

Incorporation, plurality, and the incorporation of plurals: a dynamic approach

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Abstract

This paper deals with the semantic properties of incorporated nominals that are present at clausal syntax. Such nominals exhibit a complex cluster of semantic properties, ranging from argument structure, scope, and number to discourse transparency. We develop an analysis of incorporation in the framework of Discourse Representation Theory, a dynamic theory that can connect sentence-level and discourse-level semantics. We concentrate on data from Hungarian, where incorporated nominals may be either morphologically singular or plural. We set out to capture two sets of contrasts: (i) those we find when comparing incorporated nominals on the one hand and their non-incorporated, full-fledged argument sisters on the other, and (ii) those we find when comparing morphologically singular and morphologically plural incorporated nominals. A more elaborate version of the analysis can be found in Farkas and de Swart (2003).

1. Background on incorporation

The term ‘incorporation’ is generally used to describe constructions in which a verb and one of its arguments form a particularly tight unit. Initially, this phenomenon attracted the attention of linguists because of its morpho-syntactic interest (Sadock 1980, Mithun 1984, Baker 1988, Massam 2001). Aspects of this phenomenon that are relevant to semantics have been in the background or even the foreground of the discussion from the beginning, though. Thus, the question of the discourse transparency of the nominal in an incorporated construction figured prominently in Sadock (1980), as an argument for the syntactic nature of the process of incorporation. Mithun (1984) showed that there is cross-linguistic variation with respect to whether an incorporated nominal is discourse transparent or not. Incorporation has captured the attention of semanticists because of its relevance to issues of scope and the semantics of indefinite noun phrases. A cross-linguistically stable property of incorporated nominals that has been noted from the earliest work is their inability to take wide scope over other elements in their sentence. The term ‘incorporation’ is used in de Hoop (1992) in connection with such ‘narrow scope only’ indefinites. The seminal work of Van Geenhoven (1998) highlights the semantic similarities between incorporated nominals in West Greenlandic and weak, narrow scope indefinites in English and German. As a result of Van Geenhoven’s work, incorporation has

become connected to another star problem in semantics, namely the account of the semantic properties of bare plurals (see Carlson 1978, Krifka et al. 1995, Chierchia 1998). Van Geenhoven coined the term ‘semantic incorporation’ under whose wing she gathers all narrowest scope indefinites, independently of their morpho-syntactic characteristics. Dayal (1999) picks up the bare plural thread, and shows that the singular/plural distinction in incorporation constructions has semantic repercussions in Hindi. Most recently, Chung and Ladusaw (2003) highlight the relevance of incorporation to argument structure. A central empirical issue they address involves the phenomenon of ‘doubling’. Doubling refers to cases where the incorporated nominal is doubled by a full DP, resulting in constructions whose glosses would be something like *John pet-has a dog*.

From these brief references to the literature, it should be clear that the notion of incorporation is not defined in the same way by all authors. Baker’s (1988) use of the term incorporation, for instance, covers only cases in which the incorporated entity is of bar level zero, i.e., made up of an unmodified noun. Massam (2001) uses the term ‘pseudo noun incorporation’ to cover a special class of nominals in Niuean that may be modified by adjectives and allow ‘lite’ coordination, but cannot be preceded by articles. Under standard assumptions such nominals are of category NP, and not DP. Van Geenhoven (1998) extends the notion even further, and includes all narrow scope indefinites.

Our use of the term ‘incorporation’ is somewhat in the middle. We deal only with nominals that are present in the syntax, excluding compounds like the English *berry picking*. Incorporated nominals in our sense must have special, reduced morpho-syntax that contrasts with that of full-fledged arguments. The special morpho-syntax, we claim, correlates with a special, reduced, semantic role incorporated nominals play, which explains their core static and dynamic semantic properties.

2. Two sets of contrasts in Hungarian

2.1 Incorporated and non-incorporated nominals in Hungarian

We illustrate the contrast between incorporated and non-incorporated arguments with the Hungarian minimal pair in (1) and (2):

- (1) Mari fel-olvas egy verset.
 Mari Part-read.III a poem.Acc
 ‘Mari is reading a poem aloud.’
- (2) Mari verset olvas fel.
 Mari poem.Acc read.III Part
 ‘Mari poem read aloud.’ Or: ‘Mari is reading aloud a poem/poems/poetry.’

The contrast involves the D(irect) O(bject), which is realized by a full-fledged argument in (1) and an incorporated one in (2). Note that in (1) the DO noun phrase is a full DP consisting of the indefinite D *egy* and the head noun in the Accusative case. In (2) on the other hand, the DO is, significantly, article-less, though case marking is still present on the head noun. Syntactically, the bare nominal occurs in an immediately preverbal position, which we call, following Szabolcsi (1997), PredOp. When this position is filled, verbal particles, glossed as Part, must occur postverbally.

The postverbal position of the verbal particle can thus be used as a test showing that PredOp is filled. Unfocused full DPs contrast with bare nominals in that they are unacceptable in PredOp (cf. 34 below). We refer to the nominal in (2) as an I(ncorporated) N(ominal). The English translations show how difficult it is to express the meaning of an incorporated nominal in a language that does not allow this construction. One problem is that the incorporated nominal is number neutral while its unincorporated sisters are not. We indicate this fact by including both the singular and the plural form in our glosses. Another problem is that incorporated nominals are intuitively backgrounded compared to full arguments. In terms of information structure, they are less salient. Aside from the number neutrality and difference in saliency, (1) and (2) do not differ in meaning, and have the same truth conditions.

