Maximality in the Interpretation of Singular DPs:
Wholes Have Covers That Fit

Marcin Morzycki

University of Massachusetts Amherst

1   Introduction

Adjectives such as *whole* and *entire* lend themselves quite readily to an intuitive characterization: What they have in common is, roughly, a requirement that a predicate hold of all the parts of an individual. This is straightforward enough, but underlying this initially clear intuition are puzzles that relate ultimately to the semantics of part structure, distributivity, and quantification and scope mechanisms.

Perhaps perversely, in view of this natural intuition, the argument advanced here is that DPs containing *whole* and *entire*—henceforth '*whole* adjectives'—are obligatorily non-quantificational expressions. Their apparent quantificational force will be understood instead as a restriction on the tolerance normally extended to exceptions to a predication, building on Brisson (1998)'s theory of nonmaximal interpretations of plurals. To implement this, the notion of covers (Schwarzschild 1996) will be imported, with some substantial modifications, from the semantics of plurals into the semantics of singulars, and a Brisson-style theory of nonmaximal interpretations of singulars will be developed on that basis. Along the way, the analysis will lead to adopting a particular conception of choice-function indefinites (Winter 1997, Reinhart 1997, Kratzer 1998, Matthewson 1999).

Section 2 makes some observations about *whole* adjectives, characterizing their interpretive effect in general terms, noting restrictions these adjectives impose on determiners and the anaphoric and scope properties they give rise to. Section 3 briefly notes the more general puzzle of how part structure phenomena involving singular count nouns should be analyzed, in light of similarities and differences between the notion of part structure they require and that required by plural and mass nouns. Section 4 argues against analyzing *whole* adjectives as a species of universal quantifier, and then considers the highly intensional treatment proposed

by Moltmann (1997). Section 5 advances an alternative analysis of *whole* adjectives as 'maximizing modifiers' in the spirit of Brisson, in the process extending the use of covers to the interpretation of singulars and finding reason to permit intermediate existential closure of choice functions (Winter 1997, Reinhart 1997). Section 6 concludes and presents some puzzles for further inquiry.

2   Characteristics of *Whole Adjectives*

2.1   *What Do They Do?*

The essential role of *whole* adjectives is to impose a requirement that no part of an individual be exempted from having to satisfy a predicate. The sentences in (1) differ in just this respect:

(1)   a. The ferret is submerged.

        b. The $\left\{ \begin{array}{c} \text{entire} \\ \text{whole} \end{array} \right\}$ ferret is submerged.

For (1a) to be true, it is under most circumstances quite sufficient for a significant proportion of the ferret to be submerged. If some stray fur or a tail protrudes above the surface of the water, one is not inclined to take this as evidence that (1a) is false. On the other hand, (1b) makes a stronger claim, one of total ferret submersion. Any unsubmerged ferret-matter, even if only a tail, renders (1b) false. So, to put this in slightly less atheoretical terms, one may conceive of the contribution of a *whole* adjective here as universal quantification over parts of the ferret or, alternatively, as a requirement that the tolerance that would otherwise be extended for a few exceptional unsubmerged ferret parts be withheld.

These properties mirror those of all:

(2)   All of the ferret is submerged.

This seems to mean something very much like what (1b) means. More will be said about this parallel shortly.

Despite their superficial resemblance, *whole* adjectives differ from adjectives like complete or partial:

(3)   a. The $\left\{ \begin{array}{c} \text{entire} \\ \text{whole} \end{array} \right\}$ ferret is submerged.

        b. The $\left\{ \begin{array}{c} \text{complete} \\ \text{partial} \end{array} \right\}$ ferret is submerged.

Unlike the *whole* adjectives in (3a), the complete adjectives in (3b) merely provide information about the structural integrity of the ferret. They are intersective, so (3b) could be paraphrased as in (4):

(4)   The ferret is submerged, and the ferret is $\left\{ \begin{array}{l} \text{complete} \\ \text{partial.} \end{array} \right\}$

Thus (3b) and (4) are true if the ferret is submerged, more or less, and if it is a complete ferret, with all its ferret parts in the appropriate ferret configuration, or if it is a partial ferret, with not all of its ferret parts in the appropriate ferret configuration, respectively.[1] Somewhat confusingly, *whole* actually has a reading as an adjective of this class, too. This is the only reading available for *whole* in predicative position:

(5)   The ferret is whole.

Entire, which is exclusively a *whole* adjective and lacks a complete adjective reading, cannot very naturally occur predicatively at all:

(6)   *The ferret is entire.

Whole adjectives, then, unlike complete adjectives, do not appear to have property denotations.

There are nominal and adverbial relatives of *whole* adjectives:

(7)   a. The $\left\{ \begin{array}{l} \text{whole} \\ \text{entirety} \end{array} \right\}$ of the ferret is submerged.

b. The ferret is $\left\{ \begin{array}{l} \text{wholly} \\ \text{entirely} \end{array} \right\}$ submerged.

Though these are of course not irrelevant to the topic, they will for the most part be set aside here.

2.2   *Determiner Restrictions*

Whole adjectives may occur only with a restricted set of determiners. Definites, demonstratives, and genitives are fine:

---

[1] That it is in fact necessary for a ferret to be complete that all the ferret parts not only be present but also configured appropriately can be verified by reflecting on whether a bag containing all the parts necessary for the assembly of a ferret can be described as containing a complete ferret. It is, in my judgment, at best a ferret starter kit.

(8)   a. The $\left\{\begin{array}{c}\text{whole}\\\text{entire}\end{array}\right\}$ ferret is submerged.

         b. $\left\{\begin{array}{c}\text{This}\\\text{that}\end{array}\right\}$ $\left\{\begin{array}{c}\text{whole}\\\text{entire}\end{array}\right\}$ ferret is submerged.

         c. $\left\{\begin{array}{c}\text{My}\\\text{Floyd's}\end{array}\right\}$ $\left\{\begin{array}{c}\text{whole}\\\text{entire}\end{array}\right\}$ ferret is submerged.

So are DPs with indefinites headed by a, numerals, many, and less clearly some:

(9)   a. A $\left\{\begin{array}{c}\text{whole}\\\text{entire}\end{array}\right\}$ ferret is submerged.

         b. Twenty $\left\{\begin{array}{c}\text{whole}\\\text{entire}\end{array}\right\}$ ferrets are submerged.

         c. Many $\left\{\begin{array}{c}\text{whole}\\\text{entire}\end{array}\right\}$ ferrets are submerged.

         d. Some $\left\{\begin{array}{c}\text{whole}\\\text{entire}\end{array}\right\}$ ferrets are submerged.

Strong, inherently quantificational determiners are systematically incompatible with *whole* adjectives. In these contexts, *entire* results in ungrammaticality, and *whole* receives only the complete adjective reading, which will be set aside here:

(10)   a. *$\left\{\begin{array}{c}\text{Every}\\\text{each}\end{array}\right\}$ $\left\{\begin{array}{c}\text{whole}\\\text{entire}\end{array}\right\}$ ferret is submerged.

         b. *All the $\left\{\begin{array}{c}\text{whole}\\\text{entire}\end{array}\right\}$ ferrets are submerged.

         c. *Most $\left\{\begin{array}{c}\text{whole}\\\text{entire}\end{array}\right\}$ ferrets are submerged.

This is similar to the pattern of determiner restrictions Abusch and Rooth (1997) note for modifiers such as unknown or undisclosed, which will be revisited in section 5.6.[2]

---

[2] Though *whole* adjectives can occur with a definite determiner and they can occur with a plural noun, they cannot occur with both: **The entire ferrets were submerged*. Also perhaps not as good as maybe it should be is **?Some entire ferrets were submerged*.

2.3 *Scope*

Whole adjectives appear to give rise to scope effects with respect to negation that would otherwise be absent:

(11)   a. The whole ferret wasn't submerged.   (the whole f. $\prec \neg$; $\neg \prec$ the whole f.)
         b. Clyde didn't eat an entire sandwich.   ($\neg \prec$ an entire s.; an entire s. $\prec \neg$)
         c. No one likes that whole subject.   ($\neg \prec$ that whole s.; that whole s. $\prec \neg$)

In (11a), there seems to be a wide-scope reading of *the whole ferret* in which all of the ferret is claimed to have been unsubmerged, and a narrow-scope reading in which it is denied that all of the ferret was submerged. Since (11a) may in fact be judged true in a context in which parts of the ferret were submerged, the whole ferret appears to scope above negation. Similarly, (11b) can be used to deny that Clyde consumed all of a sandwich or to assert that all of a sandwich was unconsumed. And (11c) can be used to deny that anyone likes all of that subject, or to assert that no one likes any of that subject. These effects are a bit striking, since definites and demonstratives do not normally participate in scope interactions.

In this respect also, *whole* adjectives differ from complete adjectives, which do not give rise to scope ambiguities:

(12)   a. The complete ferret wasn't submerged.   (unambigous)
         b. Clyde didn't eat a partial sandwich.   (unambiguous)

This, of course, is less surprising, since complete adjectives have simple property denotations.

Oddly, *whole* adjectives do not give rise to scope ambiguities with respect to indefinites:

(13)   a. The whole ferret was submerged by a child.   (unambiguous)
         b. Someone ate this entire sandwich.   (unambiguous)
         c. The entire committee complained about an especially   (unambiguous)
            misguided proposal.

It is very difficult to judge (13a) true in a situation in which no single child is guilty of ferret submersion, but rather different children submerged different parts of the ferret. Likewise, (13b) cannot easily involve an act of cooperative sandwich consumption involving several people. Even a noun that provides a relatively clear and individuated part structure like committee in (13c) does not quite mitigate this effect—(13c) would not normally be taken to describe a situation in which there is no single proposal drawing universal criticism. With respect to existential quantifiers, then, *whole* adjectives do not seem to induce additional scope possibilities. (Scope effects with respect to universals are unexpected a priori because *whole*

adjectives are themselves either universals or else something rather like them, as the facts in (11) seem to suggest.)

This odd unwillingness to scope like normal, well-behaved universal quantifiers with respect to existentials is further reflected in the inability of *whole* adjectives to license the particular reading of *different* that arises only in the scope of universals (Beck 2000):

(14)   a. Each part of the ferret was submerged by a different child.
        b. The whole ferret was submerged by a different child.

(15)   a. Every member of the committee complained about a different proposal.
        b. The entire committee complained about a different proposal.

As (14a) and (15a) demonstrate, in the scope of a universal *different* may receive a reading in which it requires (roughly) that the individuals quantified over by the existential vary with those quantified over by the universal. But *whole* adjectives do not give rise to this reading of *different*—(15b), for example, does not have a reading in which children must vary with ferret parts.

2.4   *Discourse Anaphora*

Among the characteristic properties of universals is that they do not introduce discourse referents, and indeed make any introduced inside their scope inaccessible beyond it (Heim 1982, Kamp 1981, others). *Whole* adjectives do not have these properties.

