

## DP-internal only, amount relatives, and relatives out of existentials

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### 1. Similarities between amount relatives and relatives out of existentials

Relative clauses whose gap corresponds to the postverbal nominal in a there-existential have been claimed to have only amount readings and to lack ordinary restrictive relative readings (Carlson 1977, Heim 1987, Grosu and Landman 1998). This claim has been based on the observation that relatives out of existentials share two important structural properties with clear cases of amount relatives: a restriction to definite/universal determiners on the head noun, and a requirement for a that or null relative pronoun in some dialects of English. In this squib I argue that facts involving DP-internal only cast serious doubt on the viability of explaining these similarities via an obligatory amount relative analysis for relatives out of existentials.

Intuitively, amount relatives denote properties of amounts or degrees, and as a result the DPs containing them are interpreted as denoting amounts or degrees. This is clearly seen in examples like those (1) ((1b) adapted from Heim 1987:38).

- (1) a. Marv put everything he could in his pocket. (Carlson 1977:528)  
b. It would take days to drink the champagne they spilled that evening.  
c. The money it costs makes no difference.

The amount reading of (1a) would be true in a situation in which Marv had 10 objects, each of which individually would fit in his pocket, 4 of which together fill his pocket, and he chooses to put those four objects in his pocket. Paraphrasing, for the maximal amount a such that Marv could put that amount a in his pocket, he put a in his pocket. The non-amount reading would be true in the same context if, for each of the 10 objects, Marv put that object in his pocket at some point. In the case of (1b), the amount reading is the only pragmatically plausible one: it requires only drinking the same amount of champagne as was spilled on the evening in question, not that we drink the very same liquid.

As mentioned, amount relatives have two well-established identifying syntactic properties. First, as Carlson observed, they license only a definite/universal determiner on the head noun. For example, the sentences in (2) lack amount readings.

- (2) a. Max put many things that he could in his pocket.  
b. It would take days to drink some champagne they spilled that evening.  
c. ??Some money it costs makes no difference.

Second, in some dialects of English (compare the judgments in Carlson 1977 with those in Safir 1982; see Heim 1987 for discussion), amount relatives strongly prefer or require a that/null relative pronoun and are incompatible with which, who. The examples in (3) allow an amount reading only with difficulty, if at all, while (4) shows that expressions that arguably denote only amounts, such as the complement to measure verbs like cost, resist which-relatives.

- (3) a. %Max put everything which he could in his pocket.  
b. It will take years to drink the champagne which they spilled that evening.
- (4) ??The money which it costs makes no difference.

Carlson observed that relatives out of the postverbal position in existential sentences share both of these properties:<sup>1</sup>

- (5) a. You've eaten every cookie there was in the house.  
b. They're overwhelmed by (all) the visitors there are.  
c. ??You've eaten some/two/many cookies there are in the house.
- (6) a. ??You've eaten every cookie which there is in the house.  
b. ??They're overwhelmed with all the visitors who/which there are.

Though these facts suggest that existentials only permit amount relatives out of postverbal position, closer scrutiny reveals two important differences between amount relatives and relatives out of existentials that call into question an amount relative analysis as the explanation for the facts in (5) and (6).

## 2. Differences between amount relatives and relatives out of existentials

The first difference between amount relatives and relatives out of existentials is that the latter carry an identity of individuals requirement that is not generally carried by amount relatives (McNally 1992, Grosu and Landman 1998) and which is, in fact, quite puzzling if what characterizes amount relatives is that they describe amounts as opposed to individuals. For example, (7) cannot be true if there were 5 books on the table and I read 5 books, but not those that were on the table.

- (7) I read all the books there were on the table.

Interestingly, neither McNally nor Grosu and Landman explicitly conclude from this fact that amount relativization is not involved. The former (1992:140ff.) expresses some doubt as to the amount relative analysis, but leaves the issue unresolved. The latter maintain that the relative is an amount relative but that a more sophisticated notion of degree is needed in order to guarantee identity of individuals, as will be discussed in the next section.

A second difference between amount relatives and relatives out of existentials, not previously identified in the literature, is that the head noun quite felicitously permits further modification DP-internal only, which blocks amount readings, as seen in (9).<sup>2</sup>

- (8) a. The only reasons there are are reasons for action....  
b. You drank the only beer there was left.
- (9) a. It will take days to drink the only champagne they spilled that evening.