Work on incorporation has shown that INs are special in that the nominal is *scopally inert*. It must scope with the predicate, and therefore cannot have wide scope relative to any operator or quantifier in whose scope the predicate occurs (cf. Sadock 1980, Bittner 1994, Van Geenhoven 1998, Dayal 1999, Chung and Ladusaw 2003). We illustrate in Hungarian by the contrast between (3) and (4):

- (3) Mari kell olvasson egy verset.
 Mari must read.Subj.III a poem.Acc
 ‘Mari must read a poem.’
- (4) Mari verset kell olvasson.
 Mari poem.Acc must read.Subj.III
 ‘Mari poem must read.’ Or Marie must read a poem/poems.’

Sentence (3) is scopally ambiguous, just like its English translation. Sentence (4), however, involving an IN, lacks the wide scope reading. It only has the narrow scope reading of the DO, according to which any old poem that Mari reads will do.

Common to languages that exhibit nominal incorporation is the existence of restrictions concerning the grammatical relation of the incorporated nominal. Subjects are least likely to incorporate, and within the category of subjects, subjects of individual-level predicates are most resistant to incorporation. Hungarian places no restriction on the grammatical role of the IN, allowing, in special instances, even subject incorporation, as illustrated in (5). However, incorporation of subjects of individual-level predicates is ruled out, as illustrated in (6):

- (5) Gyerek sírt a közelben.
 Child cry.Past.III the vicinity.in
 ‘A child was crying in the vicinity.’
- (6) *Gyerek okos.
 *Child clever

One approach to incorporation that accounts for this restriction, and which has been proposed for Hungarian by Szabolcsi (1997), is to treat INs as ‘predicate modifiers’ rather than full-fledged arguments of the predicate. Predicate modifiers lack the independence required of subjects of individual-level predicates, under the view that these predicate something of an independently established referent (see Ladusaw 1994 and references therein). Our analysis builds on these insights.

2.2 The singular/plural contrast

Languages differ in whether they allow number contrast to be morphologically manifested in incorporation constructions. In Hungarian, like in Hindi, and unlike in West Greenlandic, incorporated nominals show a morphological contrast between singulars and plurals, a contrast that has significant semantic repercussions. Thus, the minimal pair in (1) and (2) is to be extended with the sentence in (7):

- (7) Mari verseket olvas fel.
Mari poem.Pl.Acc read.III Part
'Mari poems reads.' Or: 'Mari is reading poems.'

The preverbal position of the DO and the postverbal position of the particle are indicative of the incorporation construction (compare 2 versus 1 above). The morpheme *-Vk*, suffixed on the head noun *vers* in (7), is interpreted as an indication of plurality. Thus, both singular and plural bare nominals may occur in incorporated constructions in Hungarian but while singular INs are semantically number neutral, plural INs are semantically plural.

The difference in number interpretation between morphologically singular and plural INs is robust. Thus, morphologically singular INs are compatible with non-atomic (8) as well as with atomic interpretations (9):

- (8) Mari bélyeget gyűjt.
Mari stamp.Acc collect
'Mari stamp-collects.' Or: 'Mari is collecting stamps.'
- (9) Feri feleséget keres.
Feri wife.Acc seek
'Feri wife-seeks.' Or: 'Feri is looking for a wife.'

In the context of (8), a plural IN would be equally felicitous. However, the plural counterpart of (9) in (10) is pragmatically odd:

- (10) Feri feleségeket keres.
Feri wife.Pl.Acc seek
'Feri wives seeks' or: 'Feri is looking for wives.'

Unlike (9), (10) entails that Feri is looking for several wives.

Bare plurals in Hungarian are syntactically more versatile than their singular counterparts in that they may occur not only in the special preverbal position that INs occur in but also in the regular post-verbal position reserved for full-fledged arguments, as exemplified in (11):

- (11) Benéztem az ablakon és láttam egy asztalnál
in.look.Past.I the window.on and see.Past.I a table.at
szépen felöltözött gyerekeket amint kakaót ittak.
beautiful dressed child.Pl.Ac while cocoa.Acc drink.Past.IIIpl
'I looked through the window and saw at a table well-dressed children
drinking cocoa.'

The counterpart of (11) with a bare singular is ungrammatical. We therefore conclude that bare singulars are excluded from full argument positions. Bare singulars are restricted to the PredOp position, therefore they must incorporate; bare plurals on the other hand may occur both in PredOp and in full argument position, i.e., they may but need not be incorporated.

These contrasts show the need to establish a fundamental distinction between incorporated and non-incorporated arguments, since one has to block full DPs from incorporated positions and bare singulars from full argument positions in Hungarian. One also has to account for the dual status of bare plurals which can occur in both positions, without any difference in truth conditions.

2.3 Discourse transparency

An issue that has been raised from the earliest modern discussions of INs in the literature involves the question of whether they may or may not act as antecedents for pronouns in subsequent discourse. Following current standard terminology, we call nominals that may serve as antecedents to pronouns in discourse *discourse transparent*; those that may not, we call *discourse opaque*. In languages like West Greenlandic, and Chamorro, INs which are unmarked for number are discourse transparent. Dayal (1999) shows that morphologically singular INs in Hindi are discourse opaque while plural ones are discourse transparent. The same appears to be true for Hungarian, as shown in (12)-(14):

