Specificity Distinctions*

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1. Introduction

This paper is concerned with semantic noun phrase typology, focusing on the question of how to draw fine-grained distinctions necessary for an accurate account of natural language phenomena. In the extensive literature on this topic, the most commonly encountered parameters of classification concern the semantic type of the denotation of the noun phrase, the familiarity or novelty of its referent, the quantificational/non-quantificational distinction (connected to the weak/strong dichotomy), as well as, more recently, the question of whether the noun phrase is choice-functional or not (see Reinhart 1997, Winter 1997, Kratzer 1998, Matthewson 1999). In the discussion that follows I will attempt to make the following general points: (i) phenomena involving the behavior of noun phrases both within and across languages point to the need of establishing further distinctions that are too fine-grained to be caught in the net of these typologies; (ii) some of the relevant distinctions can be captured in terms of conditions on assignment functions; (iii) distribution and scopal peculiarities of noun phrases may result from constraints they impose on the way variables they introduce are to be assigned values.

Section 2 reviews the typology of definite noun phrases introduced in Farkas 2000 and the way it provides support for the general points above. Section 3 examines some of the problems raised by recognizing the rich variety of 'indefinite' noun phrases found in natural language and by attempting to capture their distribution and interpretation. Common to the typologies discussed in the two sections is the issue of marking different types of variation in the interpretation of a noun phrase. In the light of this discussion, specificity turns out to be an epiphenomenon connected to a family of distinctions that are marked differently in different languages.

2. Definiteness and determinacy of reference

Definite pronouns, proper names and definite descriptions, i.e., DPs whose D is a definite article, behave in many respects as a natural class within and across languages, which is why they are often grouped together under the label of 'semantically definite DPs'. On the other hand, within the rich realm of semantically indefinite DPs various distinctions in terms of an ill-defined notion of specificity have been drawn, among which that between overt or covert partitives and non-partitive indefinites. It is also well-known that 'specific' indefinite DPs in general, and partitive DPs in particular, are closer to semantically definite DPs than their non-specific or non-partitive sisters. A

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good illustration of this ambivalence is found in the morphology of the partitive Determiner in Romanian. The partitive article in this language is composed of the masculine singular (unmarked) form of the indefinite article, *un*, suffixed by the definite article, which bears the inflections of gender and number characteristic for Determiners in this language:

(1) a. Unul din studenţi a plecat.
a.Def.Sg.Masc from students has left.
One of the students left.

b. Una din fete a plecat.
a.Def.Sg.Fem girls has left
One of the girls left.

c. Unii studenţi au plecat.
a.Def.Pl.Masc students have left
Some of the students left.

d. Unele fete au plecat.
a.Def.Pl.Fem girls have left
Some of the girls have left.

Evidence for the necessity of distinguishing between various subtypes of definites and indefinites is furnished by data concerning Direct Object Marking, the phenomenon of morphologically marking a certain subclass of direct objects. Aissen 2001 shows that with respect to this phenomenon DPs form the hierarchy in (2) (where I substituted *Partitive* for Aissen's *Specific*).

(2) Personal Pronoun > Proper Name > Definite > Partitive

Once the relevance of this hierarchy is accepted, a question that arises is what semantic parameter is responsible for it. The answer suggested in Farkas 2000 is that what is at issue here is the question of the latitude the DP allows with respect to the choice of value for the discourse referent it introduces. In the rest of this section I review the gist of the earlier proposal concerning the typology of definites so as to have a starting point for the discussion of indefinites in the next section, which expands the left hand side of the hierarchy.

Crucial to making the proposal more precise is the assumption that argumental DPs (i.e., DPs in argument, rather than predicative positions) introduce discourse referents (aka variables), whose possible value is constrained by the information contained in the DP. Within the framework of D(iscourse) R(epresentation) T(heory), this amounts to the claim that such DPs contribute a variable and some condition on that variable. The process of interpretation of semantic structure involves assigning values to these variables by assignment functions, functions that have to meet the conditions in the DRT. One linguistically relevant DP typology, I claim, concerns the types of conditions induced by various DPs. Thus, DPs with descriptive content impose a predicative condition, i.e., a condition requiring the value of the variable to meet the property expressed by the description. The condition contributed by pronouns and proper names is of an essentially different type. A higher level classification concerns the details of

how variables are given values. The latter interacts with the former, since the conditions on a variable constrain its valuation.

The essence of the proposal in Farkas 2000 is that the DP types that form the stations of (2) differ with respect to the type of condition they impose on their discourse referent, which, in turn, has repercussions concerning the degree of latitude in choice of value for the discourse referent in question. It is this latter parameter that is crucial for semantic (in)definiteness.