- b. Marv put the only thing(s) he could in his pocket.
- c. ??The books cost the only amount of money we had.

On the basis of these these facts and a semantics for amount relatives such as Carlson’s or Heim’s, we might directly conclude that the relatives in (8) are not amount relatives. However, as Grosu and Landman’s semantics accounts for sentences such as (7), we should consider whether it could also account for the facts in (8)-(9).

### 3. The problem posed by DP-internal only

I begin by sketching Grosu and Landman’s analysis (hereafter, G&L). G&L take Heim’s 1987 proposal as a starting point. Heim suggests that the putative restriction to amount relativization follows from an independent condition, shown in (10), which she uses to account for the well-known definiteness effect in existentials.

(10) \*There be  $\underline{x}$ , when  $\underline{x}$  is an individual variable.

Restrictive relativization out of an existential would leave a variable as a trace, violating (10); in contrast, if relativization involves only an amount, the variable corresponding to that amount in the relative clause (here represented as a degree  $\underline{d}$ ) will not occupy all of the postverbal position but rather only part of it, as sketched in (11).

(11) books [<sub>CP</sub> there were  $\underline{d}$ -many books on the table]

As (11) does not explain the identity of individuals requirement attested in examples like (7), G&L argue for maintaining the intuition behind (10) and (11) and for introducing a richer notion of degree than has been previously assumed. While degrees are most often modeled as strictly numerical values, G&L model degrees as triples consisting of the cardinality of a plural individual, a sortal restriction on that individual, and the plural individual itself. Thus, (11) has the denotation in (12), read as “The set of all measure triples, of which the object measured is a sum of books on the table.”

(12)  $\{ \langle |x|, \text{BOOKS}, x \rangle : \text{BOOKS}(x) \wedge \text{ON-THE-TABLE}(x) \}$

For example if there are two books **a** and **b** on the table, the denotation of (11) will be equivalent to (13), where  $\mathbf{a} \oplus \mathbf{b}$  indicates the plural individual consisting of **a** and **b**.

(13)  $\{ \langle 1, \text{BOOKS}, \mathbf{a} \rangle, \langle 1, \text{BOOKS}, \mathbf{b} \rangle, \langle 2, \text{BOOKS}, \mathbf{a} \oplus \mathbf{b} \rangle \}$

G&L propose that the interpretation of amount relative clauses necessarily involves a maximalization operator MAX whose effect is to return the singleton set containing the unique triple from a set like (13), all of whose components are maximal; for example, MAX applied to (13) would yield (14).

(14) {<2, BOOKS, a⊕b>}

The MAX operator guarantees that the denotation of the head nominal will be intersected with a singleton set, necessarily yielding a singleton set as a result. This singleton set will require a definite or analogously interpreted universal determiner. Finally, to guarantee the identity of individuals reading, they posit another operator, SUBSTANCE, defined in (15), whose effect is to convert the denotation of the amount relative (represented here as MAX(CP)) from a set of degrees into a set of individuals.<sup>3</sup>

(15) [[SUBSTANCE(MAX(CP))]] = {x: <|x|, P, x> ∈ [[MAX(CP))]]}

Obviously, SUBSTANCE cannot apply in the interpretation of typical amount relatives such as those in (1), as identity of individuals is not enforced in those cases. By way of explanation G&L suggest only the following, which implies, curiously enough, that they consider identity of individuals the rule, rather than the exception, with amount relatives:

We do not know what exactly the contextual conditions are that allow (and sometimes even prefer) the special interpretation strategy which produces the identity-of-quantity interpretations....A cursory glance at such examples suggests that the presence of a modal, generic, or habitual may facilitate these interpretations. (Grosu and Landman 1998:142)

Note, however, that while modality, habituality and genericity facilitate amount readings, none is strictly speaking necessary to make an identity of quantity reading available, as the following examples show:

- (16) a. We were astonished at the beer they spilled that evening.  
b. We lost the battle because we lacked the soldiers our enemy had.

Thus, one initial weakness of this account is that, in addition to having to stipulate the existence of a more complex notion of degree than is necessary in other contexts for which degrees are used (such as the interpretation of gradable adjectives), it fails to predict when the identity of individuals reading is required vs. simply permitted.

An additional problem arises from facts involving DP-internal only. Recall from (9) that this use of only blocks an otherwise available identity of quantity reading. For example, we must explain why the relevant DP in (9a) cannot be paraphrased using “the only quantity of champagne they spilled that evening”; or (9b), using “the only quantity of things he could”. G&L’s analysis correctly predicts the blocking of the amount reading in (9); the problem is that the same analysis does not account for the existential facts in (8).