- (12) a. János_i egy beteget_j vizsgált a rendelőben.
 J._i a patient.Acc_j examine.Past the office.in
 ‘Janos_i examined a patient_j in the office.’
- b. pro_i Túl súlyosnak találta őt_j és
 pro_i too severe.Dat find.Past he.Acc_j and
 beutaltatta pro_j a kórházba.
 intern.Cause.Past pro_j the hospital.in
 ‘He_i found him_j too sick and sent him_j to hospital.’
- (13) a. János_i beteget_j vizsgált a rendelőben.
 J._i patient.Acc_j examine.Past the office.in
 ‘Janos_i patient_j-examined in the office.’
- b. ?* pro_i Túl súlyosnak találta őt_j és
 pro_i too severe.Dat find.Past he.Acc_j and
 beutaltatta pro_j a kórházba.
 intern.Cause.Past pro_j the hospital.in
 ‘He_i found him_j too sick and sent him_j to hospital.’
- (14) a. János_i betegeket_j vizsgált a rendelőben.
 J._i patient.Pl.Acc_j examine.Past the office.in
 ‘Janos_i patients_j-examined in the office.’
- b. pro_i Túl súlyosnak találta őket_j és
 pro_i too severe.Dat find.Past he.Pl.Acc_j and
 beutaltatta pro_j a kórházba.
 intern.Cause.Past pro_j the hospital.in
 ‘He_i found them_j too sick and sent them_j to hospital.’

The full indefinite in regular argument position in (12a) can be the antecedent of a discourse pronoun in the (b) sentence (in boldface), as expected on the basis of standard assumptions about the dynamic properties of indefinites (e.g. Kamp and Reyle 1993). Although discourse transparency judgments are notoriously subtle, our consultants agree in finding (13) significantly worse than (12), which justifies calling morphologically singular INs opaque as far as overt discourse pronouns are concerned. Morphologically plural INs in Hungarian are fully discourse transparent, as illustrated by (14). Obviously, neither analyses that predict full discourse transparency for INs nor those that predict full opacity can deal with these contrasts. We need a theory that can make discourse transparency sensitive to number.

Summing up, the issues we address in this paper are the following: (i) the contrasts in scope and subject restrictions between INs and full-fledged (indefinite) DPs; (ii) the question of why singular INs contrast with both full-fledged singular/plural indefinites and plural INs in being semantically number neutral; (iii) the contrast in discourse transparency between singular and plural INs in languages such as Hungarian and Hindi. While we will point out how the analysis of the Hungarian facts is generalizable to other languages, interested readers are referred to Farkas and de Swart (2003) for a full discussion.

The account we develop here is formulated within the framework of Discourse Representation Theory (DRT), and takes Kamp and Reyle (1993) as its starting point. This choice is motivated by the nature of our problem, which involves static, truth-conditional issues as well as dynamic ones. DRT was set up precisely to bridge sentence-level semantics and dynamic, discourse-level aspects of interpretation.

We proceed by establishing in Section 3 a distinction between thematic arguments and discourse referents in DRT. We also develop there a new view on plurality. Section 4 gives an account of incorporation in terms of unification of thematic arguments, and discusses the core semantic properties of INs. Section 5 extends the analysis to plural INs. Section 6 concludes the paper with a discussion of further issues.

3. DRT with new details

The version of DRT developed in Kamp and Reyle (1993) focuses on the role of DPs at the sentence level and in the discourse. Here, we separate two notions that are conflated in Kamp and Reyle's work, namely discourse referents and thematic arguments of a predicate. Thematic arguments are contributed by nominal and verbal predicates, while discourse referents are contributed by determiners, proper names and pronouns (section 3.1). In the process of combining a determiner with an NP, and a DP with a VP, the thematic arguments of the predicates are bound to the relevant discourse referent introduced as part of the interpretation of the DP. This process is called *Instantiation* (section 3.2). The more fine-grained analysis of DPs we propose here has consequences for the interpretation of morphological number on nominals (section 3.3), which affects the treatment of plural DPs and bare plurals (section 3.4).

3.1 Discourse referents and thematic arguments

We follow standard syntactic practice, and in particular Grimshaw (2000), in assuming that descriptive DPs consist of a nominal core, an NP consisting of an N, accompanied optionally by arguments and optionally modified by adjectives, and an inflectional layer whose highest head is a D:

(15) [DP D ... [NP N]]

We assume that nominal inflection, and in particular, morphological number, is part of the inflectional layer, and is encoded in the form of an inflectional feature. What syntactic weight such features are assigned is immaterial for our purposes. We take predicative expressions (verbs, common nouns, adjectives, certain prepositions) to denote n -place relations. The term *thematic argument* is used to refer to variables filling the places of such an expression. The role of thematic structure within the boundaries of lexical semantics is uncontroversial. We claim here that it is desirable to make room for them at the level of the Discourse Representation Structure (DRS) as well. We therefore propose that at the level of the DRS, there are two types of variables: discourse referents, denoted by u, v, w , and thematic arguments, denoted by x, y, z . The construction rules generate thematic arguments only as arguments of predicative conditions in Con_K , the set of conditions in some DRS K . These arguments do not appear in U_K , the universe of the DRS K .

The thematic arguments of a predicate must be connected to particular syntactic arguments of the verb. Which syntactic argument connects to which thematic argument is the topic of ‘linking theory’, which lies outside the scope of our work. We will, however, provide an explicit way of introducing thematic arguments into the DRS, and of connecting them with discourse referents.

Following standard DRT, we assume that discourse referents are elements of the universe of a DRS K , U_K , and are assigned values by embedding functions. We propose that the primary dynamic role of determiners in argumental descriptive DPs, as well as the primary role of proper names and pronouns, is to introduce discourse referents. The discourse referent introduced by a determiner has to be connected both to the thematic argument of the lexical predicate in the DP and to the appropriate thematic argument of the predicate the DP is a syntactic argument of. This is achieved by means of the process of *Instantiation*.

