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Q-SUPERIORITY VS. PATH CONTAINMENT IN *WH* / OPERATOR INTERACTIONS

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The major phrases in English syntactic structures, including the central VP, the XP arguments of the head V of VP, and things like time, manner, and purpose adverbials, all have simple *wh*- questions associated with them. *Who? What? Where? When? Why? How?* Together, these elements comprise a kind of augmented argument structure. Call these elements of the augmented argument structure α-elements. Quantified α-elements contrast with other kinds of operators. For example, consider the comparative *more* in (1).

(1) John has more money than Mary

More is not an α-element in the *have* relation. Rather it quantifies over amounts of *money*. The XP containing *money*, as well as *more*, is an α-element; *more* itself is not. Anticipating an identification of elements like *more* with a general notion of "extent", call elements like *more* "ξ-elements".

Quantificational operators interact in certain ways with *wh*- elements, and these interactions call for some kind of theoretical characterization. Two such characterizations that have been discussed in the recent literature are the LF representations of May (1985, 1988 (henceforth: May)), and the Scoped S-Structure (SSS) representations of Williams (1986, 1988 (henceforth: Williams)). May proposes that LF representations are subject to a version of the Path Containment Condition (PCC) of Pesetsky (1982). Williams argues that, while the PCC can be defined at S-structure as well as at LF, the PCC does not in general satisfactorily characterize the interactions between *wh*- operators and other operators. Williams proposes a different constraint on scope, Q-Superiority.

The crucial configurations that are relevant to Q-Superiority are essentially S-structure configurations. A successful S-structure characterization of these interactions would obviate the need, and consequently erode support, for a separate level of representation, LF.

In this paper I examine interactions between *wh*- operators and ξ-operators. The ξ-operators I will consider in detail are the comparative operator, like the *more* in (1), and the *so* -operator that governs result clauses, as in (2). There are a number of other ξ-operators that give rise to similar phenomena, and these will be discussed in somewhat less detail.

(2) the movie was *so* bloody [that we didn't watch it]

In § 1 I discuss aspects of the interpretation of ξ-operators as quantificational elements. In § 2 I discuss the differences between May's and Williams' quantificational notations, and in §3 I show how each theory handles *wh* / α-quantifier interactions. In § 4 I discuss interactions between *wh*-operators and ξ-operators. We will see that these interactions are not characterized by the embedded paths required by the PCC. Q-Superiority, on the other hand, will be shown to have a straightforward story about these interactions. In § 5 I discuss aspects of the interactions, and implications they might have for the two theories under consideration.

1. Scope and ξ-operators

In this section I briefly review the evidence that ξ-operators are scopal elements, and outline a characterization of them as "extent" operators.

1.1 Comparatives and scope

Ross & Perlmutter (1970) attribute to Bertrand Russell the insight that a sentence like (3) is ambiguous between a reading in which Mary believes a contradiction and one in which she believes something that is not the case.

(3) Mary believes that John has more money than he has

This ambiguity has come to be characterized as an ambiguity in the scope of various kinds of elements in e.g. Postal (1974), Williams (1977), Dresher (1977).

Suppose that the comparative operator, *more* in (3), is a quantificational element, an existential quantifier over extents. This is essentially the theory of Klein (1980) and Larson (1988), in which a simple comparative like that in (4a) gets a (very roughly paraphrased) analysis like that in (4b), where ξ is a variable over extents.

(4) a. John is taller than Mary
b. ∃ξ [¬ Mary is ξ tall & John is ξ tall]

Dresher's (1977) theory also involves existential quantification over extents, although his formulation is not Boolean, and involves a pair of existential quantifiers over extents that are directly compared, as in (5).

(5) $\exists\xi\exists\xi'$ [$\xi > \xi'$ & John is ξ tall & Mary is ξ' tall]

Assuming some kind of an existential analysis of the comparative, the ambiguity of (3) can be represented as an ambiguity in the scope of the comparative ξ-operator, as in (6), where (6a) is the reading where Mary believes a contradiction, and (6b) is the reading in which the amount of money Mary believes John has exceeds the amount he has.