Common to pronouns and proper names is that they do not have descriptive content. The condition they contribute equates the value to be assigned to their variable with another value. In DRT terms, the construction rule triggered by the use of pronouns involves the introduction of a discourse referent $x_{n'}$ and an equative condition of the form $x_{n'} = x_n$, where x_n must be a discourse referent within the domain of the input DRS. This discourse referent is contributed by the antecedent, in case there is a linguistic antecedent, or by the context, in the case of deictic pronouns. The new discourse referent $x_{n'}$ requires an update of the input assignment function relative to it; the equative condition requires the value the updated function f' assigns to $x_{n'}$ to be whatever the input function f assigned to x_n. Pronouns are felicitously used only in case the input DRS K provides an appropriate variable for the discourse referent introduced by the pronoun to be equated with. In the absence of such a variable the construction rule triggered by the use of the pronoun cannot be completed.

The condition supplied by proper names is also equative, though of a different type. Following Kripke 1972, I assume that proper names refer rigidly relative to the world in which they are used. The name *Sarah* used in an utterance in w refers rigidly to the individual *Sarah* names in w, independently of the linguistic context in which the name is used. One way of implementing this proposal is to assume as part of the model a (partial) function N from worlds and names to individuals in the worlds in question. Proper names then introduce a variable, $x_{n'}$ and an equative condition of the form in (3),

(3) $x_n = N_w$ (Name)

requiring the updated evaluation function f' to assign to $x_{n'}$ the value N assigns to the proper name in question in w, the world in which the discourse occurs. The special rigidity of proper names consists in the fact that their reference is determined by the world in which they are used and is unaffected by modal parameters within their linguistic context.

Descriptions, i.e., DPs with an NP constituent headed by a lexical N, are essentially different in that they contribute a restriction requiring the value assigned to the variable they introduce to be an element of the set denoted by the NP (or, if you prefer, an element of the set whose characteristic function is denoted by the NP). I assume then that descriptions introduce a variable $x_{n'}$ and a requirement of the form in (4),

(4) $x_{n'} \in A$

where A is the set denoted by the descriptive content of the description.[1] I chose this representation here rather than the more customary $P(x_{n'})$, where P is the predicate contributed by the descriptive content, in order to highlight the similarity of this view of

[1] I am ignoring intensionality issues here. They would be relevant to the question of the modal index of the description, which determines the world or worlds in which the value of $x_{n'}$ is to fit it.

descriptions to that of treating them as choice functions from A to an element of A, where A is given by the interpretation of the descriptive content. In what follows, the set A denoted by the descriptive condition is referred to as the *value* set because it provides the set from which the values of the variable introduced by the description may be chosen. The type of condition illustrated in (4) will be referred to as *predicative* because in effect it predicates the description of the value to be assigned to the discourse referent.

Following uniqueness-based accounts of definiteness, and in particular, Hawkins 1991, Farkas 2000 suggests that the definite/indefinite distinction in the case of descriptions involves the question of whether the value set allows a choice of value or not, in the given context. The difference between definite and indefinite descriptions is that in the case of the former there should be no choice with respect to the value assigned to the variable. The 'no-choice' situation signaled by the definite article may arise either because the description identifies a singleton set relative to the model (as in the case of descriptions such as *the present Queen of England*), or because the semantics of the description ensures that the set is a singleton (as in the case of superlatives), or, as in most cases, because within the context (i.e., within the domain of the input DRS) there is a singleton set A that serves as value set. This latter situation obtains if there is a single discourse referent that fits the description in the relevant domain, or, in case there are more, a single entity can be identified as most salient.[2] In effect then, the 'no choice' condition can be met relative to the domain of the model, the domain of the input DRS or the subset of the domain of the input DRS containing the salient discourse referents in the context. I will assume that the value set relevant to the interpretation of a description may be restricted to that of the input DRS or to the salient subdomain of the input DRS, in a parallel way to the type of domain restriction needed to account for the interpretation of quantifiers.[3]

In order to capture the notion of semantic definiteness, and therefore in order to capture what is common to proper names, definite pronouns and definite descriptions, Farkas 2000 introduces the notion of *determined reference*. Assuming K is the input DRS to K' and assuming x is new in K' relative to K, x has determined reference iff for every function f that embeds K there is a unique way of updating f relative to x so as to satisfy K'. More formally, let $G_M(K)$ and $G_M(K')$ be the set of assignments that embed K and K' in M respectively, such that every $g' \in G_M(K')$ is an update of some $g \in G_M(K)$, and let Dom(K) and Dom(K') be the set of variables in the universe of K and K' respectively.[4] The notion of determined reference can then be defined as in (5).

(5) Let x be in Dom(K') but not in Dom(K).
The variable x has determined reference if for every g', g" such that $g', g'' \in G_M(K')$ and g' and g" update the same $g \in G_M(K)$, $g'(x) = g''(x)$.

According to (5), x is a variable that has determined reference if for every g that verifies K, there is only one way of updating it relative to x so as to verify K'. Determined

[2] See Heusinger 2000 for a detailed discussion of how salience is established in discourse. Heusinger's approach is compatible with the present suggestions.

[3] Plural definite descriptions can be given an analogous treatment assuming that plural DPs denote sets of groups. The definite determiner in this case requires there to be a singleton such set whose element is meant as the value of the referent of the DP.