3.2 Instantiation

Instantiation is the replacement of a thematic argument by a discourse referent:

(16) *Instantiation of a thematic argument by a discourse referent*
Substitute u for all occurrences of x in Con_K .

We distinguish two versions of Instantiation. *D(eterminer)-Instantiation* accompanies the reduction of the node made up of the D and its NP sister. *A(rgument)-Instantiation* is involved in the combination of a verb and one of its syntactic arguments:

(17) *D-Instantiation*
Instantiate the thematic argument z of the NP by the discourse referent u contributed by material under D, and subscript u with the index x , writing u_x .

(18) *A-Instantiation*
Instantiate the relevant thematic argument of a verbal predicate by the Discourse referent contributed by the fully interpreted nominal argument.

(The subscripting mechanism in (17) keeps track of which thematic argument was affected by D-Instantiation. This information will be needed below when we discuss the interpretation of number.)

We illustrate with the example in (19):

(19) A student left

Figure 1 represents the input DRS.

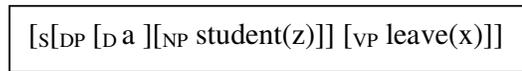


Figure 1 Contribution of the common noun and the VP

Both the common noun *student* and the intransitive verb *leave* contribute a one-place predicate with a thematic argument. Within the DP, the first step is to reduce the determiner *a*, and have it introduce a discourse referent *u*, as shown in figure 2:

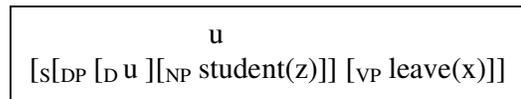


Figure 2 Contribution of D

D-Instantiation and A-Instantiation lead to the replacement of the thematic arguments *z* and *x* respectively by the discourse referent *u_z*.

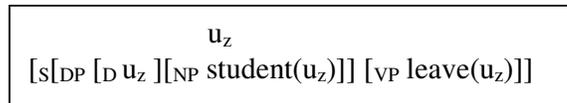


Figure 3 Application of D-Instantiation and A-Instantiation

This DRS contains only irreducible conditions, so we can remove the syntactic structure, and write it as the final DRS in figure 4.

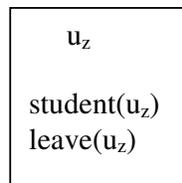


Figure 4 'A student left', final DRS

Our final interpretation is equivalent to what would be obtained under Kamp and Reyle's (1993) approach. The route is more circuitous because of the separation we propose between discourse referents (contributed by argumental DPs) and the predicative conditions contributed by the main predicative part of the sentence.

3.3 Semantic number

The nominal morphological features we encounter cross-linguistically are case, number, gender, and person. Among these, number is the only feature that plays a role in incorporation, and therefore we will focus here on the details of its interpretation. Our central claim is that number, unlike gender, plays a role in nominal dynamic semantics. We focus our attention on morphological systems that have a binary opposition between morphologically singular and morphologically plural nominals, as is the case in both English and Hungarian.

In Kamp and Reyle (1993), singular indefinites such as *a student* in argument position introduce a discourse referent that can be picked up by an anaphoric expression later in the discourse. This discourse referent is taken to refer to an atomic individual in the sense that the embedding function must assign to it an atomic individual as value. Plural indefinites such as *two students* are different only in that the discourse referent they introduce is taken to refer to a group, or a non-atomic individual. At the DRS level, the difference between singular and plural indefinite DPs is reflected in the use of upper and lower case variables: u, v, w stand for discourse referents that must have atomic entities as values, while U, V, W stand for discourse referents that must have non-atomic, group referents. In view of the distinction we established between thematic arguments and discourse referents, we need to refine this view. As far as the morpho-syntax is concerned, we take it that plural morphology involves the presence of an inflectional feature *pl* realized on the lexical head noun. We assume that *pl* is a head feature, and therefore it projects to the highest projection of the nominal (NP or DP). For a full-fledged plural DP such as *two cats*, this leads to the structure in (20):

- (20) Two cats are asleep.
 [S [DP_{pl} [D_{pl} two] [NP_{pl} [N_{pl} cats]]] [VP are asleep]]

We assume that only one of these projected features is interpreted, namely the lowest. (Nothing crucial depends on this choice, however, as will become clear below.) We agree with Kamp and Reyle that plurality should be marked on discourse referents (rather than thematic arguments), and that the discourse referent introduced by a plural nominal must allow a group-level individual as value. Kamp and Reyle encode this information by using specialized variables. However, they make it clear that the instruction to introduce a non-atomic discourse referent U into the universe of a DRS K is an abbreviation of the instruction to introduce a discourse referent u into the universe of K and introduce the condition *non-atomic*(u) into Con_K . Similarly, the instruction to introduce a singular discourse referent involves the introduction of the condition *atomic*(u) (Kamp and Reyle 1993:334). Here, we use the more elaborate instruction, and mark plurality as the predicate *plural*(u) on a discourse referent u . Crucially, we treat plurality as a privative feature, and therefore singular nominals are not associated with explicit atomicity requirements. Their atomic interpretation is due to the existence of a default atomic assignment of values to discourse referents. More specifically, we assume that in the absence of requirements to the contrary, embedding functions choose atomic values to discourse referents.

