sole author
c. every dog is in that drawing.

A relational reading of (30c) produces a truthmaker for the relational reading of (30a). But this time there is no notional reading of (30a), and it appears that this can be traced to the absence of a pure-inventory reading of (30c).

That (30c) has no pure-inventory reading can be explained in terms of the non-cons$_2$ property of 'every'. Both (29c) and (30c) have the ÐAB form, in which the coda set B is *things in the drawing*. 'Things in the drawing' is itself ambiguous between a relational and a pure-inventory sense, and in (29c)'s pure-inventory reading, we invoke the pure-inventory senses of both ÐA and B: 'a dog is among the things in the drawing'.[46] But in (30c), Ð cannot use the coda set B as a local universe: since 'every' is co-intersective, the things determining the truth-value of

[45] If the notional reading includes 'but no particular dog' as part of its content (*cf.* n. 23), then 'but no particular dog' would have to be added to (29c), since to my ear the pure inventory reading of (29c) as it stands is neutral on whether there is a particular dog.

[46] It is a good question how 'dog' retains its literal meaning in the pure-inventory reading of 'a dog is in the drawing'. Perhaps, as is argued in (Walton 1973), it is because of the implicit presence of an 'it is make-believedly the case' operator; perhaps (Wolterstorff 1980) it is because 'dog' occurs as part of the state-of-affairs description that specifies the state of affairs "introduced" by the drawing; or perhaps it is because of a pragmatically licensed shift or widening of the extension of 'dog' to include dog-images (Partee 2003). But a simpler answer is that 'a dog is in the drawing' in the pure-inventory sense is derivative upon 'the drawing is a-dog drawing', in which 'a-dog drawing' is explained in terms of **char**. But 'derivative upon' needs explaining, a task I postpone to another occasion.

'every'-sentences are rather the elements of $A \cap \overline{B}$, where $\overline{B}$ is things that are *not* in the drawing. The constitutive relevance of things not in the drawing compels 'every dog' to function as a quantifier over the full domain of discourse of the context (animals owned by Aldrovandi, say). Similarly, with proportionality determiners like 'most', $|A \cap B|$ has to be compared with $|A \cap \overline{B}|$. So for 'most dogs are in the drawing' the facts about things *not* in the drawing are again truth-value determining, compelling 'most dogs' to function as a quantifier over the domain of discourse of the context. Indeed, we get the same effect with cons_2 determiners and verb-phrase negation: 'at least one dog is in the drawing' has a pure-inventory reading, but for 'at least one dog is not in the drawing', the inner 'not' (rather than a non-cons_2 determiner) makes facts about things not in the drawing truth-value determining, which in turn compels 'at least one dog' to be a quantifier over the domain of discourse of the context.

This account distinguishes between the *absence* of a notional reading and the *impossibility of the truth* of a notional reading. There is a good sense in which it is impossible that Guercino drew $\aleph_\omega$ dogs, whether in a single drawing or a lifetime's output. But 'Guercino drew $\aleph_\omega$ dogs' has a notional reading, and '$\aleph_\omega$ dogs are in the drawing' has a pure-inventory reading. By contrast, no notional and pure-inventory readings exist for (30a) and (30c), thanks to the non-cons_2 determiners.

The absence of these readings raises one final puzzle, namely, how can the overall strategy for interpreting the area of discourse in question guarantee the absence of the reading? In any approach which involves recovering from writing

or speech some underlying representation which is then semantically interpreted, there are essentially two ways of preventing a particular reading from arising: one is to prevent the recovery process from producing an underlying representation whose interpretation would be the unwanted reading, and the other is to allow the representation but prevent the semantics of the representations from assigning it the unwanted meaning. An example of the first method is the postulation of barriers to movement. 'Perseus believes that every gorgon lives in Crete' has a reverse-scope reading which is true if Perseus believes that Euryale, Medusa and Stheno live in Crete, whether or not he believes that they are gorgons or all the gorgons. But 'Perseus believes the proposition/accepts the hypothesis that every gorgon lives in Crete' lacks a reverse-scope reading. So one might postulate a "barrier" that prevents 'every gorgon' from moving out of the noun phrase 'the proposition/hypothesis that…' into a position where it has the attitude verb in its scope (see, e.g., the discussion in Hornstein 1995:28–30).

In this example, however, the interpretation the sentence *would* receive were the forbidden movement allowed is entirely unproblematic: it would be the same as the interpretation of 'every gorgon is such that Perseus believes the proposition/accepts the hypothesis that it lives in Crete', which is perfectly meaningful. But the missing reading of (30a) would have the semantics

(31) **(some(making))λe.agent(guercino, e) and**
(a((which(λx.char(x, every(dog))))(drawing)))
λy.theme(y, e) and culminated(e)

and it is not at all clear that we understand this (the same issue arises for propositionalist and "straight" Montagovian accounts). Specifically, 'a drawing which is characterized by the property of being a property of every dog' is problematic. We can explain characterization by second-order properties on a case-by-case basis. For instance, our account of governing intentions above explains characterization of searches. But suppose the way to explain characterization of pictures is in the first place in terms of pure inventories. As we have seen, 'every dog' cannot be used in pure inventories. This makes it dubious that 'being a drawing characterized by the property of being a property of every dog' expresses a well-defined property – it is not merely that the property is necessarily inapplicable, as in the '$\aleph_\omega$ dogs' case.

If this is right, it is wasted effort to block ascription of a notional meaning to (30a) by preventing (30a) from acquiring (31) as a possible reading, since (31) itself would still stand. Rather, we want (31) to fail to express a proposition. The problem arises at the point where **which(λx.char(x)(every (tree)))** is applied to **drawing**: either this might fail to produce an output, or the output might fail to combine with the determiner **a**. But there is nothing intrinsic to the formalism of this paper which predicts such a breakdown, and arranging for it to happen would violate the *context-free* aspect of standard versions of compositional semantics: at some point, a function which receives an argument which includes the meaning of **(every(tree))** has to "know" that this meaning was computed from, among others, that of a non-cons$_2$ determiner.

A Montagovian alternative is to allow (31) to stand but to impose a meaning-postulate which makes it equivalent to the single-sketch relational reading. The meaning-postulate would be applicable whenever a depiction-noun occupies the position of **drawing** in (31). But this strategy is acceptable only if we agree that the idea of characterization by a property of properties is neutral between relational and anti-relational ('but no particular one(s)') readings (*cf.* n. 23). I leave further reflection on which fork in this road to take to a future occasion.[47]

[47] An ancestor of this paper was written for a conference on

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