TWO TYPES OF UNIVERSAL TERMS IN QUESTIONS*

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0: INTRODUCTION

Questions involving a wh expression and a universal term, as in (1a) and (b), can be answered in three different ways, as shown in (2a)-(c):

(1)a. Who does everyman like?
b. Who do these men like?

(2)a. Mary and Sue. *Individual answer*
b. John likes Mary and Bill likes Sue. *Pair-list answer*
c. His mother. / Their mothers. *Functional answer*

There has been considerable debate in the literature about the status of these answers. Groenendijk and Stokhof (1984), for example, argue for a three-way ambiguity for such questions while Engdahl (1986) argues for a unified account of the three answers. May (1985) takes the question to be ambiguous between individual and pair list readings, treating the functional answer as an abbreviation of the pair list answer. Chierchia (1991), on the other hand, takes the functional answer as basic,

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* I would like to thank Gennaro Chierchia, Fred Landman and Keiko Yoshida for helpful comments. Research for this paper was supported by a Rutgers University Research Council Grant. Usual disclaimers apply.

deriving the list from it. The fundamental point of controversy hinges on whether the universal quantifier is allowed to take scope over the wh operator.

I focus here on the fact that the two questions in (1) inovlve two types of universal terms. The first type of universal term includes quantificational NPs with determiners like "every", "each" or "both". The second type includes plural definites with determiners like "the", "the + numeral" "those/these", and conjoined proper nouns like "John and Bill". It is well known that quantifiers and definites have distinct properties and behave differently across languages in a variety of contexts (Heim 1982, Link to appear, Landman 1989, Bittner 1991 among others). Given the inherent difference between the universal terms in the two questions, I will claim, pair list answers to them cannot be amenable to the same analysis. The controversy about scope interaction relates only to questions with quantificational NP's not to those with plural definites, which should be analysed in terms of their individual answers.

The arguments presented in this paper serve, I think, to sharpen the debate on the proper analysis of questions by bringing into consideration distinctions so far ignored or glossed over. But they also bear on the theoretical debate about scope interaction. When combined with an analysis of list answers to questions with quantificational NP's, such as Engdahl (1986) or Chierchia (1991), they argue against the view of May (1985) and Groenendijk & Stokhof (1984) that questions with quantifiers are scopally ambiguous.

I: THE NEED FOR SEPARATE ACCOUNTS

There are two pieces of evidence supporting the need for separate treatments of (1a) and (1b). As noted by May (1985), a pair list answer is available when the universal is in subject position and the wh is in object position, as in (1a), but not when the order is reversed. Thus, (3a) with the quantifier in object position does not allow the pair list answer in (3c):

(3)a. Who loves everyman?
b. Mary and Sue.
c. * Mary loves John and Sue loves Bill.

Positioning, however, is not relevant in questions with plural definites, as noted in Pritchett (1990). The questions in (4)-(6) readily allow for list answers:

(4)a. Who loves these men ?
b. Mary loves John and Sue loves Bill.
(5)a. Who is looking after the kids?
b. My sister is looking after John, and the babysitter is looking after Sarah.
(6)a. Who is teaching your classes in your absence?
b. John is teaching the syntax class and Bill is teaching the semantics class.

In fact, all the questions noted in the literature as ruling out list answers systematically admit such answers once the universal term is changed to a plural definite. Whatever be the right account of the asymmetry for questions like (1a), it obviously cannot apply to (1b) since it does not show the same behavior.

A second difference between the two types of questions surfaces when we change the wh term from who to which N. When the universal term is quantificational, a singular wh term as in (7a) requires the list answer to link each man to a single woman as in (8a). A plural wh as in (7b) requires the answer to link each man to more than one woman as in (8b):

(7)a. Which woman does every man like ?
b. Which women does every man like ?
(8)a. John likes Mary and Bill likes Sue.
b. John likes Mary and Sue and Bill likes Jane and Alice.