(6) a. Mary believes $\exists\xi$ [John has ξ more money than he has]
b. $\exists\xi$ [Mary believes John has ξ more money than he has]

1.2 Result clause *so* and scope

Result clause *so* has been explicitly treated within May's LF theory, so we will discuss it in some detail here. Guéron & May (1984) characterize *so* as a quantificational operator that takes scope. Suppose that *so* is a kind of extent quantifier. A sentence like (7a)(=(2)) would get a reading like that in (7b).

(7) a. the movie was so bloody [that we didn't watch it]
b. $\exists\xi$ [the movie was ξ bloody that we didn't watch it]

We can justify characterizing *so* as a scopal element by considering the ambiguity of a sentence like (8). On one reading, we didn't watch the movie because of its bloodiness. On another reading, we didn't watch the movie because of how bloody John said it was. These two readings can be distinguished by allowing *so* to take different scopes. The readings can be represented by (9a) and (9b), respectively.

(8) John said the movie was so bloody that we didn't watch it

(9) a. John said $\exists\xi$ [the movie was ξ bloody [that we didn't watch it]]
b. $\exists\xi$ [John said the movie was ξ bloody [that we didn't watch it]]

2. Notation

May and Williams use different notations for representing operator scope. Insofar as the two theories purport to differ, it would be worthwhile at this point to distinguish between what are mere notational variations, and what are fundamental differences.

2.1 PCC and LF

May characterizes the PCC in terms of LF structures of the general form:

(10) $[_{\alpha}\ O_i\ [_{\beta}\ \ldots\ t_i\ \ldots\ ]]$.

In May's theory, all quantifiers not moved in the syntax are moved by Quantifier Raising (QR) in the transformational mapping between S-structure and LF. Thus all quantificational operators are interpreted in an adjunction structure like (10).

May's version of the PCC differs from that of Pesetsky (1982) in this way:

Pesetsky's paths are made up solely of maximal projections, while May's paths are made up of every segment of those projections (cf. May (1985, Ch. 5, fn. 3)). May characterizes his version of the PCC thus:

> A *path* is a set of occurrences of successively immediately dominating categorial nodes connecting a bindee to its binder. Each contiguous pair of nodes within a path constitutes a *path segment*.... Paths *intersect* only if they have a common path segment. Consequently, paths sharing a single node do not intersect. If the paths do intersect, then the PCC requires that one of the paths must properly contain all the members of the other. (May (1985:118))

2.2 PCC and SSS

Willams claims that, if the definition of path is reformulated along the lines of (11),

(11) The path of a quantification structure is the smallest set of nodes connecting the parts of the quantification structure (the quantifier, the scope, and the variable). (Willams (1988:(8)))

the PCC can obtain on S-structures of the following sort: extracted quantificational elements are characterized by the adjunction structure in (10), and unmoved quantificational elements are characterized by the *in situ* scheme in (12), where α:i indicates that the scope of the variable [Q N] extends to the α-node. Williams calls such heterogenously notated structures "Scoped S-structures" (SSS).

(12) $[_{\alpha:i} \ldots [Q\ N]_i \ldots]$

Williams' claim that the PCC can now be stated on SSS, as it stands, is somewhat overstated. Certain paths that overlap at a segment created by adjunction in LF, as in (13a), merely touch in SSS, as in (13b).

(13) a. $\ldots [_{\alpha} \ [_{\alpha} \ldots t_i \ldots t_j \ldots]]$
$\ldots$ ——— i
$\ldots$ ——— ..... j

b. $\ldots [_{\alpha:i,j} \ldots X_i \ldots Y_j \ldots]$

Let us consider such α:i,j nodes in SSS to be path intersections, and require the paths that meet at such nodes to be subject to the PCC. The PCC now extends to SSS.

I will adopt the heterogenous SSS notation throughout this paper, except where I note otherwise. The ξ-operators that we will be interested in are *in situ* at S-structure, so they will receive the *in situ* notation of (12) The readings of (3) and of (8) thus receive narrow and wide scope readings in the (i) and (ii) examples of (14a) and (14b), respectively.