[4] A function g' updates a function g if g' agrees with g on all assignment of values for the variables that are in the domain of g.

reference is defined in dynamic terms: what matters is that there should be a unique value for the relevant variable *at the time of the update*. The dynamic nature of interpretation is crucially used here to capture the determined reference of pronouns and definite descriptions whose antecedents are indefinite or bound by a quantifier other than the existential. Thus, there may be many embeddings of (6a) that differ on the value they assign to the variable contributed by the italicized indefinite, but if (6b) is the continuation of (6a), the definite description or pronoun will have determined reference: for every way of embedding the input DRS, there is a single value that can be assigned to the variable contributed by the definite so as to meet the conditions contributed by (6b).

(6) a. *A student* came in.
b. *He/The student* sat down.

We can now characterize the definite article as a signal of determined reference. The valuation property it signals is that in going from K to K' there is no choice relative to the value to be assigned to the variable introduced by the DP.

Common to DPs involving a lexically headed NP is that they introduce predicative conditions. Using the definite article signals that the variable has determined reference. In the case of descriptions, this amounts to requiring the appropriately restricted value set to be a singleton. Following Hawkins 1991, I assume that DPs with the indefinite article lack this requirement. Whether we want to encode this difference between definite and indefinite descriptions at the level of semantic representation or whether we want to keep the distinction as a requirement on the properties of the transition from input DRS to output DRS is immaterial for present concerns. If the former route is chosen, we can differentiate variables with determined reference by having them preceded by an exclamation mark. The variables introduced by proper names and definite pronouns will always be of the form $!x_n$, while those contributed by descriptions will be of this form when the definite article is used, but not in the presence of the indefinite article. Assuming that the use of the definite article signals determined reference rather than the fact that the value set is a singleton has the advantage of allowing a unitary account of definite article use with proper names and definite descriptions in the languages or dialects that allow (or require) articles with proper names.

The basic difference between proper names and pronouns on the one hand, and definite descriptions on the other is that the former type of noun phrases have determined reference in virtue of the type of condition they contribute, while descriptions have determined or non-determined reference depending on whether the predicative condition they contribute identifies a singleton set or not.

Overt partitives are special in that in their case the value set is established by the DP argument of the partitive preposition, which we will refer to as the *domain DP*. This DP must introduce a 'plural' discourse referent (i.e., a discourse referent whose value must be a group-level entity). The value of the discourse referent of the partitive DP must be chosen from among the elements of this group. The condition they contribute is of the form in (7),

(7) $x \in f'(\mathcal{A})$

where $\mathcal{A}$ is the discourse referent contributed by the domain DP. Because the domain DP has to refer to a group-level entity with more than one element, partitives are unlike definites in that they do not have determined reference. What distinguishes them from ordinary indefinites, however, is that a partitive condition is formally more restrictive than a predicative condition: it restricts the value domain to the elements of a group denoted by an already restricted variable. As a result, partitives must refer within the universe of discourse while indefinites do not have to.[5] Because of the type of condition partitives contribute they must refer within the universe of discourse, while indefinites do not have to.

Ordinary indefinites, which in English are preceded in the singular by the indefinite article *a(n)*, are underspecified with respect to determinacy of reference. The contrast with definites can be accounted for, following Hawkins 1991, by assuming that they form a Horn-scale with definites, and therefore, that using an indefinite form implicates that the conditions for the use of the definite are not met. The only condition ordinary indefinites impose is that the value assigned to their discourse referent be an element of the set denoted by the description.

Note that the classification discussed here is one of DP types, rather than DP tokens. Since ordinary indefinites in English are not specially marked, to be a subset of the universe of discourse previously identified by a DP. Thus, the italicized indefinite in (8) may be interpreted either partitively or not, while the partitive interpretation is, of course, forced upon the partitive DP.

(8) a. Several students came into the room.
b. *A student* was carrying a large banner.
c. One of the students was carrying a large banner.

An interesting open question is the varying strength of the blocking relation between different types of DPs. Thus, the existence of the overt partitive does not appear to block the implicit partitive interpretation of ordinary indefinites, while the existence of the definite does block the determined reference interpretation of indefinites. This suggests that the distinction between DPs with determined reference and those without is more significant than that between various types of non-determined reference.

Note that the distinctions established so far cannot be naturally captured by the parameters of DP classification most commonly encountered in the formal semantics literature. Distinctions in terms of types would have difficulty capturing both what is common and what separates the various subtypes of semantically definite DPs. Distinctions in terms of familiarity/novelty are well-known to encounter difficulties in characterizing the whole spectrum of formally definite DPs. They would also have difficulty in explaining why proper names, which may be discourse-novel, are placed so high on the definiteness scale. The quantificational/non-quantificational distinction is again not fine-grained enough to be useful here. Note also that attempting to define the notional category of definites by reducing it to the property of referring to a singleton

[5] Note that what matters for this typology is not the actual size of the value set but rather, the type of formal condition contributed by the DP. It may well happen, as Barbara Abbott (p.c.) pointed out, that the domain DP of a partitive contributes an extremely inclusive condition, as in *one of the elements of the universe*, which will be less restrictive than the value domain of an ordinary indefinite such as *a man*. Formally, however, the partitive condition restricts the value set relative to the discourse, while the predicative condition restricts it relative to the model.

set would force an unnatural treatment of pronouns and proper names. Moreover, that approach would not be useful in explaining why partitives are closer to definites than their non-partitive sisters. Note also that the distinction between choice-functional and non- choice-functional DPs, while relevant to the distinction between DPs with descriptive content and those without, is not helpful in drawing the further distinctions needed here.