In contrast, when the universal term is a plural definite, a singular wh as in (9a) seems to disallow a list answer altogether. The only possible answer is one in which all the men like the same woman, that is, a singular individual answer "Mary". A plural wh as in (9b) admits a list answer but this answer can link each man with one woman as in (8a) or with more than one as in (8b). In fact, it will also allow some men to be linked to one woman and some to more.

(9) a. Which woman do these men like ?
b. Which women do these men like ?

We can safely conclude that there must be two strategies for deriving list answers, one which applies to questions with quantificational NP's and yields subject-object asymmetries and reflects in its pairings the singular-plural requirements of the wh, and another strategy which applies to questions with plural definites and has neither of these properties.

II: LIST ANSWERS TO QUESTIONS WITH QUANTIFICATIONAL NP's

May (1985) is the best-known scope-based account of questions. Taking semantic interpretation to be defined on LF representations which encode syntactic constraints on scope relations, the individual answer to (1a) is derived from an LF in which the wh has syntactic scope over the universal, as in (10a):

(10)a. [$_{CP}$ who$_i$ [$_{IP}$ everyman$_j$ [IP t_j loves t_i]]]

Deriving the list answer is less straightforward since an LF like (10b) with the universal having wide scope is generally considered ill-formed:

(10)b.* [$_{CP}$ everyman$_j$ [$_{CP}$ who$_i$ [IP t_j loves t_i]]]

In order for (10a) to be interpreted with the universal having scope over the wh May invokes the scope principle which says that quantifiers which fall in a Σ sequence (defined in terms of mutual c-command) can be interpreted in any order. The universal in (10a) can now be interpreted with wide scope, yielding a list answer.

When the quantifier is in object position, however, as in (3a) the two quantifiers cannot fall in a Σ sequence due to the Path Containment Condition which says that overlapping A' paths must embed not intersect. This rules out (11a) as a possible LF for (3a). The universal must therefore adjoin to VP as in (11b). The scope principle does not apply since the two quantifiers are too far apart to form a Σ sequence. Thus the only answer to (3a) allowed by the theory is the individual answer:

(11)a.* [$_{CP}$ who$_j$ [$_{IP}$ everyman$_i$ [IP t_j loves t_i]]]
b. [$_{CP}$ who$_j$ [IP t_j [$_{VP}$ everyman$_i$ [$_{VP}$loves t_i]]]]

While treating questions with quantifiers in terms of a scope ambiguity is generally accepted in syntactic literature, its validity has been challenged in semantic literature, by Engdahl (1986) and by Chierchia (1991).

They point out, for example, that the status of functional answers such as (2c) remains elusive under accounts like May's. They note that questions like (12) allow individual and functional answers but not the list:

(12)a. Who does no man love?
b. Who do most/few men love?
(13)a. Mary and Sue. *Individual answer*

b. * John doesn't love Mary and Bill doesn't love Sue.
* John loves Mary and Bill loves Sue. *Pair-list answer*
c. His mother. / Their mother. *Functional answer*

If functional answers are abbreviations of list answers, as in the scope-based account, these cases are problematic since there is no source for them here.

The questions in (12) also show that list answers are only possible with universal terms.[1] In a scope based account the scope principle would have to be restricted to universal quantifiers in the case of questions but not in the case of other constructions.

Another relevant fact noted by Chierchia is the presence of subject-object asymmetries in questions where the wh moves from embedded clause to matrix spec:

(14)a. Who do you think everyone will invite?
b. I think John will invite Mary and Bill will invite Sue.
(15)a. Who do you think invited everyone?
b. * I think Mary invited John and Sue Bill.

The possibility of (14b) as an answer to (14a) is problematic within scope-based theories since it requires positing long-distance QR for the universal term, a fairly controversial move.