(14) a. i. Mary believes that $[_{S:i}$ John has more$_i$ money than [he has]]
ii. $[_{S:i}$ Mary believes that John has more$_i$ money than [he has]]

b. i. John said [$_{S:i}$ the movie was so$_i$ bloody [that we didn't watch it]]
ii. [$_{S:i}$ John said the movie was so$_i$ bloody [that we didn't watch it]]

3. How the theories work

Consider the paradigmatic examples of *wh-* /quantifier interactions.

(15) a. what did everyone buy for Max
b. who bought everything for Max

The standard claim about these two sentences is that (15a) is ambiguous between a "group" reading, in which everyone as a group bought Max something, and a "family of questions" reading, in which a set of answers, each consisting of a match between a giver and a gift, is an appropriate response. In (15b), on the other hand, *everything* has an unambiguous "group" reading.

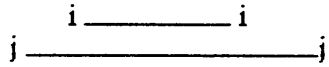
3.1 PCC

Williams points out two stipulations that are neccesary in order for the PCC to make the appropriate distinctions between (15a,b).

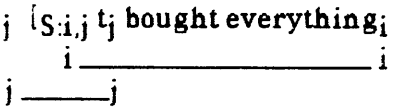
(16) a. A quantifier adjoined to S is ambiguous in scope with a quantifier dominated by S′ (a special case of [May's] *Scope Principle*).
b. Quantifiers can be adjoined to S but not to S′.(Williams (1988:(5a,b)))

Given such restrictions, the relevant representations for (15a,b) are (17a,b).

(17) a. [$_{S'}$ what$_j$ [$_{S:i,j}$ everyone$_i$ buy t$_j$ for Max]]

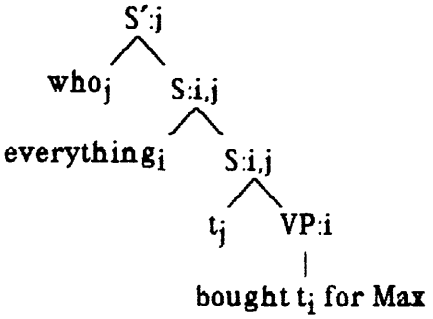


b. [$_{S'}$ who$_j$ [$_{S:i,j}$ t$_j$ bought everything$_i$ for Max]]



Only in (17a) do the paths embed. In (17a) the two scopes are in a position to interact, as provided for by the Scope Principle in (16a). This interaction allows the ambiguity we find in (17a). (17b), on the other hand, is ill-formed. To see just why this is so, consider an LF representation for it.

(18)



In (18), the i- and j-paths intersect at the segment created by adjoining *everything* to S. In order to avoid the ill-formed configuration in (17b), the scope of *everything* cannot be allowed to extend to S. The PCC and the requirement that all quantificational operators be moved by QR can both be maintained if *everything* is allowed to adjoin to VP. (19), in May's QR notation, shows a PCC-compatible representation for (15b).

(19) $[_{S'}\ who_j\ [_S\ t_j\ [_{VP}\ everything_i\ [_{VP}\ bought\ t_i\ for\ Max]]]]$
$\qquad\qquad\qquad\quad j\text{——}j \qquad\qquad\qquad i\text{————————}i$

According to May's Scope Principle in (16a), VP-adjoined *everything* is not in a position where it can be ambiguous in scope with the S′-adjoined *who* . This gets the unambiguity of the construction right. Moreover, due to May's conception of syntactic domination in terms of segments, *everything* still has scope over S. In (19), *everything* is adjoined to, but is not dominated by, VP, since it is not dominated by every segment of VP. Thus the scope of *everything* is the first major categorial projection that does dominate it: S.

In Williams' SSS, where *everything* is not moved and adjoined, there is no structural analog to the segment, in terms of which there could be characterized a notion of dominance analogous to May's. As a consequence, in the PCC-compatible SSS version of (15b) in (20), it is not clear how to allow S-scope to *everything* .

(20) $[_{S'}\ who_j\ [_{S:j}\ t_j\ [_{VP:i}\ bought\ everything_i\ for\ Max]]]$
$\qquad\qquad\qquad\quad j\text{——}j \qquad i\text{————————————}i$

Were the PCC the only available account of these operator interactions, it might legitimately be counted a strike against the SSS representation that it does not have a straightforward account of S scope for VP elements (although it is not clear that the segmental characterization of dominance in May's account is motivated substantially by anything other than just this problem, as well). We will not here try to develop a characterization of scope in SSS that would allow elements limited to VP to have scope over S, because we have at our disposal an alternative account of *wh* /operator interactions, an account that will obviate the need for such alternative formulations.