We take the morphological feature *pl* marked on the N in (20) to contribute the predicate *plural* whose effect is to require the discourse referent that instantiates the thematic argument of the nominal to be non-atomic. In the bottom-up interpretation we are assuming here, this discourse referent has not been introduced at the time the nominal bearing the plural feature is processed. Recall that in the standard case of a

descriptive DP, it is the role of the material in D to introduce the discourse referent that instantiates the thematic argument of the nominal. To capture the fact that the number information that is morphologically marked on the head noun imposes a requirement on the discourse referent to be introduced by the determiner, we adopt a presuppositional analysis, according to which the feature *pl* contributes a presupposed discourse referent and predicates plurality of it. In this view, information contributed by morphological features affects a different level of information than material contributed by phrasal morphemes. (For a presuppositional view of morphological features see also Schlenker 2003.)

We follow van der Sandt's (1991) treatment of presupposition in DRT, enclosing the presupposed material in a presuppositional box K' (to the right), separated from the asserted box K (to the left) by a double line. Material in the presuppositional part of the representation has to be eventually resolved in the asserted part but till then it constitutes a distinct level. Accordingly, the DRS in figure 5 is the representation of what we get after the plural head noun in (20) has been reduced:

K	K'
[S [DP _{pl} [D _{pl} two] [NP _{pl} [N _{pl} cats(x)]]] [VP are asleep(z)]]	u_x plural(u_x)

Figure 5 Contribution of plural NP

Recall that expressions in D introduce a discourse referent that instantiates the thematic argument of the nominal head by D-Instantiation. The result of interpreting the D and applying D-Instantiation in (20) is given in figure 6:

v_x	u_x
two(v_x) [S [DP [D v_x] [NP [N cat(v_x)]]] [VP are asleep(z)]]	plural(u_x)

Figure 6 Contribution of D and D-Instantiation

We resolve the presupposition by binding the presupposed discourse referent u_x to the discourse referent v_x that instantiates the thematic argument x of the N(P). We assume that this resolution is made possible by the identity of the thematic indices of the two discourse referents. Once the interpretation of the DP is complete, and the presupposition has been resolved, we obtain the DRS in figure 7 after A-Instantiation:

v_x
two(v_x) plural(v_x) cat(v_x) asleep(v_x)

Figure 7 ‘Two cats are asleep’, final DRS

In sum, plural morphology on a nominal contributes a presupposed condition on a presupposed discourse referent. In full-fledged DPs, the presupposed discourse referent introduced by the plural is bound by the discourse referent introduced by the determiner. In a DP like *two cats*, the lexical properties of the D entail non-atomicity, so the semantic contribution of the plural feature is redundant. In cases such as *the cats*, where the D is unmarked for number, it is not. In singular DPs like *some cat*, there is no plural marking, so no presupposition is introduced. The singular interpretation of this DP is due to the fact that discourse referents are assigned atomic values by default. This treatment of singular morphology accounts for examples like (21) in Hungarian:

- (21) Sok/hat diák elment. Pali látta őket.
 Many/six student left. Pali see.Past.Def them.Acc
 ‘Many/ six students left. Pali saw them.’

The noun *diák* is in the singular, and the verb is in the third person singular as well, but the non-atomicity entailed by the determiner overrules the default and requires the embedding function to assign a non-atomic entity to the discourse referent involved. Discourse pronouns having such morphologically singular, but semantically plural DPs as antecedents are always morphologically plural (*öket* in 21), showing sensitivity to the semantic nature of the discourse referent rather than the morphology of the antecedent.

In conclusion, we note that the role of the feature *pl* in this account is similar to that of a determiner in that it introduces a discourse referent. It is different in that this discourse referent is presupposed and is subject to stringent binding and interpretive conditions. Verkuyl and Bende-Farkas (1997) and Kamp and Bende-Farkas (2001) have also advanced proposals that relate plural marking to determiners. The crucial difference is that we maintain a distinction between the contribution of the plural on N(P)s and the contribution of determiners. The importance of this distinction will become evident when we deal with incorporated plurals in Hungarian.

3.4 Bare plurals

The analysis of the contribution of plural morphology in terms of a predicate of plurality on a presupposed discourse referent offers an interesting perspective on the semantics of existential bare plurals in sentences like (22):

- (22) Cats were playing in the garden.
 [S [NP_{pl} [N_{pl} cat]] [VP play-in-the-garden]]

Under the simplest syntactic assumptions, according to which what you see is what you get, the subject is a plural NP, for there is no lexical D. If we apply the regular construction rule for plural nouns, we obtain the DRS in figure 8 as our starting point:

[S [NP [N cat(x)]] [VP play(z)]]	u _x plural(u _x)
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Figure 8 contribution of plural noun

The problem we face now is that there is no asserted discourse referent that may act as a binder for the presupposed discourse referent introduced by the plural, because of the absence of a determiner. Thus u_x cannot be connected to x by being bound to some asserted discourse referent subscripted for x .

We assume that in languages like English where bare plural arguments are possible, the derivation may proceed because these languages allow accommodation of the presupposed discourse referent. In the DRT analysis of presupposition developed by van der Sandt (1992), accommodation of a presupposed discourse referent involves copying it into the asserted box. Once the discourse referent exists in the universe of the asserted box, we can move the conditions on the discourse referent to the asserted box as well, and delete the presuppositional box. If we apply accommodation along these lines to the DRS in figure 8, we obtain the DRS in figure 9:

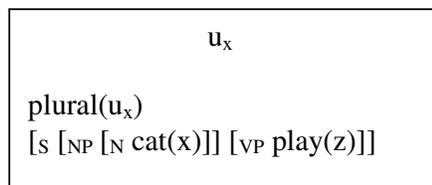


Figure 9 presupposition resolution by accommodation

Next, the accommodated discourse referent instantiates the thematic argument of the N (or NP) by a process we call *Secondary Instantiation*. Unlike D-Instantiation, Secondary Instantiation is triggered by the process of accommodation, rather than by the syntactic configuration. It involves instantiation of the thematic argument x of a nominal with a discourse referent u_x that it is co-indexed with. After Secondary Instantiation, we can apply A-Instantiation, and obtain the final DRS in figure 10:

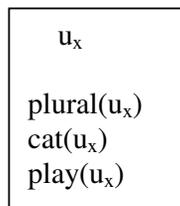


Figure 10 ‘Cats are playing in the garden’, final DRS

The embedding conditions for this DRS yield an existential interpretation for u . The presence of the condition $\text{plural}(u)$ ensures that the entity that the embedding function assigns to u is non-atomic. We conclude that in languages like English and Hungarian the presupposition triggered by the plural feature on the noun can be resolved either by binding or by accommodation.