True, *whole* adjectives, like their quantificational-determiner paraphrases, do not introduce portions of individuals as discourse referents:

(16)   a. Every member of the committee complained. *He was often cranky
           before lunch.
        b. The whole committee complained. *He was often cranky before lunch.

But unlike their quantificational determiner counterparts, *whole* adjectives do not impede the DP in which they occur from itself introducing a discourse referent:

(17)   a. Every ferret was submerged. *It didn't seem pleased.
        b. A entire ferret was submerged. It didn't seem pleased.

(18)   a. Cockroaches ate each sandwich. *It had been sitting out too long.
        b. Cockroaches ate a whole sandwich. It had been sitting out too long.

Although the universally-quantified every ferret and each sandwich do not intro-

duce discourse referents, DPs with *whole* adjectives do.

Whole adjectives do not prevent discourse referents from being introduced inside their scope, either, again contrasting with well-behaved universals:

(19) a. Every building with a faulty roof$_i$ was demolished. *It$_i$ had been leaking.
      b. An entire building with a faulty roof$_i$ was demolished. It$_i$ had been leaking.

(20) a. Each recent movie was marred by an irritating soundtrack$_i$. *It$_i$ will probably be released on CD.
      b. The whole movie was marred by an irritating soundtrack$_i$. It$_i$ will probably be released on CD.

So, *every* prevents *a faulty roof* from licensing discourse anaphora in (19a); in (19b),*whole* has no such effect. Likewise, in (20a), *each* prevents *an irritating soundtrack* from licensing discourse anaphora; in (20b), *whole* has no such effect.

2.5   *Summary*

Whole adjectives require that a predicate hold of all parts of an individual, but are distinct from adjectives such as complete in that they do not provide information about the structural integrity of an individual. They cannot grammatically occur in DPs with inherently quantificational determiners. Although *whole* adjectives seem to give rise to scope ambiguities with respect to negation, they do not do so with respect to existential quantifiers. Nor do they impede discourse anaphora, as universal quantifiers do.

3   An Interlude: Singulars, Parts, and Parts of Singulars

3.1   *Treacherous Terrain*

Any understanding of the semantics of *whole* adjectives will likely require some notion of part structure for singular individuals. It is hard to imagine expressing the contribution of such adjectives, even in the most pretheoretical impressionistic terms, without appealing to parts. Part structure for singulars is, however, treacherous terrain, and, to the extent possible, this minefield will be circumnavigated here. But since this much more general issue is fundamental to the issues more immediately at hand, the part relation necessary for count singulars will be briefly considered here, then the issue will be put to rest, and the discussion of *whole* adjectives themselves will resume in section 4.

A complete discussion of part structure that encompasses singulars is undertaken in Moltmann (1997), who brings to light a paradox concerning the notion of 'part of' in natural language.[3] On the one hand, it seems that the semantics of plural and mass nouns should be modeled using part structures with certain formal characteristics unsuitable to modeling the semantics of singular count nouns. On the other hand, there are parallels between singular count nouns and plural and mass nouns that strongly suggest that a unified treatment is required.

3.2   *Well-Behaved Part Structures: Plurals and Mass Nouns*

There are several formal characteristics associated with both plural and mass noun denotations: cumulativity, divisibility/atomicity, transitivity, and extensionality. Link (1983) illustrates cumulativity—which he calls the 'cumulative reference property', following Quine (1960) and Bunt (1979)—by example:

(21)   a. If a is water and b is water then the sum of a and b is water.
       b. If the animals in this camp are horses, and the animals in that camp are
           horses, then the animals in both camps are horses.

This demonstrates, then, that both mass nouns like water and plurals like horses denote predicates that hold of any sum of individuals in their extension. Divisibility/atomicity involves inference from individuals to their parts:

(22)   a. If the sum of a and b is water, then a is water.
       b. If the animals in this camp and the animals in that camp are horses, then
           the animals in this camp are horses.

What these examples suggest is that mass nouns like water and plurals like horses both denote predicates that hold of parts of individuals in their extensions.[4] The part structure needed for the semantics of plural and mass nouns must further encode transitivity of the part relation. As before, this may be illustrated by example:

(23)   a. If the water in this teaspoon is part of the water in this bowl, and the
           water in this bowl is part of the water on the table, then the water in this
           teaspoon is part of the water on the table.

_____

[3] Moltmann does not actually call this a paradox, and perhaps would not regard this situation as especially paradoxical. But it is at least a puzzle. More generally, Moltmann does not formulate the problem in precisely this way.

[4] Strictly speaking, divisibility and atomicity, though similar, must be distinguished. Certainly, not just any part of an individual in the extension of horses is itself horses. Hooves, for example, are not horses, despite being parts of a horse. Nevertheless, all the atomic individuals (in Link's sense, say) of which the extension of horses is made up are in fact horses. So, more precisely, plural denotations manifest atomicity and mass noun denotations may plausibly manifest divisibility.

b. If the horses in this camp are part of the horses in the state, and the horses in the state are part of the horses in the country, then the horses in this camp are part of the horses in the country.

Finally, the part relation needed for plural and mass nouns is extensional, in the sense that any two individuals with all the same parts are identical:

(24)   a. If the water in this glass is made up of these 50 teaspoons, and the water in front of Clyde is made up of these same 50 teaspoons, the water in this glass is the same as the water in front of Clyde.
       b. If the horses in this state include only the horses in this camp, and the horses Clyde owns include only the horses in this camp, then the horses in this state are the horses Clyde owns.

Thus plural and mass nouns support a view of part structure that reflects transitivity, extensionality, cumulativity, and divisibility/atomicity. Together, these formal characteristics provide a fairly clear and precise view of how part structure should work—truly, a notion of part structure a logician could love.

3.3   *Ill-Behaved Part Structures: Count Singulars*

But things are not so tidy. Count singulars have denotations that require a different notion of part structure that lacks all the formal properties noted above. They are not cumulative, so the inference in (25), parallel to (21) above, is not valid:

(25)   If Ted is a senator and Strom is a senator, then Ted and Strom are a senator.

Of course, one can infer that the sum of Ted and Strom is in the extension of senators, since plural nouns are cumulative. But no such inference can be made for senator. Nor are count singular denotations divisive. The inference in (26), parallel to (22) above, is not valid:

(26)   If Ted, Strom, and Jesse are a subcommittee, then Ted is a subcommittee.

Nor are they necessarily compatible with a transitive part-of relation:

(27)   If Ted's nose is part of Ted, and Ted is part of a subcommittee, then Ted's nose is part of a subcommittee.

This, of course, is not a valid inference. Nor are they necessarily compatible with an extensional part-of relation:

(28)   If the ethics subcommittee includes only Ted, Strom, and Jesse, and the bribe solicitation subcommittee includes only Ted, Strom, and Jesse, then

the ethics subcommittee and the bribe solicitation subcommittee are the same subcommittee.

Again, this is not a valid inference. Singular count nouns, then, lack all these distinguishing characteristics of part structure in plural and mass nouns.

3.4 *Not So Different After All*

Despite the stark formal difference between singular count nouns and plural and mass nouns, there is evidence that a unified treatment of all three is required.

Perhaps the clearest parallel among them is in partitives:

(29) a. $\left\{\begin{array}{l}\text{All}\\ \text{much}\\ \text{some}\end{array}\right\}$ of the water spilled onto the floor.

b. $\left\{\begin{array}{l}\text{All}\\ \text{much}\\ \text{some}\end{array}\right\}$ of the horses ran into the field.

c. $\left\{\begin{array}{l}\text{All}\\ \text{much}\\ \text{some}\end{array}\right\}$ of the ferret was submerged.

This is more than merely a syntactic parallel. In all three cases, the same sort of quantification seems to be taking place: over parts of the referent of the embedded DP.

Moltmann observes another parallel involving the possibility of collective predication: (her examples)

(30) a. The men gathered.
      b. The wood is heavy.
      c. The sum of these numbers is greater than two.
      d. The weight of the wood is ten pounds.

In all of these cases, predication is collective in that the VP denotation is not necessarily true of proper parts of the subject denotation. Thus no individual man needs to have, impossibly, gathered by himself in order to render (30a) true. Likewise, (30b) remains true if some particle of the wood is not on its own heavy. And analogously, (30c) does not require that both the numbers being added be greater than two, and (30d) does not require that every particle of the wood weigh ten pounds.

3.5 *A Simplifying Assumption*

Moltmann develops a theory of part structure consistent with these facts by relativizing every predicate in the grammar to a reference situation which determines part structure, and by further assuming that every argument position of every predicate is filled with a pair one of whose members is a reference situation.

For current purposes, though, it will be sufficient to suppose that there is some part relation for count singulars (s (s for 'singular') which is consistent with the observations above. This is a simplifying assumption, essentially a placeholder for an articulated theory of singular part structure. Although it seems likely that some of the additional theoretical machinery appealed to momentarily—namely, covers (Schwarzschild 1996)—may be able to replicate some of the context-sensitivity Moltmann achieves with reference situations, nothing here should be construed as a proposal about the character of the singular part-structure relation itself.

4 Universal Part Quantification and Moltmann's Intensional Alternative

This section considers two approaches to *whole* adjectives that are fundamentally different from the cover-theoretic approach that will ultimately be pursued here. The first of these, the universal part quantification approach, is in a sense logically prior; the other, that of Moltmann (1997), is temporally prior.

4.1 *Universal Part Quantification: The Idea*

The initial intuition about *whole* adjectives we began with was that they impose a requirement that a predicate hold of all the parts of an entity without exception. One can express this intuition quite simply and directly by analyzing *whole* adjectives as universal part quantifiers. Thus a sentence such as (1) could be interpreted as in (31):

$$(31)\quad \left[\!\!\left[\textit{the} \left\{\begin{array}{c}\textit{whole}\\ \textit{entire}\end{array}\right\} \textit{ferret is submerged}\right]\!\!\right] = \forall x[x \leq_s \iota y\,[ferret(y)] \quad \text{(not final)}$$
$$\to submerged(x)]$$

This reflects the meaning paraphrased by 'every part of the ferret was submerged'. For all its simplicity and naturalness, this approach runs afoul of many of the observations in section 2. On its own it does not explain the determiner restrictions *whole* adjectives impose, and, as demonstrated below, it makes wrong predictions with respect to scope and discourse anaphora.

4.2 *Scope Problems*

Perhaps the chief prediction of an account of*whole* as a universal part quantifier is that it should give rise to scope ambiguities. As noted in section 2, this may be borne out with respect to negation, but not with respect to existentials. So an account such as that reflected in (32) would account for the ambiguity of (11a), repeated here:

(32)   The whole ferret wasn't submerged.

But such an account would also predict that the unambiguous (13a), repeated here, should be scopally ambiguous:

(33)   The whole ferret was submerged by a child.