For these reasons, Chierchia argues for the alternative view which takes list answers to derive from functional answers. Here the wh operator is allowed to quantify over functions from individuals to individuals. (1a), for example, is interpreted as (16):

(16)a. [who$_i$ [every man$_j$ [t_j loves t'_i]]]
b. {p: $^\vee$p ∃f [∀y (person(s)'(f(y)) & everyman$_x$, p=$^\wedge$love(x,f(x))]}

In (16b), the semantic interpretation of (16a), quantification is over variables whose possible values are functions like "mother-of", "sister-of" "friend-of" etc. That is, functions whose domain is the set of men and whose range is a set of individuals. A function counts as a true answer just in case the men-people pairs

[1] Groenendijk and Stokhof (1984) note this and use it to argue against treating lists in terms of functional answers but this point is challenged by Chierchia (1991).

linked by that function are in the relation "love". The list answer is simply the spell-out of the function.

As explicated by Chierchia, the fact that list answers are only possible with universal terms while functional answers are generally available follows from the difference between a function, which is intensional, and a list, which is extensional. Since universal terms have a generator set they allow easy retrieval of the domain, so that the extension of the function can be given.[2] Chierchia also provides an account for the subject-object asymmetry discussed by May. He claims that there is a syntactic reflex of the fact that a wh term represents a quantification over functional variables. A wh trace carries two indices, one for the wh operator, which corresponds to the functional variable, and one for the argument (its a-index), an individual variable. In (16a) this is the superscript j on the wh trace and corresponds to the pronoun in the functional answer. A list answer becomes available just in case there is a c-commanding universal term whose generator set can provide values for the a-index. This is possible in the case of (1a), which has the LF in (16a), where the superscript j on the wh trace is bound by "everyman".

When the universal term is in object position, as in (3a), the absence of the functional answer "His mother", and hence the list, follows from the fact that an LF in which the universal term could bind the a-index of the wh trace would involve an LF like (18a):

(18)a. *[who$_i$ [every man$_j$ [t'$_i$ loves t$_j$]]]
b. [who$_i$ [t'$_i$ [every man$_j$ [loves t$_j$]]]

(18a), however, is ruled out as a weak crossover configuration in which the variable t$_j$ is coindexed with a pronoun, the a-index of the wh term, to its left. In the well-formed LF in (18b) the quantifier is adjoined to VP and does not c-command the a-index on the wh trace. The only available answer is the individual answer.

This account extends straightforwardly to list answers in questions like (14a)-(15a) which have the following well-formed LF's:

[2] This is the pragmatic explanation given in Chierchia (1991) though in work in preparation he rejects this in favor of a more precise semantic formulation.

(14)c. [who$_i$ [you think[t'$_i$ [every man$_j$[t$_j$ will invite t'$_i$]]]]]

(15)c. [who$_i$ [you think[t'$_i$[t'$_i$ [every man$_j$[will invite t$_j$]]]]]]

There is no need for long distance QR to derive the functional answer for (14a) since the universal term c-commands the trace of the wh term and binds its argument index, as in (14c). The list answer is the extensional counterpart which draws on the generator set of the universal term. In (15c), on the other hand, the functional answer, and hence the list, is not available since the a-index on the wh trace is not bound by the universal. Long distance cases require nothing special.

Chierchia's version of the functional approach thus avoids the problems inherent in the scope based account and also takes care of the two problems left open in Engdahls' theory, namely subject-object asymmetries and the restriction of list answers to universal terms. I adopt it here but as we saw earlier, it cannot apply to all questions, only to those like (1a). We need a second account for questions like (1b), to which I turn now.

III: FUNCTIONAL APPROACH AND QUESTIONS WITH DEFINITES

The basic claim I want to make is that the second strategy for deriving list answers draws on the individual answer, not the functional answer. Towards this end, I will show why list answers to questions like (1b) cannot be accounted for by the functional approach. I will also show that such questions do not have functional answers, distinguishable from their individual answers, which could be the source of the list. Consider (19), which we do not think of as allowing a list:

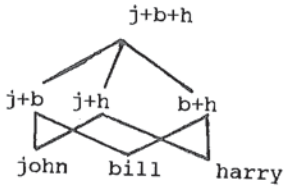
(19) Who does the man like?