The determinacy of reference scale in (2) can be seen as a scale of specificity: the contribution of the various types of noun phrases specifies more or less completely the value one is to assign to the discourse referent introduced by the DP. Noun phrases with determined reference contribute a condition that specifies this value completely, while DPs with non-determined reference do not. Further distinctions can be made in terms of how complete specification is achieved, in the case of DPs with determined reference, and in terms of how free the choice of referent remains in the case of DPs with non-determined reference. In the next section we look at subtypes of such DPs.

3. More or less specific indefinite DPs

The DP types that fall on the right hand side of the scale in (2), within the category of DPs with non-determined reference, are collectively referred to as *indefinites*. Besides not being required to have determined reference, the interpretation of these DPs varies greatly and so do the overt morphological markings on them. A challenging task for the semanticist is to account for the distribution and interpretation of the subtypes of indefinites we find within a language as well as cross-linguistically. Moving beyond descriptive adequacy, the aim is to have a semantic framework which provides the tools for drawing the particular distinctions needed for natural language description and, optimally, predicts the class of distinctions needed. Below I discuss some subspecies of indefinites in the literature, whose characterization, I claim, makes crucial reference to the properties of the assignment functions that give values to the variable the DPs introduce.

Expanding on the suggestions in Section 2, I take it that the semantic function of morphemes occurring in the Determiner area of argumental DPs is to constrain various aspects of the function that is to give value to the variable contributed by the DP.[6] This proposal is in fact quite close to the traditional view of quantifiers. Recall that the semantic job of quantifiers in predicate calculus is to encode more or less complex instructions concerning the way one is to give values to the variable(s) they bind. Thus, the universal quantifier imposes a complex constraint: the variable it binds is to be given successive values until the value set is exhausted, and the 'nuclear scope' has to be true for all those values. The valuation instruction encoded by the existential quantifier, by contrast, is relatively simple: one has to find some value in the value set for which the nuclear scope is true. Below we explore the possibility that the various Determiners within and across languages encode more or less complex instructions of this type.

[6] Items occurring in the 'Determiner area' include, but are not necessarily limited to, articles, quantifiers and numerals. We will be concerned here primarily with articles and to a lesser extent with quantifiers.

The view of specificity that emerges is one in which it is seen as an epiphenomenon that breaks down into a variety of differences concerning the way variables are given values, differences that may be morphologically marked in various languages. In the case of descriptions, there are two ways in which valuation instructions may be restricted: one may restrict the nature of the function itself, or one may place restrictions on the nature of the value set. The restriction imposed by definite and partitive articles are of the latter kind: the definite article signals that the value set uniquely determines the value of the variable relative to the input DRS, while partitives signal that the value set is given by the referent of the domain DP. Ordinary, garden-variety indefinite DPs on the other hand, impose no special restriction on the value set beyond the requirement that it be atomic, in the case of singular Determiners such as *a(n)* in English, *egy* in Hungarian or *un/o* in Romanian. Garden-variety indefinites pose no special restrictions on the nature of the evaluation function either, which accounts for the versatility of their interpretation possibilities. 'Special' indefinites encode special restrictions on either the value set or the nature of the assignment function itself. We examine some relevant cases below.

3.1. Dependency and scopal specificity

In Farkas 1994 I argued that the notion of 'specificity' has been employed as a cover term for at least three separate phenomena, partitivity, scopal specificity, and 'epistemic' specificity. Here I will discuss scopal specificity in more detail. The discussion is phrased in terms of how scope issues affect the interpretation of variables directly, without assuming a strict correlation between scope and configurational properties. In line with proposals made in Peacocke 1978, Kuorda 1981, Farkas 1997a, I assume that scopal effects are the result of variation in evaluation parameters. In the case of argumental DPs, these parameters concern the assignment function that gives them values.

Scopal specificity concerns the question of whether the interpretation of a variable within a particular expression varies or not as a result of the presence of a variation inducing operator. One type of scopal non-specificity involves cases where the interpretation of a variable co-varies with (or is dependent on) the interpretation of another variable. In such cases the former variable will be called 'dependent' and the latter will be called, following Kadmon 1987, 'the boss' variable. In order for dependency to occur, the boss variable must vary, i.e., it must be given successive values within the course of the interpretation of a sentence. This may happen as a result of it being bound by a quantifier other than the existential, or as a result of it being part of a distributive predication. In what follows the case of distributive predication will be ignored.