Similarly unwelcome predictions would be made with respect to licensing *different* as in (14–15).

4.3 *Discourse Anaphora Problems*

Another unwelcome consequence of a view of *whole* adjectives as universal part quantifiers is the prediction that they should render discourse referents introduced in their scope inaccessible to discourse anaphora. Again, as noted in section 2, *whole* adjectives do not have this effect.

In particular, they do not impede the DP in which they occur from introducing a discourse referent, as universally quantifying determiners do and as an account along the lines of (31) would predict. This is reflected in (17), repeated here:

(34)   a. Every ferret was submerged. *It didn't seem pleased.
        b. A entire ferret was submerged. It didn't seem pleased.

Nor do they impede discourse referents from being introduced inside their scope, as in (19), repeated here:

(35)   a. Every building with a faulty roof$_i$ was demolished. *It$_i$ had been
           leaking.
        b. An entire building with a faulty roof$_i$ was demolished. It$_i$ had been
           leaking.

4.4 *A Conjunctive Revision to the Universal Part Quantification Approach*

As expressed in (31), then, the universal part quantification analysis does not seem to be getting much traction on the problem. A slight revision may help. Instead of taking *whole* adjectives to be merely universal part quantifiers, one might take them instead to have a fundamentally conjunctive meaning, contributing universal part quantification as a kind of addition to the semantics of the sentence. Thus, (1) might be interpreted as in (36):

(36) $\left[\!\left[\textit{The} \left\{ \begin{array}{c} \textit{whole} \\ \textit{entire} \end{array} \right\} \textit{ferret is submerged} \right]\!\right] =$ (not final)

submerged(ιy[ferret(y)]) $\wedge$ $\forall$x[x$\leq_s\iota$y[ferret(y)] $\rightarrow$ submerged(x)]

This reflects a paraphrase such as 'the whole ferret was submerged, and every part of the ferret was submerged (as well)'.

This revision immediately avoids the discourse anaphora trouble encountered earlier, because one of the conjuncts is interpreted as though *whole* were absent and therefore unable to block discourse anaphora, and discourse referents introduced in either conjunct of a coordinate structure are accessible beyond it (The ferret_i and Greta were submerged. It_i smelled worse wet than she did.).

This may initially appear to avoid the scope difficulties too, since any existentials that might occur in the first conjunct would not have any universal introduced by *whole* to interact with. But scope problems with indefinites would apparently remain, as (37) reflects:

(37) A painter moistened the whole canvas.

In order to confront the problem here, it is necessary to consider more seriously how denotations such as the one in (36) are to be assembled compositionally. First, it will be necessary to commit to a denotation for *the whole canvas*:

(38) $[\![$ *the whole canvas* $]\!] = \lambda$P . P(ιy[canvas(y)]) $\wedge$ (not final)
$\forall$z[z$\leq_s\iota$y[canvas(y)] $\rightarrow$ P(z)]

This encodes the essentially conjunctive meaning, by requiring that *the whole canvas* apply to a property that holds of the canvas and every part of it. Crucially, this is a generalized quantifier denotation. Thus to be interpreted, the whole canvas will have to QR from object position in (37), giving rise to LFs in which it takes

scope somewhere below *a painter*, as in (39), or above it, as in (40):[5]

(39) *a painter₁ [the whole canvas₂ [t₁ moistened t₂]]*
    a. ⟦ ₂ *t₁ moistened t₂* ⟧ = λx_2 . moisten(x_2)(x_1)
    b. ⟦ *the whole canvas₂ t₁ moistened t₂* ⟧ = moisten(ιy[canvas(y)])(x_1) $\wedge$
        $\forall z[z\leq_s \iota y[\text{ferret}(y)] \rightarrow \text{moisten}(z)(x_1)]$
    c. ⟦ ₁ *the whole canvas₂ t₁ moistened t₂* ⟧ =
        λx_1 . moisten(ιy[canvas(y)])(x_1) $\wedge$ $\forall z[z\leq_s \iota y[\text{ferret}(y)] \rightarrow$
        moisten(z)(x_1)]
    d. ⟦ *a painter₁ the whole canvas₂ t₁ moistened t₂* ⟧ = $\exists x$[painter(x) $\wedge$
        moisten(ιy[canvas(y)])(x) $\wedge$ $\forall z[z\leq_s \iota y[\text{ferret}(y)] \rightarrow$
        moisten(z)(x)]]

(40) *the whole canvas₂ [a painter moistened t₂]*
    a. ⟦ ₂ *a painter moistened t₂* ⟧ = λx_2 . $\exists x$[painter(x) $\wedge$ moisten(x_2)(x)]
    b. ⟦ *the whole canvas₂ a painter moistened t₂* ⟧ = $\exists x$[painter(x) $\wedge$
        moisten(ιy[canvas(y)])(x)] $\wedge$ $\forall z[z\leq_s \iota y[\text{ferret}(y)] \rightarrow \exists x$[painter($x$)
        $\wedge$ moisten(z)(x)]]

The denotation in (39), in which *the whole canvas* has narrow scope with respect to the painter, does not present any obvious problems—it requires that there be some painter who moistened the canvas and who moistened every part of it. But the denotation in (40) is too weak—it requires only that there be a painter who moistened the canvas, and that each part of the canvas had been painter-moistened. On the reading in (40), then, this sentence would be true if a team of painters collectively moistened every part of the canvas, but no single painter moistened every part of it. Certainly, this is not a possible reading of (37).

It is not clear how this undesirable result could be avoided. So long as a *whole* adjective is attributed any quantificational force of its own with scope over the matrix predicate, even in this conjunctive way, the DP in which it occurs will have to denote a generalized quantifier and consequently be susceptible to QR, and to the possibility of taking wide scope over an indefinite as in (40). The option of simply stipulating that DPs with *whole* adjectives do not QR is unavailable, since generalized quantifiers often must QR to be interpreted. One could, however, stipulate that a*whole* DP can QR only to positions in which its scope with respect to other quantifiers is unaltered. But this does not seem like an especially promising path to pursue, beginning as it does with the bizarre stipulation that QR,

---

a grammatical device which exists chiefly to account for variation in scope possibilities, should for a particular class of expressions be both obligatory and obligatorily restricted to movements that do not give rise to new scope possibilities.[6]

4.5 *Moltmann's Intensional Approach*

Moltmann (1997) proposes an analysis of whole along different lines, cast in her general theory of part structure. This general theory makes available a rich set of tools for manipulating what sort of part structure an individual is construed as having, subject to restrictions various linguistic expressions and the context can impose. She proposes that the grammar is intricately sensitive to reference situations, or situations that determine the part structure an individual is construed as having. These are pervasive in the grammar; every predicate and every argument position is relativized to a reference situation.

Whole, on this view, restricts an individual's perceived part structure—it triggers an interpretation in which an individual is not construed as what she calls an 'integrated whole' (one in which 'the connections among parts do not hold that would define it as an integrated whole' (p. 81)). More precisely, she suggests whole applies to a pair of a reference situation and a situated generalized quantifier—a generalized quantifier interpreted with respect to a reference situation—and yields a situated generalized quantifier:

---

[6] Relegated to this footnote is an apparent but not actual counterexample to taking *whole* adjectives to be universal quantifiers. In (i), one might claim, there is a *whole* adjective but the quantification is not quite universal:

(i) a. The whole town was pregnant.
     b. I cleaned the whole house.

In (ia), for example, it need not be the case that the men be pregnant, much less that physical parts of the town such as trees and buildings be pregnant. In (ib), under normal circumstances I need not have cleaned the plumbing system of the house. These, however, appear to be ordinary domain of quantification effects, if in an unfamiliar place. Corresponding to (i) are the sentences in (ii), which involve uncontroversially universal quantifiers:

(ii) a. Everyone in the town was pregnant.
      b. I cleaned everything in the house.

In both of these cases, quantification is understood to be restricted in roughly the way it is in (i). Both of these examples also manifest tell-tale sensitivity to pragmatic considerations:

(iii) a. The whole town was wiped out.
       b. A hurricane destroyed the whole house.

In these cases, the universal quantification could be understood as extending over a far broader domain, one including men and physical structures in (iiia) and plumbing in (iiib). As will be seen in section 5, though, none of this requires assuming that the quantifier being restricted is introduced by the *whole* adjective.

(41)   Let Q be a situated generalized quantifier and s' a (Moltmann 1997, p. 81)
        situation:

$[\![\,whole\,]\!](Q,s') =$

$\quad\quad \lambda s\ \lambda P\ [Q^{s''}(P^s)=1(\forall x)[P^s(x,s')=1 \rightarrow$
$\quad\quad \text{BASED-ON}(\langle P^s,\ \langle x,s''\rangle\rangle,\ <\langle\neg\text{INT-WH})^{s''},\langle x,s''\rangle\rangle) \wedge \forall x'[x'<x \rightarrow$
$\quad\quad x'<_s x]]],$

where s'' is the situation that differs minimally from s' in that for all
$x\in D(s'')$, $\neg\text{INT-WH}(x,s'')$

Superscripts indicate reference situations with respect to which predicates are evaluated; (INT-WH$(x,s) = 1$ iff x is an integrated whole in s; BASED-ON($<P^s,<x,s'>>,<Q^{s"},<y,s'''>>$) = 1 iff Ps($<x,s'>$) 'forms a basis of' $Q^{s"}(<y,s'''>)$.

Paraphrasing in English what (41) is intended to express is not entirely straightforward, partly because it fits into a larger theory with a lot of moving parts. But its effect is, roughly, that *whole* applied to the ferret with respect to a reference situation s' will yield a situated generalized quantifier true of is submerged with respect to a reference situation s if the non-integrated-whole version of the ferret in the reference situation s'—that is, the ferret in a situation that differs minimally from s' in that there are no integrated wholes in it—is submerged in s, and the non-integrated-whole version of the ferret in s' is submerged in s on the basis of this non-integrated-whole version of the ferret not being an integrated whole, and the submersion-situation s contains all the 'actual parts' of the ferret. The motivation for all the components of this denotation will not be recapitulated here, though it is worth noting that the 'based-on' requirement is one that Moltmann suggests figures in the semantics not only of *whole* but also of other 'part-structure-sensitive perspective shifters' such as *together* and *as a whole*. The most important aspect of (41) for current purposes is that it gives rise to an interpretation in which an individual is construed as having a part structure that licenses distributivity—essentially, it is construed as an amalgamation of parts, so that anything predicated of the whole will distribute to the parts.

