Definiteness as Maximal Informativeness

The unified Link-style semantics for the definite article relies on an inherent ordering of objects, a part-whole ordering in the case of individuals.

(1) $[\![\text{the}]\!](\phi_{\langle\alpha,t\rangle})$ is defined only if there is a maximal object x (based on the inherent ordering of elements in D_α), such that $\phi(x)$. When defined, $[\![\text{the}]\!](\phi)$ refers to that maximal object.

The ϕ refers to the maximal ϕ-object: the unique ϕ in the singular case, the maximal plurality containing all ϕ-individuals in the plural case, and the maximal collection of ϕ-stuff in the mass case.

We propose an alternative account: maximality is defined with respect to a different ordering, that of "relative informativity" i.e. asymmetrical entailment. Strength relates propositions, but, when given a property, can be defined derivatively for individuals.

(2) $[\![\text{the}]\!](\phi_{\langle\alpha,st\rangle})$ is defined only if there is an object x such that $\phi(x)$ is the maximally informative proposition among the true propositions of the form $\phi(\ldots)$ (henceforth the most informative object in ϕ). When defined, $[\![\text{the}]\!](\phi)$ refers to that most informative ϕ-object.

The most informative individual with respect to property ϕ is that individual from whose being ϕ we can deduce the ϕ-ness of all other ϕ-individual.

For the basic cases discussed in the literature, Link's definition and our alternative coincide. Assume that John, Bill, and Sam are the only boys. Then *the boys* will denote the maximal plurality made up of those three individuals, both on Link's account (since that is the maximal boy-plurality) and on ours: the plurality made up of those three individuals is exactly that plurality from whose being all boys we can deduce the boyness of any of its components. Any smaller plurality would be less informative (from John and Bill being boys we can't deduce that Sam is a boy).

In fact, both Link's proposal and ours make the same prediction for any property that is upward monotone in a technical sense. Properties of degrees such as λd. *John is* d *tall* or λd. *John has* n *many children* are upward monotone (saying that John has 4 children is more informative than saying that he has 3). Hence under both accounts definite descriptions such as *John's height* or *the number of children that John has* will refer (in any world w) to the maximal object in the extension of the property in w.

Once we look at properties that are not upward monotone wrt informativity, Link's proposal and ours make different predictions. First consider properties that are downward monotone. These are cases where the smallest amount/object is more informative — unlike the earlier examples, which characterized cases where the largest object/amount is the most informative. Here is such a case:

(3) I have the amount of flour sufficient to bake a cake.

Propositions of the form d*-much flour is sufficient to bake a cake* become more informative the smaller d is. We thus correctly predict that the definite description in (3) should refer to the minimum amount of flour that would yield a true proposition, i.e. to the minimum amount that would suffice for cake baking. On the other hand, according to

Link's account, the definite description in this sentence should be undefined, since there can be no maximal amount of flour that is sufficient to bake a cake; as noted by Beck and Rullmann (1999), in a slightly different context, if an amount of flour, f, suffices to bake a cake, so does any amount larger than f.

So we see that a definite description of the form *the* ϕ alternates between referring to the minimal or the maximal individual in the extension depending on the monotonicity of the property ϕ. We get a maximality effect when ϕ is upward monotone and a minimality effect when ϕ is downward monotone as in (3).

Once the principle is clear, it is easy to construct further cases showing a minimality effect: consider, for example, *the number of Greek soldiers who together can destroy the Trojan army*. For Link, this would result in a presupposition failure, since there is no *maximal* number of Greek soldiers that together can destroy the Trojan army (the more the merrier). For us, on the other hand, the description will pick out the minimal number of soldiers that together can destroy the Trojan army, because that is the most informative such number (once we know that number we can deduce that all larger numbers would also do).

We conclude that Link's theory got the right results only because the focus was limited to upward monotone properties.

Finally, there are properties that are non-monotone. For these, we predict a presupposition failure when there is no unique individual in the extension of the property. Consider the following. You are trying to fit books (x, y, z, w, v ...) on shelves of various size (a, b, c ...). Suppose that book x together with book y fit perfectly on shelf a, and book x, y, and z together fit perfectly on shelf b. Suppose also that no other combination of books fits perfectly on a shelf. Under Link's proposal, the definite description in *#Pass me the books that together fit perfectly on a shelf* should be acceptable: it should refer to the larger collection of books that fit perfectly on a shelf, namely, $x + y + z$. Our analysis, in contrast, correctly predicts that the description suffers from presupposition failure.

An alternation similar to the one between minimality and maximality shows up in the domain of times as well. In (4) the definite description refers to the latest time, t, such that Bill lived in Boston until t, while in (5) the definite refers to the earliest time, t, such that Bill has lived in Boston since t.

(4) January 5th 1999 is the date until which Bill had lived in Boston.

(5) January 5th 1999 is the date since which Bill has lived in Paris.

We expect this alternation and do not need to stipulate it in the semantics of the temporal operators *until* or *since*. In both cases, the definite description refers to the most informative time that satisfies the relevant property (λt. *Bill had lived in Boston until* t, in (6) and λt. *Bill has lived in Paris since* t, in (7)). The difference, once again, has to do with the monotonicity of the property.