Following the classical treatment of quantifiers within a dynamic framework, we can characterize the job of the existential as requiring the input function to be updated on the variable bound by the existential, whereas the job of other quantifiers, such as that realized by *every* or *most* is to introduce a set of such updates. Following work in dynamic semantics, and in particular that of Kamp 1981 and Heim 1982, the update required by existentials can be taken as a default operation, in which case ordinary indefinite DPs, just as definites or proper names, are non-quantificational in the sense that they simply trigger the default action, namely an update on the relevant variable. DPs such as *every student*, on the other hand, are quantificational in the sense that they trigger a complex evaluation procedure. Assuming a tripartite view of quantification,

quantificational DPs introduce a set of evaluation functions that update the input function on the variable introduced by the DP, and which give it values from the value set provided by the description. Each of these functions is an input function relative to which the expression in the Nuclear Scope is evaluated. Particular quantificational Determiners impose further conditions on what the results of such updates must be in order for the whole expression to be true (or embeddable) in a model.

Under these assumptions, the semantic structure of a sentence such as (9) will have the constituents in (10):

(9) Every student left.

(10) $\forall x_3 [x_3 \in \{y: \text{student}(y)\}] [\text{leave}(x_3)]$

The familiar truth (or embeddability) conditions for this expression would require the input function f to be such that each of its updates f' on x_3 such that $f'(x_3)$ meets the condition in the Restrictor, should have updates f'' which meet the condition in the NS. The quantificational Determiner *every* in the quantificational DP *every student* is responsible for the introduction of the functions f', and for the role they play in the evaluation of the NS. More generally then, quantificational DPs introduce a set of assignment functions which serve as input functions to the interpretation of their NS. The contribution of *every* is the introduction of the relevant functions f' and the requirement that the NS be satisfied by updates of *each* such function. The contribution of a Determiner like *most* would differ in the requirement imposed: the NS has to be satisfied by a majority of updates of the functions introduced by the quantificational DP.

Indefinite DPs that depend on a quantificational DP co-vary with the values assigned to the variable introduced by the latter. If *a paper about specificity* is within the scope of *every student* in (11)

(11) Every student read a paper about specificity.

the variable it introduces co-varies with that introduced by the universal. If the indefinite is independent of the universal, i.e., outside its scope, it does not. In previous work I proposed a particular 'in situ' treatment of scope based on the premise that the choice of function that gives values to variables introduced by non-quantificational argumental DPs is not fully determined by the structural position of the DP. In the case at hand, the choice between wide and narrow scope for the indefinite is a matter of choosing a function that the indefinite updates from the functions made accessible by the context. What functions *are* accessible to an indefinite depends on what functions have been introduced by the point the indefinite is interpreted. Assuming that the input function f is introduced initially and therefore always accessible, and assuming that the functions f'' that evaluate the NS are available to variables in the NS, there are two accessible functions to the variable contributed by the indefinite in (11): f and f''. The former choice results in the 'wide scope', or independent, reading of the indefinite, under which the indefinite updates the initial function. The latter choice results in the 'narrow scope', dependent, reading of the indefinite, under which it updates the functions f' introduced by the universal. In this latter case the indefinite co-varies with the variable bound by the universal. When the indefinite is dependent it is given a sequence of values, just like the universal, with the crucial difference, however, that the

functions responsible for this are introduced by the universal. The functions that interpret such narrow scope indefinites are Skolem functions.

The assumption made here is that the main predication in the NS is necessarily interpreted relative to the functions introduced by the quantifier but that the novel variables are in principle free to be interpreted by any accessible function. At the level of semantic representation, I assume that dependent variables are subscripted by their boss variable. There are then two semantic representations compatible with (11), one where the variable introduced by the indefinite bears the subscript of the variable introduced by the universal, and one where it does not. The former gives the 'narrow scope' reading of the indefinite, while the latter gives the 'wide scope' reading. A variable may appear as a subscript on another just in case it is bound by a quantifier that introduces a set of functions accessible to the subscripted variable.[7]

Note that the dependency parameter is independent of the question of determined reference. Whether a dependent DP has non-determined reference or not depends on whether for each value of the boss variable, the context provides a choice of values. Thus, dependency does not entail indefiniteness, which is as it should be, given that in appropriate contexts definite DPs may be interpreted as dependent, as exemplified in (12).

(12) Every student was given two poems to memorize and then had to recite *the longest of the two* to the class.

Note that in order for a dependent DP to have determined reference the context must meet a special complex condition: for every relevant value of the boss variable, the context must supply an appropriate singleton set to serve as value domain for the variable contributed by the indefinite. This is why dependent definites have close paraphrases involving a pronoun bound to the boss variable in their description (in our case, *the longest poem of the two poems assigned to him/her*). Note that the special interpretation conditions imposed by proper names discussed in Section 2 render them incompatible with dependency. The condition imposed on pronouns, on the other hand, does not. The valuation properties of a variable introduced by a definite pronoun will be inherited from its 'antecedent'.

Non-determined reference, on the other hand, is compatible with dependency under ordinary circumstances, which is why ordinary indefinite DPs participate in scopal ambiguities so readily. Such indefinites are compatible with both dependent and independent interpretations.