Although Moltmann does not make this explicit, this appears to make the right predictions with respect to the scope and discourse anaphora facts. The crucial feature of (41) that makes this possible is the absence of any universal part quantifier with free variables in its scope. Because of this, no discourse referents could be introduced inside the scope of a universal part quantifier contributed by *whole*, where they would wrongly be predicted to be inaccessible. Similarly, no scope ambiguities are expected with respect to other quantifiers, because they could not occur inside the scope of any universal part quantifier. No scope ambiguities are predicted with respect to negation, either, but though this appears problematic in

light of the observations in section 2, another independent explanation of these effects is in principle available, as section 5.12 below will suggest.

One immediately striking feature of the denotation in (41) is that, without further assumptions, it is not compositional. *Whole* applies directly to a DP denotation, though the overt position of *whole* adjectives in English is lower, below the D level. To ensure a smooth mapping from syntax to semantics, it would be necessary to assume movement of the *whole* adjective to a position above DP (an adjoined position, say). This is not an unreasonable assumption to have to make, but it is an additional commitment. Moreover, without further elaboration, the ban on inherently quantificational determiners *whole* adjectives impose remains mysterious on this approach.

Neither of these problems seem intractable. More generally, this denotation for *whole* is a small component of an approach that provides an explicit and integrated theory of part structure, and thus is considerably more ambitious in its aims. However, the intensional machinery necessary to execute this program is powerful, and its consequences for the grammar pervasive. In light of that, it might be desirable to consider alternatives in which the lexical semantics of *whole* need not be crucially intensional, and the necessary theoretical commitments need not be so many and so profound.

4.6 *Summary*

Treating *whole* adjectives as universal part quantifiers makes undesirable predications regarding scope and discourse anaphora, and does not obviously lead to an account of the determiner restrictions *whole* adjectives impose. A highly intensional approach like Moltmann's fares considerably better, but requires making a number of profound additional commitments.

5 *Whole* Adjectives as Maximizing Modifiers

5.1 *Nonmaximal Interpretations: Brisson (1998)*

An alternative intuition about *whole* adjectives is available, which has already been expressed in another form with respect to plurals introduced by all. Rather than supposing *whole* adjectives universally quantify over parts or trigger reconceptualization of part structure, one can instead suppose they restrict exception tolerance. Brisson (1998) develops an analysis rooted in this intuition of plural all which may provide the basis for an understanding of *whole* adjectives.

On this view, all is a 'maximizing modifier' rather than a universal quanti-

fier, in that it eliminates the ability of plurals to tolerate nonmaximal interpretations. Under normal circumstances, this tolerance is readily extended:

(42)   The boys are building a raft.

One would naturally judge (42) true if only 98 of 100 boys are building a raft—this is a 'nonmaximal' interpretation. But in (43), the presence of *all* eliminates this possibility:

(43)   All the boys are building a raft.

For (43) to be true, every boy must be building a raft. No exceptions are tolerated.

5.2   *Covers*

To capture this effect, Brisson develops a model of nonmaximality in terms of a notion of a 'cover' of the domain of discourse (Schwarzschild 1996). A cover is essentially a means of structuring the domain, so that various individuals are grouped together in a way consistent with the context. This is useful in accounting for interpretations of predicates in which they distribute only to certain pragmatically-determined non-atomic parts. On such a reading, (44)—due to Gillon (1987) and cited by both Schwarzschild and Brisson—is true of the Broadway musical writers Rodgers, Hammerstein, and Hart:

(44)   The men wrote musicals.

Rodgers and Hammerstein wrote musicals together, as have Rodgers and Hart. None of them, however, seems to have written a musical alone, so the reading in question is not one that distributes to singular individuals.[7] Nor is it the case that all three of the them wrote a musical together, so the reading in question is not a collective one, either, at least in the most prototypical sense of the term. Covers provide a means of representing such readings. On this reading, (44) is interpreted with respect to a cover which groups together Rodgers and Hammerstein, as well as Rodgers and Hart, but no other combinations of the three.

To put it more precisely, a cover groups the individuals in a domain into cells. Thus, in the cover required to render (44) true, there is a cell containing only Rodgers and Hammerstein, and one containing only Rodgers and Hart, but none containing, for example, only Rodgers or only Hammerstein and Hart. The true reading of (44) now can be understood to be a distributive one, but not in

---

[7] I will avoid the term 'atomic individuals' here. Since *whole* adjectives will require reference to parts of singular individuals, they cannot be atomic at least with respect to that part relation. They are, of course, atomic with respect to the plural part relation.

the conventional sense that involves distributivity to singular individuals; rather, distributivity here is to cells of the cover.

Schwarzschild expresses this in terms of a theory in which it is of central importance that plurals simply denote sets, rather than plural individuals in the sense of Link (1983). The notion of a cover, though, does not seem inextricably bound up in this decision, and it will be useful here to attempt separating them. Putting things in more Linkian terms, or at least in terms more compatible with a Link-style approach, one might suppose that each 'cell' of the cover is an individual, frequently a plural individual. A cover, then, is a set of individuals, singular or plural, which has the same supremum as the domain:

(45)   Cov is a cover of D iff sup(Cov)=sup(D)

That is, that the smallest plural individual composed of all the cells of the Cov must also be the smallest plural individual composed of all the members of D. Consequently Cov merely imposes a structure on D, adding nothing and leaving nothing out. Putting this to use, a cover such as the one in (46) will be required to render (44) true given the domain D indicated:[8]

(46)   {Rodgers, Hammerstein, Hart, Greta, Hilda}⊆D, and D contains nothing
            else apart from all parts and all sums of its members
        Cov = {Rodgers+Hammerstein, Rodgers+Hart, Greta, Hilda}

Pursuant to the discussion in section 3, the nature of the part relation that undergirds (45–46) will be left unexplored, though for the moment it will do no harm to suppose that it is Link's individual part relation.

To derive the desired reading for (44), these cells in the cover will have to be distributed over. Thus Schwarzschild proposes a VP distributivity operator Part, which is restricted by a cover variable Cov. Reformulating slightly to accord with the view of plurals assumed here:[9]

(47)   ⟦ $Part_{Cov}$ ⟧^{g} = λP λx $\forall$y[[y∈g(Cov) ∧ y≤x] → P(y)]   (not final)

What this requires is that a predicate to which this distributivity operator applies be satisfied by every cell in the cover which is a part of the individual distributed over. The relevant reading of (44), then, could be derived as in (48):

---

[8] That is, D is closed under the part relation and sum formation ($\forall$x$\forall$y[[x∈D ∧ y≤x] → y∈D] and $\forall$x$\forall$y[[x∈D ∧ y∈D] → x+y∈D]).

[9] Another departure made here from the original conception of this operator is that it is being represented here in the object language and interpreted directly.

(48)　{Rodgers, Hammerstein, Hart, Greta, Hilda}$\subseteq$D, and D contains nothing
　　　　　else apart from all parts and all sums of its members
　　　Cov = {Rodgers+Hammerstein, Rodgers+Hart, Greta, Hilda}
　　　The men wrote musicals.

　　　⟦ *sgPart$_{Cov}$* ⟧(⟦ *wrote musicals* ⟧)(⟦ *the men* ⟧) =
　　　　　⟦ *sgPart$_{Cov}$* ⟧(wrote-musicals)(Rodgers+Hammerstein+Hart) =
　　　　　$\forall$y[[y$\in$Cov $\wedge$ y$\leq$Rodgers+Hammerstein+Hart] $\rightarrow$
　　　　　wrote-musicals(y)]

Given this cover, it will in fact be the case that every cell that is a part of ⟦ *the men* ⟧
satisfies ⟦ *wrote musicals* ⟧.

5.3　*Nonmaximality and Ill-Fitting Covers*

In this framework, Brisson points out, nonmaximal readings are expected. In the
cover in (48), there are no coed cells—the men and the women are separated. But
this is not necessary. One might imagine another kind of cover:

(49)　{Rodgers, Hammerstein, Hart, Greta, Hilda}$\subseteq$D, and D contains nothing
　　　　　else apart from all parts and all sums of its members
　　　Cov = {Rodgers+Hammerstein, Rodgers, Hart+Greta, Hilda}

With respect to this cover, Hart need not have participated in any way in writing
a musical for The men wrote musicals to be true. This is because Hart is not a
member of the cover and so does not satisfy the restriction on the distributive
operator. Of course, the plural individual Hart+Greta does, since this individual
is a member of the cover—however, Hart+Greta is not a part of ⟦ *the men* ⟧. Thus
Hart may be an exception to the predication here, and a nonmaximal interpretation
is permitted. Naturally, with only three men such an interpretation is pragmatically
rather unlikely, for reasons Brisson discusses.[10] But it is possible, and even more
clearly when more men are involved.

　　　Nonmaximal interpretations, then, arise with covers that are, in Brisson's
terminology, ill-fitting. A cover is ill-fitting with respect to an individual x if there
are parts of x that are stranded in cells in the cover that are not themselves parts
of x. More precisely, Brisson (1998, p. 97) proposes the definition like that in (50),
again reformulating here to accord with current assumptions:

---

[10] In fact, the framework in principle allows indefinitely nonmaximal interpretations—with the
right sort of cover, any part of an individual, however small proportionally, can be sufficient for that
individual to satisfy a predicate on a nonmaximal interpretation. Brisson illustrates how pragmatic
considerations (interacting with lexical meaning) impose practical limits on the use of such highly
nonmaximal readings.

(50)   For some cover of the universe of discourse Cov and some DP denotation
        x, Cov is *a good fit* with respect to x iff $\forall y[y \leq x \rightarrow \exists z[z \in \text{Cov} \land y \leq z \land z \leq x]]$

An ill-fitting cover is one that is not a good fit.

5.4   *Brisson's* All *and the Good-Fit Requirement*

What all does, Brisson suggests, is impose a good-fit requirement on the cover with
respect to which it is interpreted. This, of course, has the effect of eliminating the
possibility of nonmaximal interpretations. One might naturally consider extending
this approach to *whole* adjectives.[11]

For Brisson, the way all makes this contribution is to restrict the range of
possible assignment functions to only those with good-fitting covers. This is, she
suggests, not part of truth-conditional meaning, but rather a component of what
she calls the 'domain-adjusting meaning' of a sentence, an independent kind of
meaning that is 'derived alongside truth conditions' (Brisson 1998, p.201). An alter-
native approach to this, though, is to impose the good-fit requirement directly in the
denotations of particular lexical items. So, in order to express the intuition that all
maps a DP denotation onto itself and adds the requirement that it be interpreted
with respect to a good-fitting cover, one might adopt a denotation such as (42b):

---

[11] Brisson herself regards apparent nonmaximality effects involving singular DPs as entirely
different from nonmaximality effects involving plural DPs. She is skeptical about the parallel
nonmaximality possibilities in (i), noted by Landman (1989):

(i)   a. John touched the ceiling.
         b. The boys touched the ceiling.

All that is required for (ia) to be true is that John touch the ceiling. All of his body need not do
so. Likewise, if the boys are stacked in a pyramid so that only the topmost boy touches the ceiling,
(i) is true. But Brisson constructs various examples in which only the plural counterpart apparently
exhibits nonmaximality:

(ii)   a. The soldiers of the fourth platoon were captured by the enemy.
         b. Bill was captured by the enemy.