3.2 Q-Superiority

Williams' generalized formulation of Q-superiority is in (21).

(21) *Q-Superiority*
If the scope of Q_i includes the scope of Q_j, then Q_i c-commands the variable of Q_j. (Williams (1988:(21)))

In a Q-Superiority analysis, the paths of the operators are irrelevant. Condition (16b), forbidding S′ scope for (non-focussed) quantifiers, can be dispensed with entirely. Consider (15b) once again, this time as in (22), where the scope indexings of *wh*- and Q are allowed to extend without limit.

(22) ... [S':i,j who$_j$ [S:i,j t_j [VP:i bought everything$_i$ for Max]]]
... ——————————————— i
... ——————— j

Q-Superiority will disallow a wide scope reading for *everything* because it does not c-command the trace of *who*. The elements that are relevant to this c-command relation are essentially S-structure elements; the c-command requirement of Q-Superiority is essentially an S-structure requirement.

4. *Wh* /ξ-operator interactions

In the move from an ECP account of LF operator interactions to a PCC account, May notes that the ECP cannot be considered to hold of all operators. For example, consider the result clause in (23)(=May (1985):116,(2)).

(23) I told her that so many people attended last year's party that I made Mary nervous

May assumes, as we have assumed above in § 1, that the *so* in (23) is an operator that must be extracted in order to govern the result clause. He notes that *so* occupies a place immediately posterior to *that*, a position from which extractions are characteristically blocked by the ECP. Guéron & May (1984), from which May's discussion of sentences like (23) is adapted, follow Safir (1982) in considering the *so* operator, insofar as it is nonthematic, to be in principle exempt from the ECP. On this conception, there is further reason to doubt that the ECP governs LF movement. The ECP lacks generality, insofar as it does not regulate all LF movement. The PCC, on the other hand, defined on extraction paths themselves, must be blind to the thematic/nonthematic nature of the extracted elements.

We can now turn to examine how ξ-operators and *wh*- operators interact.

4.1 Comparatives and *wh*

Consider (24b), which is the ambiguous (24a)(=(3)) with the embedded subject extracted. (24b) is as ambiguous as (24a) is.

(24) a. Mary believes John has more money than he has
b. who$_j$ [does Mary believe [t_j has more money than he has]]

This kind of ambiguity is trouble for the PCC.

Guéron & May (1984) argue that a ξ-operator, like the comparative operator, must adjoin to, and bind its complement from, S'. If the quantification path of *more* in (24) must extend to S', then the contradictory reading of (24), represented in (25a), will have paths that intersect, at the embedded {S', S} path segment. Neither path properly contains the other, in violation of the PCC.

(25) a. [S':j who$_j$ [S:j Mary think [S':i,j [S:i,j t_j has more$_i$ money than ...]]]]
i ——————— i
j ——————————————— j

b. $[_{S':i,j}$ who$_j$ $[_{S:i,j}$ Mary think $[_{S':i,j}[_{S:i,j}$ t_j has more$_i$ money than ...]]]]
i ——————————————— i
j ——————————— j

Suppose instead that the path of the comparative operator, for some reason can stop at S. In that case, the contradictory reading can be saved by VP-scope for *more*, as in (26a) but the noncontradictory reading of (24), in (26b), will violate the PCC.

(26) a. $[_{S':j}$ who$_j$ $[_{S:j}$ Mary think $[_{S':j}$ $[_{S:i,j}$ t_j $[_{VP:i}$ has more$_i$ money ...]]]]]
*i ___ ... i_____ i
j_____ j

b. $[_{S':j}$ who$_j$ $[_{S:i,j}$ Mary think $[_{S':i,j}$ $[_{S:i,j}$ t_j has more$_i$ money than ...]]]]
i _____ i
j _____ j

Note that the VP adjunction option can be of no help in (26b). The operator must have scope outside the embedded S, which is the point at which the paths begin to intersect. Any ξ-path past this point, whether it extends to S or VP, will violate the PCC.