Some of the variation we find within the indefinite article systems of various languages concerns the possibility of dependent interpretations. Thus, in Farkas 1997b, it is argued that reduplicating the indefinite in Hungarian is a mark of dependency. The indefinite in (13),

(13) Minden gyerek hozott egy-egy csokrot.
every child bring.Past a-a bouquet.Acc

[7] The question of whether the distinction between dependent and independent variables as well as other matters of scope should be encoded in the semantic representation or left only as interpretation requirements is an issue that I will not discuss here, since it is not crucial to present purposes.

can only receive a dependent interpretation. Moreover, such indefinites are felicitous only in contexts which supply an appropriate boss variable for the indefinite to co-vary with. The condition imposed by a reduplicated indefinite article in Hungarian requires the variable to co-vary with an individual or situational boss variable. Under present assumptions, it requires the variable introduced by it to be subscripted by a situational or individual variable. The restriction of the boss variable to situation or individual-level variables is needed because reduplicated indefinites may not occur within the scope of modals:

(14) *Mari kell hozzon egy-egy csokrot.
Mari must bring a-a bouquet.

Assuming that modals involve quantification over worlds, a narrow scope reading for the indefinite here involves co-variation with the modal variable bound by the universal quantifier contributed by *kell* 'must'.

The fact that reduplicated indefinites in Hungarian may occur only in configurations where an appropriate boss variable is accessible follows from the requirement imposed by the reduplicated article. Thus, the ungrammaticality of (15) follows from the fact that no boss variable is available for the indefinite to depend on:

(15) *Mari lát at most egy-egy gyereket.
M. sees now a-a child.Acc

Note that as formulated here, the condition imposed by a reduplicated indefinite in Hungarian is not equivalent to a condition that would require it to have narrow scope with respect to some operator or, equivalently, a condition requiring it to occur in a subordinate DRS. Consider the interaction of indefinites and negation. A sentence such as (16),

(16) Mari is not reading an article on indefinites.

is ambiguous with respect to the scope of the indefinite relative to negation: under the wide scope reading, the claim made is that there is an article on indefinites that Mary is not reading (but there may be others that she is), while under the narrow scope reading there is no article on indefinites that Mary is reading. This latter reading is represented in DRT with the indefinite within the subordinate box introduced by negation.

An indefinite 'within the scope' of negation has special interpretive properties. Very roughly put, the negative operator requires the expression in its scope to be false (unembeddable) under *all legitimate assignments*, i.e., all assignments that meet the conditions imposed by the expression in question. In the terminology used here, the negative operator then introduces a set of functions that update the input functions, relative to which the expression in its scope is to be evaluated. In the case of a sentence such as *Mary didn't leave yesterday* the set of functions in question would differ only with respect to temporal indices within the relevant interval defined by *yesterday*. If, however, the expression in the scope of negation contains an indefinite, the variable introduced by this indefinite may be interpreted with respect to the set of functions introduced by the negative operator, resulting in the narrow scope reading of the indefinite, or with respect to the input function, resulting in the wide scope reading of the indefinite. In the former case the interpretation of the variable varies: the variable is

interpreted by a set of functions ranging over the whole value set. In the latter case, the interpretation of the variable does not vary: it is interpreted by a single function – an update of the input function. The interpretation of an indefinite within the scope of negation varies without co-varying with another variable.

Based on the above discussion, one can identify three distinct ways in which the interpretation of a variable may vary: (i) The variable is bound by a variation-inducing quantifier. This is the case of variables introduced by quantificational DPs. (ii) The variable is dependent on another, i.e., it co-varies with a variable bound by a variation-inducing quantifier. This is the case of indefinites within the scope of universals. (iii) The variable is interpreted by a set of functions introduced by a non-quantificational operator, i.e., an operator that introduces a set of assignment functions but no special variable that it binds. This is the case of indefinites within the scope of negation. The second type of variation is compatible with determined reference, the third is not. In what follows I will use the term *quantificational DP* to refer to DPs that induce variation of type (i): they introduce a variable and a set of functions that update the input function relative to the variable in question. The Determiner in such DPs encodes instructions concerning the relation between the functions introduced by the DP and their updates relative to the NS.

Returning to reduplication of the indefinite article in Hungarian, if it signals dependency rather than simply non-quantificational variation, we expect it not to be licit within the scope of negation. That this is indeed the case is shown in (17):

(17) *Mari nem lát at egy-egy gyereket se.
M. not sees a-a child.Acc neg

(The morpheme se signals that the indefinite is within the scope of negation.)

Note that the distinction between reduplicated and non-reduplicated indefinites in Hungarian cannot be captured by making reference to type-theoretic distinctions. Assuming an ambiguity between choice-functional and non choice-functional indefinites, as proposed by Reinhart 1997, Kratzer 1998 and Matthewson 1999 in other contexts, would not be helpful either. Reinhart 1997 assumes that choice-functional indefinites are associated with choice functional variables that may be bound by existential quantifiers in an unconstrained way, which is responsible for the free scope of such DPs. Quantificational indefinites, on the other hand, behave like universal DPs and are restricted in scope. This distinction cannot capture the requirement of co-variation associated with reduplicated indefinites. Reduplicated indefinites would have to be either special choice-functional indefinites that have to co-vary, or special co-varying quantificational indefinites.