(iii)   a. Polly graded the exams.
         b. Polly graded the exam.

(iv)   a. Jane knows the answers to these questions.
         b. Jane knows the answer.

These do appear to demonstrate that is not the case that all singulars exhibit nonmaximality in all
contexts. This does not mean, however, that singulars do not in principle exhibit nonmaximality
effects. In particular, it is possible, and indeed expected, that a singular and a plural similar to it would
manifest different nonmaximality effects in different contexts. Thus, just as pragmatics determines
when and how a plural can exhibit nonmaximality, it can determine when and how a singular can. In
(ii-iv), it seems quite clear why the singular would be different from the plural for pragmatic reasons.

(51) $[\![\,all_{Cov}\,]\!]^g = \lambda x \,.\, \iota y[y{=}x$ and $g(Cov)$ is a good fit with respect to x]

Or, combining this with the definition in (50):

(52) $[\![\,all_{Cov}\,]\!]^g = \lambda x \,.\, \iota y[y{=}x \wedge \forall v[v{\leq}x \rightarrow \exists z[z{\in}g(Cov) \wedge v{\leq}z \wedge z{\leq}x]]]$

This amounts to treating the good-fit requirement as a presupposition (a possibility Brisson considers). To give the denotation of all access to the Cov variable with respect to which the DP will be interpreted, it is subscripted with it here. This sort of access to the cover is apparently required in the domain-adjusting meaning approach too. It is not obvious how to ensure that the cover variable with which all is subscripted matches the cover variable with which the corresponding Part operator is subscripted. This will have to remain a stipulation, though one might certainly imagine that some binding-theoretic requirement is involved. Importantly, this denotation—as well as any built on Brisson's definition of a good fit—will require that the DP argument of all be of type *e*, since the part relation is defined for this type only.

5.5 *The Singular Good-Fit Requirement and* Whole *Adjectives*

To extend this approach to *whole* adjectives, a number of additional revisions will be necessary. The most basic of these will be to make reference to parts of singulars, per the discussion in section 3, in the definition a good fit. Two approaches seem sensible. One is a disjunctive approach in which a distinct notion of good fit is defined for singulars with reference to a singular part relation:

(53) For some cover of the universe of discourse Cov and some DP denotation x, Cov is *a singular good fit* with respect to x iff $\forall y[y{\leq}_s x \rightarrow \exists z[z{\in}Cov \wedge y{\leq}_s z \wedge z{\leq}_s x]]$

A singular counterpart would have to be defined for the Part operator as well, again by simply replacing the plural part relation with the singular one. A tentative definition of *whole*, then, could be as in (54):

(54) $[\![\,whole_{Cov}\,]\!] = \lambda x \,.\, g(Cov)$ is a singular good fit with respect to x (not final)

Combining (53) and (54):

(55) $[\![\,whole_{Cov}\,]\!] = \lambda x \,.\, \forall y[y{\leq}_s x \rightarrow \exists z[z{\in}g(Cov) \wedge y{\leq}_s z \wedge z{\leq}_s x]]$ (not final)

Entire would have an identical denotation.

 An alternative approach that initially may seem more appealing is not to distinguish between the singular and plural part relations in the definition of a

good fit and of the Part operator. This is where a theory in which there is a single generalized part relation, such as Moltmann's (1997), would be useful. There are independent reasons for not taking this route, however, which will begin to emerge momentarily, where focus will turn to the Part operator in more detail.

5.6 *The Determiner Restriction*

Given (55) as it stands, there would be no reason to expect the incompatibility of *whole* adjectives with inherently quantificational determiners. This can be corrected. One might hope to achieve an account of the determiner restriction without recourse to the brute-force technique of simply assigning *whole* adjectives a high type. But it is not clear what such a solution might be, or that a high type in this instance might not actually be more explanatory.

A determiner restriction similar to the one noted here is imposed by epistemic adjectives such as unspecified or unknown (Abusch and Rooth 1997). Such adjectives have what they call propositional readings:

(56)   a. The suspects were arrested at unspecified   (Abusch and Rooth 1997)
          locations.
          'The suspects were arrested at some
          locations and it was unspecified which
          locations they were arrested in.'
       b. Fabienne put the money in an unexpected place.
          'Fabienne put the money at some place, and it was not expected that she
          would put the money in that place.'
       c. Fabienne put the money in the expected place.

These readings are impossible with inherently quantificational determiners:

(57)   a. Solange has stayed in every unspecified   (Abusch and Rooth 1997)
          hotel.
       b. The campus police installed burglar alarms in most unknown buildings.

Their account of this distinction, however, does not appear to extend naturally to *whole* adjectives. What they propose (roughly characterized) is that on the propositional reading, an adjective such as unspecified takes an argument corresponding to the individual whose identity is (or is not) specified, and that this argument is picked up as a discourse referent, which inherently quantificational DPs do not introduce.[12] But for *whole* adjectives, there is no independent reason to adopt this view, and indeed it seems potentially problematic to assume that a good fit require-

---

[12] This is simplified in that it does not reflect their elaborations of the account in light of the observation that inherently quantificational DPs may introduce group discourse referents.

ment on covers might be imposed through an anaphoric mechanism.

On the alternative, higher-type approach, rather than denoting properties as in (55), *whole* adjectives would take determiner denotations as arguments:

(58) $[\![\, whole \,]\!]^g = \lambda P \, \lambda D \, . \, \iota x[x{=}D(P) \wedge g(Cov)$ is a singular good fit with respect to x

This yields the unique individual that the DP would have denoted had the *whole* adjective been absent, with the additional requirement that the DP be interpreted with respect to a good-fitting singular cover. Thus it must be the case that had the *whole* adjective been absent, the DP denotation would have been of type *e*. Inherently quantificational determiners, then, are ruled out.

This approach has at least three virtues, aside from empirical adequacy. First, it parallels very closely the denotation given for *all* in (52), repeated here as (59):

(59) $[\![\, all_{Cov} \,]\!]^g = \lambda x \, . \, \iota y[y{=}x \wedge g(Cov)$ is a good fit with respect to x$]$

This is more than a superficial or accidental parallel—it amounts to the claim that *whole* adjectives are incompatible with inherently quantificational determiners for the same reason that all is incompatible with inherently quantificational DP complements. Yet the high type allows this to be captured without being forced into syntactic assumptions, such as movement of *whole* adjectives to a position above the DP. Second, because in (58) *whole* adjectives no longer denote properties, the correct prediction is made that they should not occur in predicative positions. Third, in supposing that *whole* adjectives take determiner denotations as arguments, something is reflected of the special relationship certain 'functional' kinds of adjectives may bear to determiners. Larson (1999) and Zimmermann (2000) have proposed that certain adjectives may incorporate with certain determiners. This is the case overtly in English another. In German, the *whole* adjective ganz 'whole' is actually restricted to certain determiners in an idiosyncratic way. It seems desirable, then, to be able to capture a close relationship between certain kinds of adjectives and determiners. Yet in English, there does not appear to be any evidence, aside from the similarity to all, to suppose that any such incorporation takes place with *whole* adjectives, at least in a syntactic or morphological sense. Supposing that *whole* adjectives take determiner arguments provides a way of expressing this relationship, but it does not require or preclude making these other commitments.

In this case, then, the higher-type approach actually may be more elegant, and perhaps even in some sense more parsimonious, than a lower-type alternative might be. This may be among the rare occasions when brute force is exactly what's called for.

5.7 *Choice Functions*

There is a certain complication the denotation in (58) presents. It requires that DPs modified by *whole* adjectives denote individuals. This is straightforward for definites. But for indefinites, especially nonspecific ones, this requires making some further assumptions.

For specific and wide-scope indefinites, this can be achieved naturally through a choice function interpretation (Winter 1997, Reinhart 1997, Kratzer 1998, Matthewson 1999).[13] Thus, assuming the choice-function interpretation for *a sandwich* in (60a), *a whole sandwich* may have the denotation in (60b):

(60) a. *a sandwich*
      $[\![\,a\,]\!] = \lambda P \,.\, f(P)$, where F is a partial function picking out an x such that
      $P(x)$
      $[\![\,a\,]\!]([\![\,sandwich\,]\!]) = f(sandwich)$
   b. *a whole$_{Cov}$ sandwich*
      $[\![\,whole_{Cov}\,]\!]^g = \lambda P\,\lambda D \,.\, \iota x[x{=}D(P) \wedge g(Cov)$ is a singular good fit with
      respect to x
      $[\![\,whole_{Cov}\,]\!]^g([\![\,sandwich\,]\!])([\![\,a\,]\!]) = \iota x[x{=}D(P) \wedge g(Cov)$ is a singular
      good fit with respect to x

Choice functions can thus ensure that indefinites may denote individuals. Since the denotation for *whole* in (58) requires that DPs modified by *whole* adjectives always denote individuals, this would require that any indefinite modified by *whole* be a choice-function indefinite. This requires particular assumptions about choice functions.

In particular, the choice function mechanism must be one that would permit indefinites modified by *whole* adjectives to take narrow scope, as in (61):

(61) Every ferret ate an entire sandwich.

This has a reading in which sandwiches eaten vary with ferrets. In order to accommodate this fact, it will be necessary to assume that choice functions may be existentially closed inside the scope of other quantifiers (Winter 1997, Reinhart 1997). Supposing choice functions receive only widest-scope existential closure (Matthewson 1999) would predict that, given this approach to *whole* adjectives, the indefinite in (61) should have only a wide-scope reading. Although it is not entirely straightforward to demonstrate, a parameterized choice function mechanism of the sort proposed by Kratzer (1998) may not suffice, either. Kratzer accounts for

---

[13] One might also attempt to draw the distinction between inherently quantificational DPs on the one hand and definites and indefinites on the other in Kamp-Heim terms (Heim 1982, Kamp 1981). I won't pursue this possibility here.

pseudoscope effects—cases where indefinites take unexpectedly wide scope (or, in some cases, unexpectedly narrow scope)—by proposing that indefinite determiners may denote choice functions with an implicit argument that can be bound by higher quantifiers, creating the illusion of unexpected scope. This could in principle account for (61). It might be the case that the indefinite determiner here denotes a choice function with an argument bound by every ferret, so that for each ferret there is a different way of picking out a particular sandwich. But Kratzer further proposes that choice functions have values provided by the context—essentially, that only specific indefinites may have choice-function interpretations. Yet one may probably utter (61) on the reading in which sandwiches may vary with ferrets in a context that does not make salient a particular function from ferrets to sandwiches. This judgment may be somewhat precarious, though, if only in that it is unclear how it could adequately be tested.