I will assume that DP-internal only denotes a function from properties to properties, since it is unacceptable in predicative uses:

(17) ??My dog is only.

The effect of only is to guarantee the uniqueness of the extension of the NP in the relevant possible world, much as the definite article does, but without the familiarity presupposition typically manifest in definites. The proposed semantics for DP-internal only appears in (18), where  $x$  ranges over atomic and nonatomic individuals.

$$(18) \quad [[\text{only}(\text{NP})(w)]] = \{ \underline{x} \mid \underline{x} \in [[\text{NP}]](w) \wedge \forall \underline{x}' [\underline{x}' \in [[\text{NP}]](w) \rightarrow \underline{x}' \leq \underline{x}] \}$$

This semantics differs from that generally assigned to focus-sensitive only, but that should be unsurprising given that in some languages the counterpart of only as a DP-internal modifier is different from its counterpart as a focus-sensitive operator (e.g. Spanish único/sólo, German einzig/nur).

Unlike the definite article, only is blocked when the uniqueness of the extension of the NP could never be at issue in any possible world, presumably because only would never be able to contribute anything in such cases.<sup>4</sup> Consider the following:

- (19) a. The only mother of Susan is Maria.  
 b. The only largest number is infinity.  
 c. The only even prime number is 2.

The examples in (19) respectively imply that it is at issue whether there exist two or more mothers of Susan, numbers that tie for being equally large, or prime even numbers, indicating that in at least one (counterfactual) possible world, the extensions of the relevant NPs are not singleton sets.

Given the semantics in (18) and G&L's semantics for amount relatives, it is unsurprising that amount relative readings should be incompatible with DP-internal only in (9). The MAX operator which is essential to the semantics of amount relatives guarantees that the extension of the amount relative will be unique in whatever possible world it is interpreted in. This uniqueness, unlike that in (19a-b), is not a matter of world knowledge but rather is the result of an aspect of the semantics of amount relatives that is invariant over possible worlds. Thus, there is no way it can ever be at issue whether the extension of an NP containing an amount relative was unique or not.

However, by the same logic, G&L's amount reading for relatives out of existentials, which differs from that for "ordinary" amount relatives only in enforcing identity of individuals, should be excluded as well. Consider (20a); the head noun plus relative clause will have the denotation in (20b) after the application of their SUBSTANCE operator.

- (20) a. The only books there are on the table are the ones I put there.  
 b.  $\{x: \langle |x|, \text{BOOKS}, x \rangle \in [[\text{MAX}(\text{books there are } \_ \text{ on the table})]]\}$

(20b) denotes a singleton set in all possible worlds – the unique maximal plural individual that constitutes the books that were on the table in that world. Even if the internal structure of  $\underline{x}$  (and crucially, the cardinality of the set of its atomic parts) might vary from world to world, the output of SUBSTANCE on MAX(CP) does not make that internal structure available to further semantic composition operations: the

only thing any such operations will have access to is a singleton set. This will be the case not only for DP-internal only but also, crucially, for the determiner with which the NP combines. If the denotation of the set produced by SUBSTANCE were not guaranteed to be unique in all possible worlds, we would not be able to explain the fact that relatives out of existentials (and any other amount relatives involving identity of individuals) permit only determiners expressing uniqueness or maximality, as was shown in (5).

#### 4. What accounts for the similarities, then?

If we conclude, as the facts involving DP-internal only suggest, that nonamount relatives are also possible out of existentials, we must still explain the restriction to definite/universal determiners on the modified noun and the restriction on the relative pronoun. Note that neither of these facts entails that the head noun plus relative clause denotes a singleton set of degrees but rather only that it denotes a singleton set which (as Heim 1987 suggested) is sortally incompatible with *who* and *which*.