Q-Superiority has a straightforward account of the facts. At S-structure, since *more* does not c-command the trace of *who*, it cannot have wider scope than the *wh*-operator. However, apparently any scope up to, but not past, *wh* is allowed. This flexibility in the scope of *more* allows both readings of (24), with no stipulations about the characteristic scope of the comparative operator.

4.2 Result clause *so* and *wh*

Now consider (27b), which is the ambiguous (27a)(=(8)) with the embedded subject extracted. (27b) is as ambiguous as (27a) is.

(27) a. John said the movie was so bloody that we didn't watch it
b. which movie$_j$ [John say [t_j was so bloody that we didn't watch it]]

This kind of ambiguity is again trouble for the PCC, again regardless of whether the *so* operator has S′ or S scope.

Assume that *so* has S′ scope, again following Guéron & May (1984). Then the narrow scope path of *so* in (28a) will intersect with the *wh* path along the embedded (S′,S) segment, without embedding.

(28) a. $[_{S':j}$ which movie$_j$ $[_{S:j}$ John say $[_{S':i,j}$ $[_{S:i,j}$ t_j was so$_i$ bad] that ...]]]
i _____ i
j _____ j

b. $[_{S':i,j}$ which movie$_j$ $[_{S:i,j}$ John say $[_{S':i,j}$ $[_{S:i,j}$ t_j was so$_i$ bad] that ...]]]
i _____ i
j _____ j

If, on the other hand, *so* has S scope, then the wide scope path of *so*, in (29b), will violate the PCC.

(29) a. $[_{S':j}$ which movie$_j$ $[_{S:j}$ John say $[_{S'':j}$ $[_{S:j}$ t_j $[_{VP:i}$ was so$_i$ bad that ...]]]]
i ——— i
j ——————————————— j

b. $[_{S'':j}$ which movie$_j$ $[_{S:i,j}$ John say $[_{S'':i,j}$ $[_{S:i,j}$ t_j was so$_i$ bad that ...]]]]
i ——————————————— i
j ——————————————— j

In the same manner as it does above in § 4.1, Q-Superirity allows *so* any scope up to, but not past, the *wh*- operator, again allowing both available readings, and again without special stipulations about the characteristic scope of *so*.

4.3 Other operators

Dresher (1977) notes that a scopal analysis can be extended to account for *as* and *too* operators. The *enough* operator can be added to the list as well. Consider the examples in (30)((30a,b) = Dresher's (65a,b)).

(30) a. John believes that chess is as hard as it is enjoyable
b. John believes that chess is too hard for him to be able to enjoy it
c. John believes that chess is easy enough for him to enjoy it

These sentences have a narrow operator scope reading where the content of John's belief is expressed by the complement of *believes*. They also all have a wide scope reading where the complement of the operator expresses an independent characterization of the content of John's belief.

(31) John believes that chess is ξ hard, where
a ξ = as much as it is enjoyable (e.g. for everyone else)
b. ξ = too much for him to be able to enjoy it
c. ξ = so much that he can enjoy playing it

The two kinds of readings lend themselves to scopal ambiguities, as illustrated in the (i) and (ii) examples, respectively, in (32).

(32) a. i. John believes $[_{S:i}$ that chess is as$_i$ hard][as it is enjoyable]
ii. $[_{S:i}$ John believes that chess is as$_i$ hard][as it is enjoyable]

b. i. John believes $[_{S:i}$ that chess is too$_i$ hard][for him to enjoy it]
ii. $[_{S:i}$ John believes that chess is too$_i$ hard][for him to enjoy it]

c. i. John believes $[_{S:i}$ that chess is easy enough$_i$][for him to enjoy it]
ii. $[_{S:i}$ John believes that chess is easy enough$_i$][for him to enjoy it]

Extracting the embedded subject from any of these will set up sentences with exactly the properties that the *more* and *so* sentences had above. Assuming, for example, with May, that these nonthematic ξ-operators have S′

scope, the narrow scope readings of all of these sentences will have intersecting, but not embedding, paths.