5.8   *A Reservation: Is There Really 'Singular Distributivity'?*

At this point, it is worth pausing to note one potential qualm with embarking on an analytical path that leads to such a close parallel between singular and plural semantics.

One may, perhaps, sensibly abstract away from some of the problems concerning the differences between the part relation required for singulars and for plural and mass nouns, even if only tentatively. But if singulars really are interpreted using a Part distributivity operator, even in a cover-theoretic framework in which the notion of distributivity does not entail universal quantification over atoms, some notion of distributivity, however weakened, is placed foursquare at the heart of the semantics of singulars. Whether this is justified is not clear.

Of course, a predicate sometimes holds of all the parts of a singular of which it is predicated. Inversely, a predicate sometimes holds of a singular of which it is predicated but not necessarily of its parts. This is all entirely consistent with the cover-theoretic notion of distributivity—the former case may be modeled with a cover in which the parts occupy different cells and hence are distributed over, and the latter with a cover in which the parts are grouped together in a single cell. But covers coupled with the Part distributivity operator can give rise to other interpretations as well, as the discussion in section 5.2 illustrated. One might reasonably wonder, then, if these sorts of interpretations are also attested for singulars. Since a more pressing concern with the same source is about to arise, it will suffice to simply leave this question unresolved here, as a kind of pebble in our analytical shoe.

5.9   *A More Acute Problem: Trouble with Scope*

A more clear-cut and dramatic sign of trouble is that the account as it stands makes the wrong predictions with respect to the scope of certain indefinites. Scope ambiguities with respect to negation could arise, on this account, by supposing that the Part operator can occupy a syntactic position above or below negation. The absence of scope ambiguities with respect to indefinites in monoclausal sentences might also be explained. But this account wrongly predicts certain narrow-scope interpretations of indefinites in embedded clauses that are not in fact possible.[14]

The crucial fact about the interaction of *whole* adjectives and indefinites is that there doesn't seem to be any—that is, no scope ambiguities arise. Yet the Part distributivity operator introduces a universal quantifier with a property variable free in its scope. This leaves a backdoor open through which existential quantifiers might sneak in and thereby perniciously achieve narrow scope. In monoclausal sentences, there might be independent ways to guard against this risk. On typical assumptions, QR can attach indefinites only to proposition or truth-value denoting expressions; a corresponding assumption might be maintained on the choice-function approach adopted above. The Part operator, on the other hand, applies only to property-denoting[15] expressions, so in monoclausal structures will necessarily occur below the lowest point at which an indefinite may on these assumptions be interpreted, thereby ensuring that no indefinite is interpreted inside the scope of the universal introduced by the Part operator.

But in complex sentences, this mode of explanation is unavailable, and the backdoor is wide open. Before facing the problem head-on, though, it may be helpful to demonstrate that indefinites introduced in embedded clauses indeed do not seem to be in the scope of a universal even when a *whole* DP occurs in the matrix clause. Contrasts in the available interpretations of *different* reflect this especially clearly:

(62)   a. Every member of the committee suggested that Floyd submerge a
            different ferret.
        b. The whole committee suggested that Floyd submerge a different ferret.

---

[14] Thanks especially to Roger Schwarzschild for making me think more clearly about scope with respect to indefinites.

[15] This oversimplifies slightly; in fact, a counterpart of the Part operator that applies to relations must also be defined to account for distributivity over object positions, and more generally it is probably necessary to assume that these are alternative members of a family of distributivity operators that are generalized, as suggested by Lasersohn (1998), to various types in the same general way that generalized conjunction (Partee and Rooth 1983) is; this is the approach Brisson (1998) adopts. What is crucial for the current point is that no distributivity operator applies to propositions.

(63)   a. Everyone in town suspects that a different lamp store is run by the mafia.

       b. The whole town suspects that a different lamp store is run by the mafia.

Just as when *whole* and *different* occur in clausemate DPs, the particular reading of *different* that arises in the scope of universals is not present in the (b) sentences, as it is in the (a) sentences—(63a) for example, cannot be used to express what an out of the blue utterance of (63b) most naturally means. The embedded indefinites, then, do not appear to be in the scope of a universal.[16] Yet given the account of *whole* adjectives as it stands, they should. The Part distributivity operator introduces a universal quantifier with scope over the entire matrix VP. If the embedded indefinite scopes within its clause, it would then be inside the scope of this universal, and the relevant readings of *different* should be possible in (62b) and (63b). Illustrating:[17]

(64)   *the whole$_{Cov}$ committee [Part$_{Cov}$ [suggested that Floyd submerge a ferret]]*

       a. ⟦ *suggested that Floyd submerge a ferret* ⟧^{g} =
λx . suggest($^\wedge\exists$f[submerge(f(ferret))(Floyd)])(x)

       b. ⟦ *Part$_{Cov}$* ⟧^{g} = λP λx . $\forall$y [[y∈g(*Cov*) ∧ y≤$_s$x] → P(y)]

       c. ⟦ *Part$_{Cov}$ suggested that Floyd submerge a ferret* ⟧^{g} = λx $\forall$y[[y∈g(*Cov*) ∧ y≤$_s$x] → suggest($^\wedge\exists$[submerge(f(ferret))(Floyd)])(y)]

       d. ⟦ *the whole$_{Cov}$ committee* ⟧^{g} = ιx[x=ιz[committee(z)] ∧ g(*Cov*) is a singular good fit with respect to x]

       e. ⟦ *the whole$_{Cov}$ committee Part$_{Cov}$ suggested that Floyd submerge a ferret* ⟧^{g}
= $\forall$y[[y∈g(*Cov*) ∧ y≤$_s\iota$x[x=ιz[committee(z)] ∧ g(*Cov*) is a singular good fit with respect to x]] → suggest($^\wedge\exists$f[submerge(f(ferret))(Floyd)])(y)]

The resulting reading is one true if the cover is a singular good fit, and every member of the cover consisting only of parts of the committee suggested that Floyd commit ferret-submersion. The indefinite is in the scope of the universal introduced by the Part operator, and it is a puzzle why the indefinites in (62–63) do not seem to behave as though they were in the scope of a universal.

---

[16] Differences in available readings might be detectable here even without *different*, but *different* provides a convenient way of abstracting away from complications introduced by the independently present de re-de dicto ambiguity.

[17] The embedded indefinite is interpreted here in the choice function style, with existential closure at the clause level. The collective *the whole committee* is treated as denoting a singular individual here, though the point being made in the text probably does not hinge on what the proper analysis of collectives is (see Schwarzschild 1996 for discussion of this question). For ease of readability, I depart in a purely notational way from the roughly Heim and Kratzer (1998) assumptions otherwise adopted here in using the cap operator.

5.10   *The Singular Part Operator*

What the scope problem and the uneasiness expressed above collectively suggest is that in fact there may be something wrong about thinking of singulars as involving distributivity, even in the cover-theoretic way. Perhaps, then, the locus of distributivity—the Part operator—is to blame.

We cannot simply throw out the rotten apple here, however. While distributivity may not be quite the notion that is required, the Part operator does more than that. It is also crucial to the mechanics of covers—it does the essential work of relating a predicate and an individual in a cover-sensitive way. What is necessary, then, is some means of doing this essential work without distributivity. Fortunately, this seems to be possible.

Rather than simply borrowing the singular Part operator as a kind of calque on the plural one, or possibly treating the singular and plural Part operators as somehow not fully distinct, one can define the singular Part operator on its own terms. To do this, one might begin by thinking afresh and perhaps a bit impressionistically about what exactly it means to predicate something of a singular individual. If I assert of a sandwich that it is eaten, I seem to be predicating consumption in a kind of collective way of a single individual, possibly an 'integrated whole' in Moltmann's sense. Depending on the context, this single individual may not actually include every part of the sandwich, of course—it may simply be part of the sandwich, and in most contexts, it is a big part. But I am probably not predicating consumption in some independent, distributive way of the bread, the hummus, the cucumber slices, and the mysterious little seeds (cumin?) falling all over my plate. Indeed, if I had for some reason wanted to do this, I might have used a plural (the parts of the sandwich, possibly).

Perhaps, then, we can do justice to this vague intuition by supposing that the singular Part operator, unlike its plural counterpart, applies a predicate to only one cell in the cover—namely, in this case, the one containing whatever I regard as the sandwich in the current context. Assuming this context is fairly normal, the bread, hummus, cucumber slices, and most of the seeds will probably count as part of the sandwich, but the seeds that have fallen on my plate probably do not. Thus the bread, hummus, cucumber slices, and non-fallen seeds will make up a single cell of the cover in this context; the fallen seeds will have to be included in some other cell (perhaps the one that also includes my plate) of which consumption will not be predicated. Given the domain D indicated, things might look like this:

(65)   {the bread, the hummus, the cucumbers slices, the seeds that have fallen,
            the seeds that have not fallen, me, my plate, Clyde}⊆D, and D
            contains nothing else apart from all parts and all sums of its members
        Cov = {the bread+the hummus+the cucumber slices+the seeds that have
            not fallen, the seeds that have fallen+my plate, me, Clyde}

This, then, models a nonmaximal reading—it separates the irrelevant parts of the sandwich—but does not involve distributivity. It is, in fact, precisely analogous to how collective predication works in plurals. In singulars, though, this seems to be the only interpretation possible. Use of a singular seems to presuppose that the cover contains a single cell of which something will be predicated (collectively, in this sense).

The singular Part operator can be redefined to reflect this requirement; for comparison, the plural Part operator is repeated here as well, and they are more clearly distinguished notationally:

(66)   a. $[\![sgPart_{Cov}]\!]^g = \lambda P\, \lambda x\, .\, P(\iota y[y{\in}g(Cov) \wedge y{\leq_s}x])$
        b. $[\![plPart_{Cov}]\!]^g = \lambda P\, \lambda x\, .\, \forall y[[y{\in}g(Cov) \wedge y{\leq}x] \rightarrow P(y)]$

The singular Part operator is no longer a distributivity operator. It now applies its first argument, a property, to the unique cell in the cover that is part of its second argument, an individual. The plural Part operator is just as it was before. It applies its first argument, a property, to every cell in the cover that is part of its second argument, an individual. So the singular Part operator is a more demanding version of the plural one, in that it presupposes a particular kind of cover.

The cover in (65) satisfies this presupposition, since there is a unique cell that contains only parts of the sandwich. A cover otherwise identical to it in which the seeds that have fallen are a cell of their own, however, would not, since there would be two sandwich-only cells. That this possibility is ruled out in singular predication—understood here as a failure of presupposition—is consistent with the intuition expressed above that singular predication is in a sense always collective.

Despite this quite fundamental revision, the role of *whole* adjectives remains unchanged. They can still contribute a good fit requirement, just as they did before.