The sortal restriction follows directly from a semantics for existentials such as that in McNally 1992. McNally posits that the postverbal DP denotes the entity correlate of a property, which can for our purposes be formally equated with a kind,<sup>5</sup> and that the existential predicate there be denotes the property of being instantiated. As she notes, if we adopt this analysis, the restriction on relative pronouns follows directly as long as we assume that the relative pronouns who, which are sortally incompatible with kinds. This analysis has the further advantage of accounting for exceptions to the restriction on definite/universal determiners such as those in (21):

- (21) a. For instance, they can observe that there's a difference between reasons there are to believe P—where these include reasons not now available to you—and reasons you have to believe P. For example, one reason there is to believe you'll soon be sick is the fact that you just drank poison. (J. Pryor, 'Is There Non-Inferential Justification?', ms. Princeton U., emphasis original)
- b. One problem there is with this website, is that it does not explain what a press syndicate does.  
([etec.hawaii.edu/~burniske/e306/student/sheeman3/rough.html](http://etec.hawaii.edu/~burniske/e306/student/sheeman3/rough.html))
- c. One risk there is is that these students will then leave the state for higher-paying jobs. (adapted from a text at [insidethecapitol.blogspot.com](http://insidethecapitol.blogspot.com))

If the gap corresponds to a kind, the relative clause will denote a property of kinds. But then in order to combine semantically with the head noun, the latter will also have to denote a property of kinds. For example, a noun like reason must be able to denote a property of all (sub)kinds of reasons (good reasons, bad reasons, etc.) in addition to specific token reasons (like the one I gave yesterday for being late). The head noun plus relative clause in (21a), repeated without the purpose clause in (22a) for simplicity, could be translated as in (22b), where the subscript k indicates a sortal restriction to kinds.

- (22) a. reasons there are \_

b.  $\lambda_{x_k}[\text{reason}(x_k) \wedge \text{there-be}(x_k)]$

There is no reason a priori that this set of (sub)kinds should be unique, and therefore there is no reason to expect a restriction to a definite or universal determiner to accompany relatives out of existentials. Thus, the facts in (21) are totally expected. Crucially, though, the full DP must refer to a (sub)kind of reason – one that actually exists. While this does seem to be the case in the examples in (21), the same is not true for DPs such as that in (20a), which does not obviously denote a kind; as we saw in (5), when the DP denotes token individuals, a definite/universal determiner is always required.

To account for the facts in (5) without positing an amount relative semantics, 1) the NP must come to denote a property of atomic or nonatomic token entities rather than kinds only after the head noun and relative clause have combined, otherwise the explanation for the restriction on relative pronouns is lost; and 2) the denoted set of token entities must be unique/maximal. Mueller-Reichau 2006 offers an analysis of the relation between kind- and token-denoting expressions which could lend itself well to dealing with the relative pronoun facts. Whether the determiner restriction can be explained in a principled way remains an open question. However, it seems no more insurmountable an obstacle than is the problems raised for the amount relative analysis by DP-internal only. I therefore conclude that an ordinary restrictive relative analysis for relativization out of existentials is still worth attempting.

## Endnotes

\*I am grateful to the anonymous reviewers for Linguistic Inquiry, whose comments contributed substantially to the improvement of this squib.

<sup>1</sup>Examples can be found of DPs modified by relatives out of existentials and headed by an indefinite determiner or no determiner at all, contrary to what has been assumed in the literature since at least Carlson 1977. However, this appears to be possible only when the head noun (and DP as a whole) denotes a kind or other higher-order object, and we are still left with the problem of explaining why a definite or universal determiner is necessary when the DP as a whole does not denote a kind. See Section 4.

<sup>2</sup>An anonymous reviewer observes that only produces this effect only within DPs and not when it takes an entire DP as its focus, as in (i):

- (i) Marv put only those beads that he could in his pocket.

This is unsurprising on a Roothian (1985) analysis where the alternative set for (i) on the amount reading would be the set  $\{p : \exists d [p = \text{Marv put } d\text{-many beads in his pocket}]\}$ . Obviously whether the scope of only includes the full DP or not is crucial, as will become clear in Section 3.

Note, by the way, that different similarly blocks amount readings although it is perfectly acceptable in relatives out of existentials:

- (ii) a. Marv put the different things he could in his pocket.  
b. He showed me the different products there were on sale.

<sup>3</sup>Although Grosu and Landman are not explicit about this in their paper, SUBSTANCE must apply to MAX(CP) for the semantics to work out properly.

<sup>4</sup> In contrast, the definite article, at the very least, affects the semantic type of the expression it combines with.

<sup>5</sup>As Chierchia 1984 observed, kinds can be modeled as entity correlates of properties. McNally proposes that any definite or indefinite DP can denote an entity correlate of a property when in postverbal position in a there-existential – for example, three books denotes the entity correlate of the property of being three books, rendering kinds on her view a proper subclass of the entity correlates of properties.

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