The assumption that nominals in regular argument position combine with the predicate by A-Instantiation in both English and Hungarian makes two important predictions concerning bare nominals. First, the fact that *pl* is a privative feature explains why languages like English and Hungarian allow bare plurals in regular argument position, but not bare singulars. Unlike (22), (23) is not grammatical:

(23) *Cat is playing in the garden.

The singular noun *cat* does not introduce a presupposed discourse referent, because in the absence of a number feature, there is no trigger for this presupposition. Consequently, no discourse referent can be accommodated. Given that there is no discourse referent, A-Instantiation cannot apply, and the derivation fails. The facts are the same in Hungarian, where we observe that the counterpart of (11) with a bare singular in postverbal position is ungrammatical.

We account for the local scope of bare plurals in argument position in English and Hungarian by assuming that the accommodation of the discourse referent introduced by the feature *pl* is local, rather than global (cf. Roberts 1998). This means that the presupposed discourse referent is copied into the asserted box K in which the condition $N(x)$ is interpreted, rather than in the highest box. In the case of definite descriptions, both local and global accommodation appears to be needed. We suggest that plural morphology is different in that its effect can only be local. The local nature of accommodation here is connected to the fact that the presupposition trigger is a morphological feature rather than a lexical item. The freedom associated with the interpretation of definite descriptions is connected to the fact that they involve an overt determiner D. Expressions in D are special in that they have the power to allow (or even require) the interpretation of the discourse referent they introduce in a superordinate box. The specific reading of indefinite *a*, the semantics of *the* and other empirical observations support this claim. We have no independent evidence that nominal morphology can play this role, though. Connecting the two observations, we assume that determiners, proper names and pronouns are special in that they may cause the discourse referent they introduce to be interpreted in a superordinate box. There are arguments in the syntactic literature showing that these items do in fact occur under D thus making it possible to claim that only items in D may introduce discourse referents non-locally. Accordingly, accommodation of a discourse referent that is presupposed by plural morphology is expected to be local, rather than global. The locality of the discourse referent introduced by plural morphology (via accommodation) accounts for the impossibility of such nominals to take wide scope relative to other operators or NPs in the sentence:

- (24) a. Every child read Hungarian novels.
b. Mary didn't read Hungarian novels.
c. You must read Hungarian novels.

In all these cases, the bare plural is interpreted within the scope of the scope-bearing operator, as predicted by our analysis. By contrast, in the case of ordinary indefinites, scope ambiguities arise. The situation in Hungarian is the same as in English.

In sum, we have established here a distinction between thematic arguments and discourse referents and proposed a new account of number interpretation in terms of a privative feature *pl* responsible for the introduction of a presupposed discourse referent. In the case of full DPs, the presupposition is resolved by binding. In the case of bare plurals, the presupposition is accommodated.

4. The semantics of incorporation

So far, we found thematic arguments only in intermediate stages of the derivation. This reflects the standard view that thematic arguments are relevant for lexical

semantics and linking theory, but they do not play a role in the final semantic representation of the sentence, or at the discourse level. We assume indeed that this is the default, but propose that in special cases thematic arguments survive in final representations. In this section, we discuss two such cases: implicit arguments and incorporated nominals. In section 4.1, we show that implicit arguments are represented by uninstantiated thematic arguments in final DRSS. Incorporated nominals take us one step further, because they have lexical content (section 4.2). The descriptive content on the thematic argument needs to be linked to the relevant thematic argument of the verb. We propose a process of unification of thematic arguments to account for this, and accordingly call this mode of composition *Unification*. This approach accounts for a number of semantic properties outlined in section 2 above (section 4.3).

4.1 Implicit arguments

Implicit arguments are arguments of a predicate that have semantic presence and yet have no syntactic realization, not even as covert pronouns. Implicit arguments can be divided into two large classes depending on their interpretive properties: context-dependent implicit arguments that get an anaphoric interpretation, and non-anaphoric implicit arguments that get an existential interpretation (Fillmore 1986, Partee 1989, Lasnik 1993, Condoravdi and Gawron 1996, and references therein). As their name suggests, the interpretation of context-dependent implicit arguments depends on information supplied by the context of utterance or by linguistic context. In (25) the interpretation of the implicit argument of *local* is given by the context of utterance: the bar is local relative to the location of the speaker.

(25) After the talk we all went to a local bar.

The implicit arguments we are interested in here contrast with those in (25) in that their interpretation does not depend on the context. To exemplify, consider the interpretation of the Agent in an agentless passive such as (26):

(26) The vase was broken.

The Agent here is implicit in the sense that it is not realized in the syntax, though its presence is signaled by the passive verb morphology. The interpretation of this implicit argument is independent of both utterance and linguistic context. Such implicit arguments are non-anaphoric, and get an existential interpretation.