Under Chierchia's account, list answers draw on the generator set of the universal term. Though the man is a universal term, its generator set necessarily has only one individual. But, of course, for a list answer to be meaningful there must be at least two members. So even though (19), strictly speaking, has a list answer we do not think of it as such.

Turning now to questions with plural definites we can expect a parallel situation. In theories which recognize plural individuals as primitives (Link 1983, 1984, to appear and Landman 1989), singular and plural definites both denote single individuals. A singular definite denotes an atomic individual; a plural definite

denotes an individual with parts, as shown below:

(20)



Generator set of the men = {j+b+h}
Generator set of everyman = {j,b,h}

In a sense, then, the representation of (1b) is the same as that of (19), there is just one member in the generator set of the men. Assuming that John and Bill are the two men in the relevant context, the question asks for the plural individual j+b in the generator set of the men who j+b loves. The list is obviously indistinguishable from the individual answer. To contrast, in the case of (1a), in the same context, the question would ask for j and for b, the two individuals in the generator set of every man, who each man loves, yielding a meaningful pair list answer.

That the functional approach yields a list answer to (1a) but not to (1b) simply follows from the nature of the quantifiers involved. We need posit no stipulations to prevent it from applying to questions like (1b).[3]

Before turning to the strategy that yields list answers to (1b), however, let us consider a potential problem for the line of argumentation being developed. If questions with singular or plural definites do not allow list answers because their generator set is a singleton, it is expected that they also should not allow functional answers but clearly, (19) can be answered with "Their wife" just as (1b) can be answered with "Their wives". Such answers, it is easily shown, however, are not true functional answers. They are simply alternatives to individual answers in that they use a definite description instead of referring to the individuals by name.

[3] Once plural individuals are included no stipulations would be needed to prevent the scope-based theory from applying to questions with plural definites either. Thus these facts do not determine the choice between the two standard approaches.

The exchanges in (21) serve as a diagnostic:

(21)a. Who does everyman love ?
b.* Everyman loves Mary and Sue. In particular, John loves Mary and Bill loves Sue.
c. Everyman loves his mother. For example, John loves Mary and Bill loves Sue.

The contrast between (21b) and (c) explicates Chierchia's claim that the list answer derives from the functional answer. "Every" being a distributive determiner entails that in the case of the individual answer, each man love the individuals named. The functional answer, on the other hand, allows the value of the individual to vary with each man. The distributivity of "every" entails that each man love his mother, not that they all have the same mother. Individual and functional answers can be distinguished in terms of their entailments -- the list is consistent only with the entailments of the latter.

In contrast, functional and individual answers cannot be distinguished in the case of plural definites since both can be felicitously followed by the list:

(22)a. Who do these men love ?
b. These men love Mary and Sue. In particular, John loves Mary and Bill loves Sue.
c. These men love their wives. So, for example, John loves Mary and Bill loves Sue.

The list being consistent with both, individual and functional answers must have the same entailments here.

Another diagnostic showing that functional answers to questions with plural definites are not independent of individual answers is shown by the fact that, just like individual answers, they are possible even when the plural definite is in object position. Thus (23) through (25) readily allow functional answers:

(23)a. Who likes these men?
b. Their wives.
(24)a. Who is looking after the children?
b. Their mothers.
(25)a. Who is teaching your classes in your absence?
b. My colleagues.

This is in contrast to questions with universal (or non-universal) quantificational NPs. They do not allow such answers with the quantifier in object position.

(26)a. Who loves every man / most men?
b. *His mother / *Their mother.

Recall that this is explained by Chierchia as a weak crossover effect resulting from the quantificational term having to cross over the a-index of the wh trace in order to bind it. Individual answers are possible to questions like (26) because such binding is not required for them. Clearly, the same factor that yields the absence of the subject-object asymmetry with respect to individual answers seems to be at play in the case of the so-called functional answers to questions with plural definites.

We can conclude that functional answers to such questions are not independent of individual answers and from this point on I will ignore functional answers as a possible sourse foor the list.