(33) a. what game$_j$ John believe [$_{S':i,j}$ [$_{S:i,j}$ t_j is as$_i$ hard as it is enjoyable]]
b. what game$_j$ John believe [$_{S':i,j}$ [$_{S:i,j}$ t_j is too$_i$ hard for him ...]]
c. what game$_j$ John believe [$_{S':i,j}$ [$_{S:i,j}$ t_j is easy enough$_i$ for him ...]]

The wide scope readings will violate PCC of course if S scope is assumed, as above.

Too / enough complements have alternative empty object constructions available. The standard analysis of these, from Chomsky (1977), is that they are empty operator structures.

(34) a. John believes that chess is too hard [O_i [PRO to enjoy t_i]]
b. John believes that chess is easy enough [O_i [PRO to enjoy t_i]]

For some reason, only the narrow scope for the operators is allowed when the complement has an empty object.[1]

(35) a. i. John believes [$_{S:i}$ that chess is too$_i$ hard [O_i [PRO to enjoy t_i]]]
ii. * [$_{S:i}$ John believes that chess is too$_i$ hard [O_i [PRO to enjoy t_i]]]

b. i. John believes [$_{S:i}$ that chess is easy enough$_i$ [O_i [to enjoy t_i]]]
ii. * [$_{S:i}$ John believes that chess is easy enough$_i$ [O_i [to enjoy t_i]]]

Examples analogous to those we have been considering will not feature the wide scope reading; the operators will only take scope over the embedded complement. Hence, the empty object constructions will violate the PCC only if the characteristic scope of ξ-operators is S'. S', however, is the scope that nonthematic operators like ξ-operators are assigned in principle in May's current theory.

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[1] Assume with Jones (1988a) that (a) empty operators must be governed by an operator, and (b) that the empty object within the *too / enough* complement receives its reference (through coindexing with its operator) ultimately from the copular subject NP through predication with the *too / enough* AP. The (a) government requirement on the empty operator keeps the scope of the *too / enough* operator local, hence narrow. On the narrow scope reading of the constructions, the *too / enough* operators are associated with the As, *hard* and *easy*, that are predicated of *chess*, the appropriate antecedent for the empty object in the *too / enough* clause. On the unavailable wide scope reading, on the other hand, the operators would be associated with the upstairs *believe* predicate, predicated of *John*. Thus *chess* is unavailable as an antecedent for the empty object in the wide scope reading. Even in cases where an upstairs subject is a selectionally appropriate antecedent for the empty object, the wide scope reading is still unavailable. Compare (i) and (ii).

(i) [$_{S:i}$ John$_j$ believes chess is hard enough$_i$ [[PRO$_{arb}$ to get him$_j$ into the club]]]
(ii) * [$_{S:i}$ John$_j$ believes chess is hard enough$_i$ [O_j [PRO$_{arb}$ to get e_j into the club]]]

Even the *de dicto / de re* NP ambiguity creates the same problem, although the force of this particular kind of evidence depends on whether scope is the appropriate characterization of this particular kind of ambiguity. See e.g. Barwise & Perry (1981) for arguments that it is not.

Supposing for the sake of argument, however, that, as in, e.g. Montague (1974), the *de dicto / de re* ambiguity is a matter of scope, the examples work like this. Assume that the definite description in (36) is a quantificational operator, narrow scope for which will yield a *de dicto* reading, as in (36a), wide scope for which will yield a *de re* reading, as in (36b).

(36) John believes that Mary didn't kiss the boy she kissed

a. John believes that $[_{S:i}$ Mary didn't kiss [the boy she kissed]$_i$]

b. $[_{S:i}$ John believes that Mary didn't kiss [the boy she kissed]$_i$]

Since both readings are available when the embedded subject is *wh*-moved, as in (37), the old problem arises. The *de dicto* reading will violate PCC if S′ is the scope of the iota operator, as in (37a), and the *de re* reading will violate PCC if S is, as in (37b)

(37) who$_j$ does John believe t_j didn't kiss the boy she kissed

a. who$_j$ [John believe $[_{S':i,j}$ $[_{S:i,j}$ t_j didn't kiss [the boy she kissed]$_i$]]]

b. $[_{S':j}$ who$_j$ $[_{S:i,j}$ John believe t_j didn't kiss [the boy she kissed]$_i$]]

4.4 Conclusion

On its own terms, May's PCC does not account for the interactions between *wh*- operators and ξ-operators. Q-Superiority, on the other hand, seems to make the appropriate distinctions, and with less stipulation than that required for PCC. In the following section I discuss a couple of consequences of these results.