Now that the definitions of the singular and plural Part operators are so clearly distinct, it becomes especially pressing that the right Part operator occur with the right sort of DP. There are a number of ways of approaching this. One might imagine that mismatches are ruled out by what varieties of individuals can stand in the singular or plural relation to each other. Alternatively, this could be a matter of syntactic agreement. If, as Schwarzschild suggests, Part operators are

related to floated quantifiers, this would not be unexpected—floated quantifiers may in fact agree with their associated DPs, as they do in for example Hebrew (Shlonsky 1991) and German (Merchant 1996). A related understanding might view the relationship between the plural Part operator and floated quantifiers as fundamentally the same as the relationship between the singular Part operator and adverbs that seem to quantify over parts of a singular, such as mostly, wholly, or largely, or even the use of all in expressions like all wet (Schwarzschild 1996, p. 162–170).[18]

This revision, then, has divorced the Brissonian cover-theoretic approach to nonmaximal interpretations from distributivity, allowing *whole* adjectives to render nonmaximal readings impossible without presupposing a theory of singular predication that requires universal part quantification.

5.11   *Scope of Indefinites Revisited*

In eliminating universal quantification from the semantics of the singular Part operator, the prediction of the unattested scope interactions with respect to indefinites has been eliminated as well.

The new interpretation of the previously problematic (64) illustrates this:

(67)   *the whole$_{Cov}$ committee [sgPart$_{Cov}$ [suggested that Floyd submerge a ferret]]*
    a. $[\![$ *suggested that Floyd submerge a ferret* $]\!]^g =$
        $\lambda x \,.\, \text{suggest}(^\wedge \exists f[\text{submerge}(f(\text{ferret}))(\text{Floyd})(x)$
    b. $[\![$ *sgPart$_{Cov}$* $]\!]^g = \lambda P \lambda x \,.\, P(\iota y[y \in g(Cov) \wedge y \leq_s x]$
    c. $[\![$ *sgPart$_{Cov}$ suggested that Floyd submerge a ferret* $]\!]^g =$
        $\lambda x \,.\, \text{suggest}(^\wedge \exists f[\text{submerge}(f(\text{ferret})(\text{Floyd})])(\iota y[y \in g(Cov) \wedge$
        $g(Cov)$ is a singular good fit with respect to x])
    d. $[\![$ *the whole$_{Cov}$ committtee* $]\!]^g = \iota x[x = \iota z[\text{committee}(z)] \wedge g(Cov)$ is a
        singular good fit with respect to x]
    e. $[\![$ *the whole$_{Cov}$ committee sgPart$_{Cov}$ suggested that Floyd submerge a ferret* $]\!]^g$
        $= \text{suggest}(^\wedge \exists f[\text{submerge}(f(\text{ferret}))(\text{Floyd})])(\iota y[y \in g(Cov) \wedge$
        $y \leq_s \iota x[x = \iota z[\text{committee}(z)] \wedge g(Cov)$ is a singular good fit with
        respect to x]])

The existential introduced by the indefinite was previously in the scope of the universal quantifier over cells in the cover. Now, there is no such universal for it to interact with, and no scope interactions with the Part operator are expected.

---

[18] Thanks to an anonymous SALT reviewer for pointing out the relevance of examples like this.

More generally, an explanation has now emerged for why *whole* adjectives do not give rise to scope ambiguities with respect to indefinites. *Whole* adjectives are not themselves universally part-quantifying, and the singular Part operator does not contribute any universal quantifiers that might give rise to such scope interaction, either.

5.12 *Scope of Negation:* Not*, Scope, and Not Scope*

At this point, one might be concerned about the apparent scope interactions between *whole* adjectives and negation observed in section 2 above. In redefining the singular Part operator, we have eliminated scope interactions with indefinites, but in doing so, have we also lost an account of the interaction of *whole* adjectives and negation?

In one sense, yes. On a theory in which the singular Part operator has universal force, one might suppose that multiple interpretations are possible depending on whether negation occurs immediately above or below the syntactic position of the Part operator, and therefore with scope over or under the universal it contributes. But with the revised singular Part operator, such an account is no longer available. The relative position of Part and negation could make no difference:

(68)   The whole ferret isn't submerged.

(69)   *the whole$_{Cov}$ ferret isn't [sgPart$_{Cov}$ submerged]*
  a. $[\![$ *submerged* $]\!]$ = λx . submerged(x)
  b. $[\![$ *sgPart$_{Cov}$ submerged* $]\!]^g$ = λx . submerged(ιy[y$\in$g(*Cov*) $\wedge$ x$\leq_s$x])
  c. $[\![$ *isn't sgPart$_{Cov}$ submerged* $]\!]^g$ = λx . $\neg$submerged(ιy[y$\in$g(*Cov*) $\wedge$ y$\leq_s$x])
  d. $[\![$ *the whole$_{Cov}$ ferret* $]\!]^g$ = ιx[x=ιz[ferret(z)] $\wedge$ g(*Cov*) is a singular good fit with respect to x]
  e. $[\![$ *the whole$_{Cov}$ ferret isn't sgPart$_{Cov}$ submerged* $]\!]^g$ = $\neg$submerged(ιy[y$\in$g(*Cov*) $\wedge$ y$\leq_s\iota$x[x=ιz[ferret(z) $\wedge$ g(*Cov*) is a singular good fit with respect to x]])

(70)   *the whole$_{Cov}$ ferret sgPart$_{Cov}$ [isn't submerged]*
  a. $[\![$ *isn't submerged* $]\!]$ = λx . $\neg$submerged(x)
  b. $[\![$ *sgPart$_{Cov}$ isn't submerged* $]\!]^g$ = λx . $\neg$submerged(ιy[y$\in$g(*Cov*) $\wedge$ y$\leq_s$x])
  c. $[\![$ *the whole$_{Cov}$ ferret sgPart$_{Cov}$ isn't submerged* $]\!]^g$ = $\neg$submerged(ιy[y$\in$g(*Cov*) $\wedge$ y$\leq_s\iota$x[x=ιz[ferret(z)] $\wedge$ g(*Cov*) is a singular good fit with respect to x]])

32

An identical denotation is arrived at in (69) and (70), so an explanation in terms of the relative scope of negation and Part is not an option.

There is, however, another way of looking at things. The interpretation a sentence such as (68) receives on this analysis is a weak, scopally 'underspecified' one. What is denied in (68) is that the ferret, construed maximally, is submerged; it is not asserted that the ferret, construed maximally, is unsubmerged. For current purposes, this could actually be paraphrased in quantificational terms: the interpretation of (68) corresponds to a reading in which negation has scope over a universal part quantifier, not vice versa. Of course, such a weaker interpretation does not rule out the possibility that the stronger one could also be true. To deny that the ferret, construed maximally, is submerged is not to assert that the ferret, construed maximally, is unsubmerged. Perhaps, then, the weaker reading is all the semantics provides, and the stronger reading arises in some contexts pragmatically.

One reason this seems a sensible route to take is that some version of it would probably be necessary anyway in a scope-based account, as the interpretation of (71) illustrates:

(71)   Floyd really didn't want to talk about that whole sensitive topic.

The most natural interpretation here is the strong one, in which this sentence is taken to claim that there was no part of the topic Floyd wanted to talk about. But even on a scope-based account, only the weaker interpretation (in which Floyd's desire was for discussion of not all of the topic) could be provided by the semantics. Both the *whole* adjective and the relevant singular Part operator are embedded under negation here, which would yield the weak reading. And because negation and the *whole* DP are not clausemates, even if some quantificational force could be assumed for the DP, it is not clear how it could achieve scope over the matrix-clause negation. It is independently necessary, then, to assume that stronger readings can sometimes arise for sentences in which the semantics provides only the weaker ones.

Another reason for attributing the stronger interpretations to pragmatic strengthening is their sensitivity to lexical properties of predicates. The stronger interpretations arise most naturally with what Yoon (1996) (see also Kennedy and McNally 1999 and **?**) calls partial predicates—very roughly, predicates such as dirty, wet, or touch that typically hold of an individual if they hold of any part of it. These contrast with total predicates such as clean, dry, or eat, which typically hold of an individual only if they hold of all of it.[19] With total predicates, the stronger

_____

[19] The relation between partial and total predicates and the cover approach to nonmaximal interpretations may warrant more investigation than it can be given here. One way of understanding partial predicates in this light is as predicates that in most contexts tolerate extremely ill-fitting covers; total predicates can be understood to tolerate only covers that fit relatively well. Kennedy

reading does not as naturally arise:

(72) a. *Partial predicate*: Clyde didn't touch this whole sandwich.
      b. *Total predicate*: Clyde didn't eat this whole sandwich.

(73) a. *Partial predicate*: Floyd wouldn't mention that entire problem.
      b. *Total predicate*: Floyd wouldn't solve that entire problem.

Out of the blue, it is quite natural to take the partial predicate sentences as involving the complete absence of sandwich-touching and problem-mentioning. But the most likely interpretation of the total predicate sentences involves incomplete sandwich-consumption and incomplete problem-solving. The outlines of an explanation of this contrast may lie in the observation that on the weak reading, the partial-predicate sentences deny that something independently fairly unlikely. In (72a), it would be denied that Clyde made full physical contact with all of the sandwich, perpetrating upon it either systematic poking or some sort of exhaustive rubbing. In (73b), it would be denied that Floyd's mere mention of the problem exhausted the subject, which would require either that the problem be so small that a discussion of all of it could be characterized as a mention, or else that Floyd kept mentioning the problem in separate acts that ultimately exhausted it. Given the relative unlikelihood of these readings, it seems reasonable that the stronger ones would be in general more salient. The weak readings of the total-predicate sentences, however, deny something relatively less pragmatically odd. Of course, none of this is evidence against a scope ambiguity account directly—on such a view, these pragmatic factors would still select among the possible readings in the same way. But again, this is a case in which independent pragmatic factors probably must be appealed to on either approach.

---

and McNally (1999) develop a fine-grained theory of essentially the total-partial distinction in adjectives, with special attention to degree modification, in terms of the scale structure. Some connection between a cover-theoretic and a scale-structure representation of this contrast might be expected. Both approaches have at their heart the interaction of context-sensitivity with aspects of lexical semantics that can circumscribe it. Empirically, there is a connection, too. Certain part-structure adverbs that may be thought of as overt relatives of the singular Part operator also have readings that involve not proportions of an individual, but, loosely put, proportions of a scale:

(i)   a. The campus is completely nauseating.
      b. Oklahoma is wholly Republican.
      c. Gretchen is mostly Portuguese.
      d. The table is largely dry.
      e. Her committee is entirely opposed to actually trying to use that title.

These are ambiguous. The campus in (ia), for example, may be claimed to have no non-nauseating parts, or else to cause a maximal degree of nausea. Oklahoma in (ib) may have been claimed to contain only Republicans, or else to be Republican to a maximal degree. Gretchen in (ic) may be claimed to have been assembled in such a way that most of her parts came from Portugal (suppose she is a mannequin, say); or else to be Portuguese to a maximal degree. Further examination of this empirical connection, of the possible usefulness of covers in this domain, and of how this may relate to adjectival scale structure will have to be left to future research.