IV: LIST ANSWERS TO QUESTIONS WITH PLURAL DEFINITES

I will now make the connection between list and individual answers to questions with plural definites precise. In particular, I will show that list answers are one reading of those individual answers which are ambiguous between distributive and cumulative readings.

Let us begin by considering sentences with plural terms, such as (27), which are known to be ambiguous:

(27) The boys solved the problems.

Scha (1981) claims that this sentence has three readings: a **collective** reading, i.e. one in which the boys worked jointly on all problems; a **distributive** reading, i.e. one in which each boy worked on all the problems but separately; and a **cumulative** reading, i.e. one in which each boy worked separately on different problems but all the problems were solved. My aim here is not to show how precisely this phenomenon should be captured, but rather to show its relevance to the analysis of questions and to show its relevance to the analysis of questions and will use Scha's terminology without necessarily adopting his account of it. The point to keep in mind is that collective/distributive readings are sometimes possible even with one singular argument but cumulative readings require both arguments to be plural.[4]

[4] "The boys solved the problem", for example, can be interpreted distributively or collectively but not cumulatively.

Now consider possible individual answers to (1b):

(28)a. John and Bill love Mary and Sue.
b. These men love Mary and Sue.

Both are ambiguous between distributive and cumulative readings. So, (28a) can either be interpreted distributively (John and Bill each love Mary and Sue) or cumulatively (John and Bill love Mary and Sue respectively). (28b) is similarly ambiguous though one cannot test the second reading by adding "respectively".

Recall that in connection with (22a) we determined that a pair list can follow an individual answer, thereby making it more specific. Note, however, that adding a floating quantifier to it results in deviance:

(29)* These men each love Mary and Sue. In particular, John loves Mary and Bill Sue.

This establishes that the list answer represents one reading of the individual answer, namely its cumulative reading. One way to think of list answers to questions with plural terms, then, is as a disambiguating strategy rather than a distinct interpretation.

We are now in a position to explain the differences between the two types of questions noted in section 1. The absence of subject-object asymmetries in the case of plural definites, it should be obvious, follows from the fact that they are derivative on individual answers which are always available. Let us turn to differences having to do with the number requirements of the wh.

The first fact noted was that a question with a plural definite and a singular wh as in (9a), repeated below, does not admit pair list answers:

(9a) Which woman do these men love?

This follows straightforwardly if we take list answers to be cumulative readings of individual answers. It is generally accepted that wh NPs of the form which N carry uniqueness implications. Any theory which incorporates this (Higgibotham & May (1981) or Srivastav (1991), for example) would force the individual answer to (9a) to relate a plural term with a singular woman. But cumulative readings, as mentioned above, only arise when there are two plural terms. An answer to (9a) would not be ambiguous and so there would be no room for the disambiguation provided by list answers.

The point is worth stressing since ignoring this can lead to misanalyses. May (1985), for example, notes that (30a) does not have a list answer and takes this as indicative of the subject-object asymmetry. Note, however, that the list answer becomes available once the wh term is made plural as in (30b):

(30)a. Which student admires those two professors?
b. Which students admire those two professors?

May's analysis cannot account for this difference, but it is precisely what is expected under the approach I am suggesting since (30b) but not (30a) will allow individual answers with two plural terms. Its cumulative reading can therefore be made explicit via a list answer.

We are also now in a position to understand why list answers to the two types of questions display different restrictions in pairings. Recall that questions with quantificational NPs such as (7a-b) pair each man with one woman when the wh expression is singular and with more than one if it is plural:

(7)a. Which woman does every man love?
b. Which women does every man love?

This is expected in the function-based account once the singular-plural distinction is incorporated. Assuming that who is unspecified for number, which woman imposes uniqueness and which women requires at least two, the wh term determines whether the range of the function linking men with the individuals they love will be singular or plural.