Koenig and Mauner (2000) review evidence showing that the implicit Agent in sentences like (26) is different both from inferred entities and from explicitly realized indefinite arguments. They note that implicit arguments in agentless passives are linguistically active in that they may control the PRO subject of rationale clauses. Thus, (27c) is a normal continuation of (27a) but not of (27b):

- (27) a. A ship was sunk.
 b. A ship sank.
 c. ... to collect settlement money from the insurance company.

The existence of this contrast is used to argue that the passive construction in (27a), but not the inchoative in (27b) involves an implicit Agent argument. Crucially for us,

Koenig and Mauner (2000) show that such non-anaphoric implicit arguments differ in interpretive potential from ordinary indefinite DPs such as the Agent in (28) in that they cannot antecede discourse pronouns. Thus, (29) is a normal continuation of (28), but not of (26):

(28) The vase was broken by someone.

(29) He must have been very clumsy.

Based on this evidence, Koenig and Mauner (2000) propose that agentless passives (as well as certain subjects realized by *on* in French) involve what they call ‘a-definites’, expressions that connect to a variable in an argument position of the predicate, but which do not introduce a discourse referent. Kamp and Rossdeutscher (1994) discuss this type of argument and use the notion of *schematic* discourse referent to talk about implicit (and inferred) arguments.

Our proposal is that implicit arguments are represented by uninstantiated thematic arguments in final DRSS. Accordingly, the DRS in figure 11 is the final representation of (26):

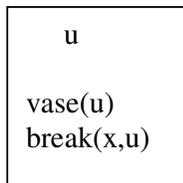


Figure 11 Uninstantiated thematic argument in final DRS

While both Koenig and Mauner (2000) and Farkas (2001) propose DRSS similar to this one, neither goes into the non-trivial details of how they are to be interpreted. If we want to maintain representations like the one in figure 11 as licit final DRSS, we need to change the definition of truth of a DRS.

In standard DRT, truth is a matter of embedding a DRS into a model. A DRS is embeddable into a model iff there is an assignment (or embedding) function f that satisfies it. Embedding functions are functions from discourse referents to elements in the domain of the model. In standard DRT, predicative conditions may only have discourse referents as arguments. Whether an embedding function makes the predicative condition true thus depends on the values that the embedding function assigns to the discourse referents that serve as arguments of the predicate. Now under present assumptions, both uninstantiated thematic arguments and discourse referents may occur as arguments in predicative conditions in final DRSS. Therefore the clause giving the verification requirement on predicative conditions has to be modified.

Let the term ‘argument’ refer to both thematic arguments and discourse referents, and let a be a variable over arguments. Assume now that we have a predicative condition of the form $P(a_1, \dots, a_n)$, made up of an n -ary predicate followed by n arguments, and let i be a variable over the elements in $\{1, \dots, n\}$. The verification requirement imposed by a condition of this form is given in (30):

(30) A function f verifies a condition of the form $P(a_1, \dots, a_n)$ relative to a model M iff there is a sequence $\langle e_1, \dots, e_n \rangle \in E^n$, such that $\langle e_1, \dots, e_n \rangle \in I(P)$, and if a_i

is a discourse referent, $e_i = f(a_i)$, and if a_i is a thematic argument, e_i is some element in E.

E is the set of entities in the model M and $I(P)$ is the interpretation of the predicate P in M. A predicate specified for n thematic arguments in the lexicon is assigned a set of n -tuples by the interpretation function I. If all the arguments are visible in the linguistic structure, the predicate has n thematic arguments in the DRS as well. If in the construction process, a thematic argument has been instantiated, a discourse referent appears in its place in the predicative condition. This discourse referent is assigned a value by the embedding function f . If, however, a_i is an uninstantiated thematic argument in K, the value of a_i is not directly determined by f . In the case of a non-anaphoric implicit argument, all that is required is that there be an individual e in E such that e and the values given by the embedding function to the relevant discourse referents form an n -tuple that is an element of $I(P)$. Thus, the effect of (30) is to impose predicate (or event) level existential closure of non-anaphoric implicit arguments. Given that the interpretation of the implicit argument is solely a matter of the interpretation of its predicate, it follows that semantic number entailments on thematic arguments can arise only as a result of predicate entailments. In the absence of such entailments, thematic arguments are semantically number neutral. Predicates may involve more complex entailments on their thematic arguments, such as in the case of the internal argument of *seek*, which may result in the absence of an existential entailment coming from the predicate. These matters are, however, beyond the scope of this paper.

We see below that the revised definition of truth of a DRS does not only play a role in the interpretation of DRSS such as the one in figure 11, but also proves useful in the interpretation of incorporated nominals.

4.2 Incorporation as unification of thematic arguments

Once thematic arguments are in place, and uninstantiated thematic arguments are legal in final DRSS, the possibility arises for a nominal that introduces a predicative condition but no discourse referent to combine with a predicate and modify one of its thematic arguments without instantiating it. Since the nominal does not contribute a discourse referent, it could not combine with the predicate by Instantiation. We propose a rule of *Unification* of thematic arguments as a mode of composition that allows nominals to combine with their predicate in just this way:

- (31) *Unification*
Replace the relevant thematic argument y of a verbal predicate with the thematic argument z contributed by a nominal argument of the verb.

We assume that Unification accompanies the reduction of syntactic nodes made up of a verb and a nominal whose contribution is a predicative condition involving an uninstantiated thematic argument. Since the two predicative conditions share a thematic argument as a result of Unification, they will be said to form a complex predicate. Details of linking theory determine which particular thematic argument of the predicate is affected when the nominal combines with it.