All this suggests, then, that an understanding of the interaction of *whole* adjectives and negation should be largely pragmatic—an unsurprising conclusion, perhaps, since covers model essentially pragmatic, or in any case contextual, phenomena. There is more to be said about these issues, though, and some speculation about possible research directions will be ventured in section 6 below.

5.13 *Discourse Anaphora*

The view that *whole* adjectives are maximizing modifiers rather than universal part quantifiers seems to provide a natural explanation of their discourse anaphoric properties. Since *whole* adjectives merely enforce a requirement on covers, with respect to discourse anaphora DPs containing them should behave though they were absent. This correctly predicts that *whole* adjectives should have no effect on discourse anaphora possibilities.

As noted in section 2, DPs with *whole* adjectives may introduce discourse referents, while universally quantified DPs may not. Repeating (17–18):

(74)   a. Every ferret was submerged. *It didn't seem pleased.
        b. A entire ferret was submerged. It didn't seem pleased.

(75)   a. Cockroaches ate each sandwich. *It had been sitting out too long.
        b. Cockroaches ate a whole sandwich. It had been sitting out too long.

This is now expected, since there will be no universal quantifier in DPs modified by *whole* adjectives.

For exactly the same reason, DPs with *whole* adjectives do not impede DPs in their scope from introducing discourse referents accessible outside it. Repeating (19–20):

(76)   a. Every building with a faulty roofi was demolished. *Iti had been leaking.
        b. An entire building with a faulty roofi was demolished. Iti had been leaking.

(77)   a. Each recent movie was marred by an irritating soundtracki. *Iti will probably be released on CD.
        b. The whole movie was marred by an irritating soundtracki. Iti will probably be released on CD.

Again, since *whole* adjectives are not universal quantifiers, and indeed are nonquantificational, it is expected that they should have no effect on discourse anaphora possibilities.

This approach to *whole* adjectives does raise a potentially interesting possibility: might the good-fit requirement on covers *whole* adjectives impose persist in discourse anaphora? That is, might we expect pronouns with antecedents modified by *whole* adjectives to also impose the good-fit requirement? (This question could also be asked with respect to all, incidentally.) Empirically, this does not seem to be the case:

(78)   Clyde ate the whole sandwich. It tasted funny.

The second sentence of (78) does not require that the whole sandwich have tasted funny. (It does not preclude this possibility, but nothing can be concluded from this—this possibility is normally not precluded.) The current analysis of *whole* adjectives predicts this result, for two independent reasons. First, it need not be the case that the cover used in the first sentence in the interpretation of the whole sandwich is the same as the cover used in the second sentence in the interpretation of it. Second, the denotation of a DP modified by a *whole* adjective will always contain a portion consisting of the denotation of the DP without the *whole* adjective, so the discourse referent introduced by the DP without the *whole* adjective will always be accessible.

6   Some Further Questions and a Final Word

6.1   *Further Questions*

A few puzzles associated with *whole* adjectives have not been addressed here, but bear pointing out briefly. One of them is a mysterious quirk of the syntax of *whole* in English with respect to numerals:

(79)   a. A whole three thousand ferrets were submerged.
        b. Three thousand whole ferrets were submerged.

Both of these orders are in one way or another potentially problematic. In (79a), the position of the *whole* adjective is just below the determiner, as the account developed here would predict. But it is puzzling what an overt determiner is doing in this position at all. In general, English plurals are incompatible with a:

(80)   *A three thousand ferrets were submerged.

Yet the DP in (79a) is indisputably grammatically plural, as both the plural morphology on the noun and the plural agreement morphology on the verb reflect. It seems possible that this is related to a more general (but nonetheless mysterious) phenomenon in which certain adjectives can license a on plurals—e.g. *An incredible 2 billion people watched the World Cup final*. Semantically, it is not entirely

clear what *whole* contributes in such sentences, either, or indeed whether it receives the *whole* adjective or the complete adjective reading. Whatever the syntax and semantics of this sort of structure might be, it does not seem to follow directly from anything said here. In (79b), another sort of problem seems to emerge. The position of *whole* is below a numeral, which would be puzzling under this analysis unless the numeral is analyzed as a determiner rather than an adjective. Perhaps more vexing, the DP is plural, and it is not obvious that *whole* here receives the irrelevant complete adjective reading.

A more general puzzle that may be connected to these observations concerns the relationship between *whole* adjectives and polarity. This is a topic explored in den Dikken (To appear), who examines Dutch *heel* 'whole', which shares many of the properties of English *whole*. He notes an intriguing peculiarity of this *whole*: it has a negative polarity item incarnation with intricate and unusual licensing conditions. A taste of the effect:

(81) Ik ken die hele   vent *(niet)   (den Dikken To appear)
      I   know that whole.INF bloke not
      'I don't know that bloke at all.'

Interestingly, this *heel* occurs most easily with demonstratives, which may correspond to an effect in English in which demonstratives give rise to strengthened readings with respect to negation more easily than do definites or indefinites:

(82) Floyd doesn't want to talk about $\left\{ \begin{array}{l} \text{this} \\ \text{the} \\ \text{an} \end{array} \right\}$ entire subject.

In German, polarity effects and the syntactic strangeness in (79) seem to converge (Angelika Kratzer, p.c.). As in English, both the pre-numeral and post-numeral position is possible for a *whole* adjective in German, but interestingly, the pre-numeral position requires positive polarity and receives a special interpretation:

(83) Hans/niemand hat ganze zwei Dissertationen betreut.
      Hans/no one   has whole two   dissertations   supervised
      'Hans/no one has supervised two dissertations.' (Gives rise to the feeling that two is not a lot.)

These issues will be left for future research. It may be worth noting, though, that the use of covers may help in understanding the connection between *whole* adjectives and polarity. Covers are essentially a kind of domain restriction, and the good-fit requirement can be understood as an intellectual cousin to the sort of domain-widening Kadmon and Landman (1993)suggest is responsible for the polarity sensi-

tivity of English any.[20] Since an intimate connection between manipulation of contextually-provided domains and polarity sensitivity is independently expected, an approach to *whole* adjectives in terms of restrictions on covers may provide the foundation for an understanding of their polarity properties.

6.2 *A Final Word*

The central argument made here is that *whole* adjectives are not universally quantifying, but maximizing modifiers in the sense of Brisson (1998). This accounts for their essential semantic contribution, the restrictions they impose on determiners, their scope properties, and the anaphoric possibilities they license. In the course of pursuing this approach, a general model of nonmaximal interpretations of singulars was developed and some consequences for choice functions were encountered. To the extent that this approach managed to explain nonmaximal interpretations of singulars and plurals similarly using the same sorts of theoretical tools, it suggests that there is something right about the analytical intuition, expressed especially by Moltmann (1997), that part structure in singulars and in plurals should be understood in highly parallel terms.

References

Abusch, Dorit and Mats Rooth. 1997. 'Epistemic np modifiers'. In Lawson, A., ed., *Proceedings of SALT VII*. CLC Publications, Ithaca, New York.

Beck, Sigrid. 2000. 'The semantics of 'different': Comparison operator and relational adjective'. *Linguistics and Philosophy* 23(2):101.

Brisson, Christine. 1998. *Distributivity, Maximality, and Floating Quantifiers*. Doctoral dissertation, Rutgers University.

Bunt, H. 1979. *Mass Terms and Model-Theoretic Semantics*. Cambridge University Press, Cambridge.

den Dikken, Marcel. To appear. 'Direct and parasitic polarity item licensing'. *The Journal of Comparative Germanic Linguistics* .

Gillon, Brendon S. 1987. 'The readings of plural noun phrases in English'. *Linguistics and Philosophy* 10(2):199.

Heim, Irene. 1982. *The Semantics of Definite and Indefinite Noun Phrases*. Doctoral dissertation, University of Massachusetts.

Kadmon, Nirit and Fred Landman. 1993. 'Any'. *Linguistics and Philosophy* 16(4):353.

Kamp, Hans. 1981. 'A theory of truth and semantic representation'. In Groenendijk, Jeroen A., Theo Janssen, and Martin Stokhof, eds., *Formal Methods in the Study of Language*. Foris, Dordrecht.

---

[20] Thanks to Ana Arregui pointing me in this direction.

Kennedy, Christopher and Louise McNally. 1999. 'From event structure to scale structure: Degree modification in deverbal adjectives'. In Mathews, T. and D. Strolovitch, eds., *Proceedings of SALT IX*. CLC Publications, Ithaca, New York.

Kratzer, Angelika. 1996. 'Severing the external argument from its verb'. In Rooryck, Johan and Laurie Zaring, eds., *Phrase Structure and the Lexicon*. Kluwer Academic Publishers, Dordrecht.

Kratzer, Angelika. 1998. 'More structural analogies between pronouns and tenses'. In *Proceedings of SALT VIII*. CLC Publications.

Landman, Fred. 1989. 'Groups I'. *Linguistics and Philosophy* 12:559.

Larson, Richard. 1999. 'Semantics of adjectival modification'. Lecture notes, LOT Winter School, Amsterdam.

Lasersohn, Peter. 1998. 'Events in the semantics of collectivizing adverbials'. In Rothstein, Susan, ed., *Events and Grammar*. Kluwer Academic Publishers, Dordrecht.

Link, Godehard. 1983. 'The logical analysis of plurals and mass terms: A lattice-theoretical approach'. In Bauerle, et al, ed., *Meaning, Use, and Interpretation of Language*. DeGruyter, Berlin.

Matthewson, Lisa. 1999. 'On the interpretation of wide-scope indefinites'. *Natural Language Semantics* 7(1):79.

Merchant, Jason. 1996. 'Object scrambling and quantifier float in German'. In Kusumoto, Kiyomi, ed., *Proceedings of NELS 26*. GLSA, University of Massachusetts, Amherst.

Moltmann, Friederike. 1997. *Parts and Wholes in Semantics*. Oxford University Press, New York.

Quine, W.V.O. 1960. *Word and Object*. MIT Press, Cambridge, Mass.

Reinhart, Tanya. 1997. '*Wh*-in-situ in the framework of the minimalist program'. *Natural Language Semantics* 6(1):29.

Schwarzschild, Roger. 1996. *Pluralities*. Kluwer Academic Publishers, Dordrecht.

Shlonsky, Ur. 1991. 'Quantifiers as functional heads: A study of quantifier float in Hebrew'. *Lingua* 84:159.

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

Yoon, Yoongeun. 1996. 'Total and partial predicates and the weak and strong interpretations'. *Natural Language Semantics* 4(217-236).

morzycki@linguist.umass.edu

Dept. of Linguistics
South College
University of Massachusetts
Amherst, MA 01003
USA