5. Discussion

We began by assuming that ξ-operators were scopal elements, and then supposed that they had some kind of quantificational content. We then asked about how they interact with *wh*- elements. Underlying a question like this last, however, is the supposition that all quantificational elements must interact. That is, we supposed that, regardless of the knds of things that the different operators quantified over, α-operators and ξ-operators did not differ from each other as quantifiers. In this section I want to discuss a couple of aspects of this fundamental assumption.

5.1 Variable S′/S scope

In the above examples, the PCC failed only on the condition that the scope of the ξ-operator was fixed either at S′ or S. Note that, in May's own terms, there is no choice between the two scopes. May has principled reasons to limit the scope of ξ-operators to S′. What is shown above is that, if the scope of the operator is limited to any characteristic scope, the PCC fails.

One possiblilty not considered above is that ξ-operators do not have characteristic S or S′ scope, but instead can have either. This is essentially

Williams' theory of operator scope, modulo any constraints on those scopes. Recall, for example, that the wide scope reading for *more* in (24) had a representation that did not violate the PCC in (25b), where the ξ-operator had S′ scope, and that the narrow scope reading for *more* had a representation that did not violate the PCC in (26a), where the ξ-operator had S scope.

In a theory like GB, where there is a great deal of overgeneration, it frequently seems to happen that a certain construction has a number of possible analyses, only a limited number of which are not ruled out by the constraints of the interacting modules. The PCC theory of operator interactions could perhaps be saved by allowing ξ-operators to have any scope. The relevant ambiguities could then be allowed, because each reading of the ambiguous examples would have a representation that is in accord with the PCC.

Such a move away from assigning a characteristic scope to ξ-operators would of course invite the question why α-operators are not allowed the same treatment. In effect, such a move would deny the fundamental assumption outlined above that α-operators and ξ-operators do not differ from each other as quantifiers. Such a move would also require principles other than those by which ξ-operators are assigned S′ scope in May's theory at present.

This kind of fiddling with the PCC theory must be weighed against the essentially null hypothesis of operator scope of the O-Superiority theory.

5.2 ξ-operators and focus

One possibility not considered in the above examples was the possibility of the ξ-operator taking wider scope than the *wh*- operator. Recall, for example, the wide scope comparative example of *wh* /ξ-operator interactions in (25b), the essentials of which are repeated here.

(38) $[_{S'}{}_{i,j}$ who$_j$ $[_S$ Mary think $[_{S'}$ $[_S$ t$_j$ has more$_i$ money than he has$]]]]$

i ——————————————— i

j ——————————————— j

Configurationally, in May's theory, the two quantifiers are in a position to switch scope. Williams' theory predicts no scope ambiguity, since *more* does not c-command the trace of *who* . The kind of reading that would indicate that the scope of *more* could extend past *who* would be something like that in (39).

(39) for some amount, who does Mary think has that much more money than he has?

The fact that there is not easily any such construal for (38) might immediately seem to favor Williams' theory over May's. However, other forces are at work here, and the matter is more complex than it appears. For example, if ξ-operators are in fact existential, as we have been supposing, then we would not expect to find any interaction between the *more* and *wh* ; these kinds of interactions are in general hard to hear.

As things turn out, the only way that existentially quantified elements can be forced into being able to switch scopes with *wh*- elements is by having them

focussed. Since both theories handle focussed elements as exceptions to the general rule, we might expect the two theories to come to similar conclusions about *wh* /focussed ∃-operator interactions, although by somewhat different routes. I have looked at these focussed constructions in some detail in Jones (1988b), and, in general, the properties of these constructions can be handled, more or less, by either theory. So the properties of focus constructions cannot strongly favor either theory.

The main point of the present paper has been that Q-Superiority has a better story than PCC at LF about the scope of non-focussed ξ-operators with respect to *wh*- elements. Insofar as elements at S-structure are adequate to characterize the nature of the interactions, the structures created by the mapping of S-structure to LF are superfluous.

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