Matthewson 1999, following Kratzer 1998, suggests that, on the contrary, choice-functional indefinites are not subject to co-variation while quantificational indefinites are. This distinction is not more helpful than Reinhart's in capturing the special requirement encoded in reduplicative morphology. Reduplicated indefinites would necessarily be quantificational, under this approach, but would still be subject to the co-variation condition. The point of this discussion is that assuming an ambiguity between choice-functional and non-choice-functional DPs does not render the special condition requiring these DPs to co-vary with some other variable superfluous.

Note that a distinction in terms of occurrence in the main DRS as opposed to an embedded one, quite naturally made in DRT, is not helpful either, given the observation about negation just made. I conclude then that allowing nominal morphology to restrict

interpretation characteristics of variables introduced by DPs is necessary in order to account for the interpretive characteristics of reduplicated indefinites in Hungarian. The semantic import of indefinite article reduplication in Hungarian is that of imposing the co-variation restriction on the variable introduced by the DP, on a par with the various other restrictions introduced by other Determiners.

The question now arises whether DP properties that were captured using different parameters could not be expressed in these terms. To illustrate, note that under present assumptions it is expected (or at least not unexpected) to find a language where nominal morphology is sensitive to non-quantificational variation, without distinguishing the special type of co-variation Hungarian is sensitive to. In present terms, an indefinite that is marked for not being able to vary is a DP that introduces a variable that has to update the input function. Such an indefinite would then introduce a variable marked for fixed reference. In DRT terms, this amounts to the requirement that the variable occur in the main DRS. An indefinite that has to vary would be a DP that introduces a variable marked for variation. In DRT terms such indefinites would be required to occur within an embedded DRS. Under the assumption made here, namely that interpretation requirements are made explicit at the representational level, and that variables have indices encoding such requirements, the difference between *fixed* and varying non-quantificational DPs may be encoded by assuming that the former have a function index fixed to the input functions f, while the latter require a functional index ranging over a set of functions.

Below I claim that the two indefinites in Lillooet Salish discussed in Matthewson 1999 appear to be of just this sort. Matthewson 1999 shows that in Lillooet Salish there are two types of indefinites, one marked by the prefix *ku-* and the other by the prefix *ti-*. Indefinites marked by *ti-* may only be interpreted as having 'widest scope', i.e., as not varying or co-varying. Such indefinites then are marked for updating the input function.[8] Indefinites marked by *ku-* on the other hand, must occur within the scope of another quantificational DP, modal or negation. It appears then that these DPs are marked for variation, without regard to finer distinctions concerning the type of variation involved. In present terms, they require their functional index to range over a set of functions.

The analysis Matthewson herself proposes is different: for her, the distinction between *ti-* and *ku-* indefinites marks overtly the choice-functional ambiguity mentioned above, that remains covert in English. From the larger perspective of cross-linguistic variation, however, it appears that the ambiguity posited by Kratzer and Matthewson addresses only one aspect among several differentiations within the realm of indefinites, and therefore assuming such an ambiguity becomes much less appealing. Note that extending the logic of the ambiguity proponents would make us assume English indefinites to be ambiguous also with respect to whether they co-vary or not (a distinction overtly marked in Hungarian). The parsimonious move is to assume a non-ambiguous interpretation of indefinites with a choice-function- like mechanism, and allow morphology to place further restrictions on the interpretation properties of these DPs.

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[8] Matthewson 1999 notes that *ti-* indefinites may co-vary with another variable that is bound by a quantifier just in case their description contains a pronoun bound by the quantifier in question. Note that in present terms, this means that variation in the values assigned to the variable contributed by the indefinite results from varying the value set to which the input function applies, rather than the function itself.

So far we have seen morphology marking 'wide scope only', non-varying, indefinites, indefinites that must vary and indefinites that must co-vary. There is a further type of indefinite whose scope is restricted: indefinites that may not have wide scope relative to another DP or operator, but which need not occur within the scope of any element, i.e., they are not necessarily co-varying. English 'existential' bare plurals, exemplified in (18) seem to fit this description.

(18) John read poems all afternoon.

One possible analysis of these noun phrases, suggested by van Geenhoven 1996, is to treat them as 'semantically incorporated', in which case, in present terms, they would not contribute an independent discourse referent that is given values by assignment functions but be part of the predicate. This is essentially the approach to morphological incorporation developed in Farkas and de Swart (2000). The scopal properties of incorporated nominals then follow from a more basic property, namely that they are incorporated.

Van Geenhoven extends her semantic incorporation analysis to all narrow scope indefinites. Such a move, however, would prevent us from distinguishing between ordinary narrow scope indefinites and reduplicated ones in Hungarian. Another line of analysis, explored in Farkas and de Swart, is to treat such bare plurals as argumental DPs introducing variables and involving a null Determiner that comes with the restriction of having to be interpreted by the current, most recently introduced assignment function. This type of 'local scope' DPs are the opposite of the 'widest scope' DPs exemplified by *ti-* indefinites in Lillooet Salish. From the point of view of scope, these DPs will behave just like incorporated nominals but for a different reason. Incorporated nominals cannot scope independently of their predicate because, in effect, they are predicate modifiers. Bare plural argumental DPs, on the other hand, are limited in scope by the restriction associated with the null Determiner.

