Abstract: Evidence for the syntactic representation of the domain restriction of quantifiers

Goal: As is well known, a quantifier restriction is contextually confined (Stanley & Szabó 2000). In this paper I argue that the "confinement" should be syntactically represented even when it is not pronounced, showing that the so-called D-linking property in *which*-DPs involve DP-internal structure. The proposal is that D-linked quantification over nouns requires two mechanisms, pluralization (cf Schwarzschild 1996) and partitioning. I present novel syntactic evidence that elements of this sort show up as morphemes projecting structure which the derivation utilizes in standard ways. This evidence shows that plural count nouns and mass nouns do not have the same distribution and are not equal in their ability to denote the extension of sets.

Background: The semantic operation behind *wh*-questions consists of a *wh*-operator that binds a variable in its scope, as is shown in (1). Sentences like (2a) exhibit this basic property but clearly *which* quantifiers are also contextually confined. As a result, the semantic interpretation of (2a) is closer to (2d) than (2b).

1. a. What will John see *t* ?
   b. *Which* x is *such that John will see* x.
2. a. Which project will John see *t* ?
   b. *Which* x *is such that John will see* x.
   c. Which project (~~of the set of projects~~) will John see *t* ?
   d. *Which* x *project of the set of projects is such that John will see* x *project*.

(2c) corresponds naturally to (2d) and provides a more accurate representation of (2a).

Syntax of the confining expression: I propose that the relevant structure of *which project*, as used in (2), is the following:

3. ... [$_{DP}$ which [$_{PartP}$ project *one* ... [$_{NumP}$ -s [$_{ClP}$ <project>]]]]

(constituent is either deleted or topicalized)

Between PartP (partition phrase) and NumP are other layers, such as PP (headed by prepositions such as *of* or *among*) and DP (to mark definiteness on the set generated by Num), which I abstract away from here. Before describing this structure in detail, I present data from topicalization because these cases show that the structure representing the confinement can be phonetically realized. First, I will show that these cases involve real extraction, following standard syntactic constraints. (4b) shows reconstruction effects that allow quantifier-variable binding, which is not possible when the *of*-phrase is base-generated at the beginning of the sentence, as in (4c). This topicalization is also sensitive to the adjunct island, as shown in (5b). Other examples not presented here can also show that binding effects under Principle A and obviation effects with Principle C result from reconstruction.

4. a. Every groom$_1$ will pick which of his$_1$ friends will be best-man.
   b. Of his$_1$ friends, every groom$_1$ will pick which (one) will be best-man.
   c. *As for his$_1$ friends, every groom$_1$ will pick which (one) will be best-man.
5. a. I left before the referee decided which teams were disqualified.
   b. *Of the teams, I left before the referee decided which (ones) were disqualified.
   c. As for the teams, I left before the referee decided which (ones) were disqualified.

The constituent that undergoes movement is the structure representing the confinement, the complement of PartP, as in (3). The noun is represented here first in ClP (classifier phrase) because it is a count noun (Borer 2005, Uriagereka 2008). The plural morpheme is taken to be a set generator, taking its conceptual stock from its syntactic complement, the ClP. Crucially, movement of the complement of Num to the Spec of PartP specifies what one may think of as a unit within the set denoting the confining expression. The head of this PartP is the element *one*, which is distinguished from classifiers (cf Bernstein 1993). The pronunciation of just one copy

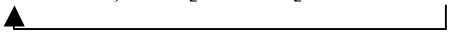
can be explained by the LCA (Kayne 1994) as expanded upon by Nunes (2004). Lower copies get deleted either through a chain-reduction operation or NP-ellipsis.

The following examples show that the confinement of *which* quantifiers must be plural count nouns as derived in (3). The confinement cannot be a mass noun, as in (6b). Nor can it be a singular count noun, as in (7b). Finally, semantic identity to the quantified restriction is required of the confining expression, which prevents sentences like (8b). The identity requirement of the confining expression is a natural consequence of movement (copy + merge), as shown in (3). The unacceptable cases in (6-8) all improve when topicalized phrases are introduced by the expression *as for* rather than the preposition *of* – in other words, when extraction is not involved.

6. a) The host couldn't decide which bottle of beer to save for later.
   b) *Of beer, the host couldn't decide which bottle *t* to save for later.
   c) Of the bottles of beer, the host couldn't decide which (one) *t* to save for later.
7. a) The librarian didn't know which pages of the book had been ripped out.
   b) *Of the book, the librarian didn't know which pages *t* had been ripped out.
   c) Of the pages of the book, the librarian didn't know which (ones) *t* had been ripped out.
8. a) The farmer didn't know which eggs of the geese were about to hatch.
   b) *Of the geese, the farmer didn't know which eggs *t* were about to hatch.
   c) Of the eggs of the geese, the farmer didn't know which (ones) *t* were about to hatch.

Consequences: The D-linked property of *which*-DPs is a natural consequence of the property of *which* to select PartP. I have shown that the element in Spec of PartP is generated by movement from NumP. PartP can be stranded in the cases where the confining expression is topicalized, an operation that obeys standard syntactic constraints. This analysis points to an important distinction in nominal expressions. Singular count nouns have been assumed to have as their extension a set of singularities (cf Chierchia 1995). Moreover, mass nouns have been treated as inherently plural nouns which have minimal parts in their extension. It has been noted that the distribution of mass nouns is similar to that of bare plurals. According to this view, however, the confinement of the *which* quantifier should be equally expressible by a plural count noun or mass noun. However, the contrast between (6b) and (6c) suggests that this is not the case. In the expression *which project*, the singular count noun here does have its extension of a set of projects, which is crucially the confinement on the quantifier. In this analysis, I argue that such a set must be built compositionally through syntactic derivations. Thus, NumP is not only the holder of a morphological marker for pluralization; it is associated with a specific semantic operation generating a set. D-linked *which*-DPs show that plural count nouns and mass nouns do not have the same distribution and are not equal in their ability to denote the extension of sets. I propose that this is a consequence of different hierarchies within the matrix DP, resulting in the following structure in (9) that shows all the relevant layers within the phrase *which bottle of beer*. Here, the contextual confinement is deleted at PF, but in cases like (6c), it can be topicalized, triggering the deletion of the copy in PartP.

9. $[_{DP}$ which $[_{PartP}$ (bottle of beer) *one* ~~$[_{NumP}$ -s $[_{ClP}$ <bottle ... $[_{MassP}$ beer]>]]]]~~



The typology of quantifiers found in natural language and the range of nominal expressions that they select suggest that quantifiers are sensitive to the different nominal features that this layered hierarchy predicts, which has vast consequences for the underlying semantic ontology.

[Bernstein, JB (1993) Topics in the syntax of nominal structure across Romance. Doc. diss., CUNY.] [Borer, H (2005). *Structuring Sense*. OUP.] [Chierchia, G (1995). *Dynamics of Meaning*. U.Chicago Press.] [Kayne, RS (1994). *The Antisymmetry of Syntax*. MIT Press.] [Nunes, J (2004). *Linearization of Chains and Sideward Movement*. MIT Press.] [Schwarzschild, R (1996). *Pluralities*. Kluwer Academic Pub.] [Stanley, J & Szabo, ZG (2000). On Quantifier Domain Restriction. *Mind & Language*, 15(2&3), 219-261.]