To understand list answers to questions with plural definites, on the other hand, we need to focus on the semantics of cumulative readings. We know that such readings arise when two group level terms are involved. A possible individual answer to (9b) would be of the form in (31a) and would have the semantic form in (31b), if John and Bill are the two men under discussion:

(9)b. Which women do these men love?
(31)a. These men love Mary and Sue.
b. j+b love m+s

The basic answer to (9b) only relates two plural individuals. How the relation distributes over their parts is not determined by the semantics. The question simply says that the relation love should be such that the sum of all the atomic men who love any woman should be the plural individual these men and the sum of all the

atomic women loved by men should be the plural individual picked out by the wh term. Thus when a list answer is used to spell out the cumulative reading, the possibility of linking each man with one or more women remains open.

A similar point can be made by examining the functional answer (32a) to the question in (1b):

(32)a. These men love their wives.

Though this is most naturally interpreted as each man loving the one woman he is married to, the possibility of each man loving more than one woman if he is married to them is not ruled out. On the other hand, the functional answer in (32b) to a question like (1a) implicates that each man was married to more than one woman:

(32)b. Everyman loves his wives.

What we have, then, in the case of questions with plural definites is the phenomenon known as "dependent plurals". The flexibility of interpretation and the influence of pragmatic factors is therefore not surprising.

V: CONCLUSION

I have argued above that list answers to questions with plural definites represent one of two readings of an individual answer relating two plural terms. The idea that list answers may derive from a plural reading of the question is not new. There is a debate between May (1985, 1988) and Williams (1986) on this point. Williams suggests that pair list answers derive from a plural reading of the question, though he does not articulate how exactly the pair list would be derived. The difference with the present acccount, however, is that Williams clubs together all universal terms and suggests that questions like (1a) involve a "group" reading of the universal term, this reading being favored in subject positions only. This he does in order to rule out the pair list answer when everyone is in object position as in (3a). Plural terms, on the other hand he claims, are always group denoting and thus always allow for pair list answers. The evidence he cites for treating everyone as group denoting separates it from NP's like every man but as pointed out by May this gets the wrong results since the latter also allow pair list answers when they occur

in subject position.[5]

May (1985) also recognizes that plural definites do not show subject-object asymmetries. He takes the opposite tack from Williams, however, in resolving this issue. Instead of including quantificational universals in the set of plural NPs, he argues that the plurality feature can be treated as universal quantification. He is then forced to explain the availability of the pair list answer when the plural term is in object position, as in (4)-(6). Recall that in this position, the Scope Principle will not apply since the plural and wh are not in a Σ sequence. May says that the pair list answer in this instance is simply a reply not a formal answer. The problem, however, is that the criteria for distinguishing a formal answer from a simple reply remains unclear.

The problem with both Williams' and May's accounts is that they try to provide a single analysis for what are really two distinct phenomena. One account that does make the required distinction is Pritchett (1990). He argues that plural definites, unlike quantificational NPs, adjoin to CP at LF as an instance of Left Dislocation. (4a) thus has the following LF:

(33) $[_{CP}$ these men$_j$ $[_{CP}$ who$_i$ $[_{IP}$ t_i loves $t_j]]]$

Here the universal term falls in a Σ sequence with the wh operator, allowing the scope principle to apply. Thus Pritchett provides an explanation for the absence of subject-object asymmetry within the scope-based theory. Note, however, that this does not capture the difference between (1a-b) with respect to the number requirement of the wh. It seems to me that the only way to get that difference is to to recognise that the list answer to (1b) has a different source from the list answer to (1a). In this paper I have argued that the list answer to (1b) is a cumulative reading of the individual answer, unlike the list answer to (1a) which has been argued to be a spell out of the functional answer.

To sum up, I have shown that pair list answers to questions with quantificational NP's and those with plural definites have different properties which must be taken into account. List answers to the second kind of question, I have argued, represent cumulative readings of

[5] The distinction is based on the following contrast, where it is assumed that the antecedent of <u>each other</u> must be a group:
(i) *Every girl likes each other here.
(ii) Everyone likes each other here.

their individual answers. If list answers to the first kind are also derived, from functional answers, as argued by Engdahl and Chierchia on independent grounds, it would seem that theories which allow wh operators to participate in scope interactions of the normal kind cannot be on the right track.

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