3.2. Epistemic (non)-specificity

Below I suggest that epistemic specificity can be characterized in terms of variation, albeit of a special type. The question of epistemic specificity arises with respect to the interpretation of indefinites such as those in (19):

(19) A painting is missing from this room.
A student in Syntax 1 cheated on the exam.

These sentences are used in contexts which do not narrow down the choice of value for the variable in question to a unique entity, and therefore the variable contributed by them does not have determined reference. The speaker may, however, have a particular individual in mind, and the context may make it clear that she does. In this case the indefinites are epistemically specific. For epistemically specific indefinites all updates relative to the variable introduced by the indefinite that are consistent with the speaker's point of view agree in the value they assign to this variable. In the case of epistemic non-specificity, there is variation with respect to the value assigned to the variable in question not only given information provided by the context as a whole but also with respect to what the context presents as information available to the speaker. In this case then, the indefinite has fixed, non-variable reference relative to the speaker but not

relative to the context as a whole. In order to model the dual status of such indefinites one would have to enrich the notion of context along the lines proposed in Gunlogson 2001. The crucial suggestion there is to assume that Stalnaker's common ground is derived from a more basic notion of discourse commitments of a participant. Assuming a two-participant discourse, the context would include two such discourse commitments, CDa and CDb each determining a context set, ca and cb , defined as the intersection of the propositions in CDa and CDb respectively. In the case of epistemically specific indefinite DPs, all embeddings of the discourse in ca agree on the value they assign to the variable introduced by the indefinite (assuming the speaker is a).[9]

4. Conclusion

In conclusion, it appears that treating Determiners as lexically encoding complex valuation instructions allows us to capture the variety of scopal non-specificity we find across DP types without having to introduce additional machinery. We have isolated here several ways in which the interpretation of a variable may vary and we saw that languages sometimes mark DPs for a particular type of interpretation. The means of capturing these distinctions was by way of valuation restrictions, rather than directly in terms of scope. The parameter of variation is independent of that of determined reference, though it interacts with it.

With respect to degree of scopal independence, the indefinites we examined so far can be seen to form the scale in (20):

(20) widest scope only > neutral > co-varying, varying > local scope only > incorporated nominals

Lillooet Salish *ti-* indefinites illustrate the leftmost type, garden-variety indefinites such as DPs with *a(n)* illustrate neutral scope DPs, Hungarian reduplicated indefinites and Lillooet Salish *ku-* marked DPs illustrate the two subtypes on the next rung respectively, and English existential bare plurals are 'local scope only' DPs. Incorporated nominals form a rich world of their own, which lies beyond the scope of this paper.

The distinctions we have discussed here fall under the rubric of constraining the assignment function involved in the interpretation of the DP. Another possible way of constraining the interpretation of a variable contributed by a DP is to impose restrictions on the properties of the value set. Subjunctive relative clauses in Romance languages for instance, can be seen as imposing a special requirement on the modal interpretation of the world parameter of the description, i.e., the question of what world or worlds the description is interpreted relative to. The property known as d-linking is also characterizable in terms of a particular restriction on the value set, namely that it should be 'discourse old'. Recent discussions of *any* in English involve the nature of the value set as well. Thus, the widening condition proposed by Kadmon and Landman 1993 is also a value set condition. Horn 1999 suggests another constraint on the structure of this set, namely that its elements should form a scale. Under this proposal, just like under Kadmon and Landman's, *any*-DPs have no quantificational force of their own. Their universal flavor is as a consequence of the fact that even the extreme element of the

[9] For suggestions along similar lines, see Farkas 1994.

scale is an acceptable value for the variable introduced by the DP. Alternatively, one may assume that such DPs actually require successive evaluation, but unlike universals, the evaluation is disjunctive rather than conjunctive, and, moreover, the alternative functions are not introduced by the DP itself but must be provided by its context. It is this latter property that makes them indefinite under present assumptions.[10]

Finally, note that the case of epistemic specific indefinites highlights the common thread between determinacy of reference and variation, which unites the scales in (2) and (20). The determinacy of reference parameter concerns the issue of whether updates on the variable in question vary or not relative to the value they assign to it. Determined reference DPs have fixed values relative to each relevant input function. Non-determined reference DPs do not. The various notions of indefinites discussed under the scopal specificity rubric involved the issue of fixed or variable reference relative to different parameters. The questions discussed here lead us to examine the details of the distribution and interpretation of various types of Determiners in natural languages and try to account for the variation we find.

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[10] For proposals linking *any*-DPs in Romanian with disjunction, see Manea-Manoliu 1966. Giannakidou (to appear) presents an analysis of *any* and its Greek relatives that is in the same vein.

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