Our claim is that nominal incorporation in the sense in which we have used it in section 1 involves Unification of thematic arguments. Thus incorporated nominals are special in that they are argumental, and yet their essential contribution to semantic

structure is a predicative condition on a thematic argument. As a result, they can only combine with their predicate by Unification. We assume that the morpho-syntax of the nominal signals whether it introduces a discourse referent or not, and its syntactic position signals what mode of composition may (or must) be used when combining the nominal with its predicate. We assume that in Hungarian nominals in PredOp position must combine via Unification while nominals in full-fledged argument position may only combine via A-Instantiation. We also assume that in this language DPs introduce a discourse referent while bare singulars do not. The feature *pl* introduces a discourse referent as well, one that obeys more stringent binding and accommodation restrictions than discourse referents introduced by DPs. For discussion of cross-linguistic variation and its limits, see Farkas and de Swart (2003).

In order to illustrate our proposal that incorporation involves Unification of thematic arguments, we work out the interpretation of the Hungarian example (32):

- (32) Az orvos beteget vizsgált.
 The doctor patient examined
 ‘The doctor patient examined.’ Or: The doctor examined a patient/patients.

The definite article *az* of the subject DP contributes a discourse referent u , and the NP the condition $doctor(z')$. The pre-verbal incorporated nominal *beteget*, ‘patient.Acc’ on the other hand, contains neither an article nor a morphological number feature and therefore its only contribution to semantic representation is the predicative condition contributed by the N, $patient(z)$. The verb *vizsgált* contributes the predicative condition $examine(x,y)$. Given that the subject is a full-fledged DP, it reduces by DP-internal Instantiation, which results in the substitution of u for z' . This leaves us with the DRS in figure 12, where thematic subscripts are omitted for the sake of simplicity:

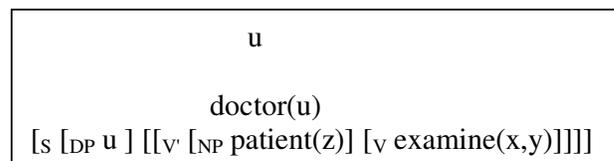


Figure 12 After D-Instantiation of the subject

Because *beteget* occurs in PredOp, V' must reduce by Unification. This is possible, because the sole contribution of the NP is a predicative condition. Unification substitutes the inner argument y of the verb by the thematic argument z contributed by *beteget*:

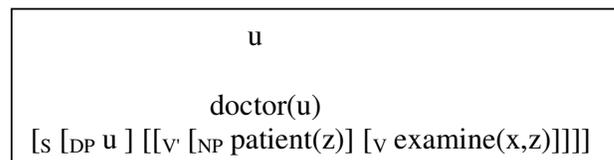


Figure 13 Unification of thematic arguments

The S-node is reduced by A-Instantiation, resulting in the final DRS in figure 14:

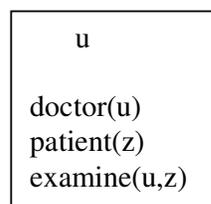


Figure 14 ‘The doctor patient-examined’, final DRS

According to (30), the embedding conditions of the DRS in figure 14 require that $f(u)$ be a doctor, and that there be a pair $\langle e_1, e_2 \rangle$ in $I(\textit{examine})$, such that $f(u) = e_1$, and e_2 has the property of being a patient. This verification condition results in the narrow scope existential closure of the uninstantiated thematic argument.

The analysis just presented explains two distributional observations made about Hungarian, namely that bare singular nominals cannot occur in full-fledged argument positions and that full-fledged DPs cannot occur in the PredOp position. The counterpart of (32) with a postverbal bare nominal is ungrammatical:

- (33) *Az orvos vizsgált tegnap beteget.
 The doctor examine.Past yesterday patient.Acc

The bare NP contributes a predicative condition and nothing else, but its syntactic position requires combination via A-Instantiation. Given its DRS contribution, such an NP may only combine via Unification, a mode of composition that is not available given the syntactic position in which the nominal occurs.

Consider now the example in (34), involving a full-fledged unfocused DP in PredOp. (The perfectivizing particle *meg* has been added in post-verbal position as a diagnostic of the fact that the DP occurs in PredOp.)

- (34) *Az orvos egy beteget vizsgált meg tegnap.
 the doctor a patient.Acc examine.Past Part. yesterday

The DP contributes a discourse referent, and therefore, by the time the V' node is reduced, the DP may not combine with the predicate via Unification, but only via Instantiation. This mode of combination, however, is not available to nominals in PredOp position.

We do not exclude, in principle, languages that allow nominals in full-fledged argument position to combine either via Unification or Instantiation. In such a language, nominals marked for not introducing a discourse referent (either by a special D or by the absence of one) would be free to occur in full-fledged argument position and would have to combine via Unification. Maori *he* nominals discussed in Chung and Ladusaw (2003) would be an example of such a case.

4.3 Semantic properties of incorporated nominals

We turn now to the question how our analysis accounts for the semantic properties of morphologically singular INs.

Number neutrality

The analysis of singular INs given here, combined with the analysis of morphological number proposed in section 3 above accounts for the contrast in number interpretation between singular INs and full-fledged DPs, which was part of the puzzle we started out with in section 1. Full-fledged singular DPs have an atomicity entailment by

default. With plural DPs, semantic number is realized as the feature *pl* interpreted as the predicate *plural* on a presupposed discourse referent. Singular INs, on the other hand, do not contribute discourse referents. They modify uninstantiated thematic arguments, which do not carry information about semantic number. The only way we can obtain information about atomicity in their case is from the lexical entailments of the predicate. Thus, we infer that the singular IN in (8) comes with a non-atomicity entailment, and the singular IN in (9) comes with an atomicity entailment. In the absence of lexical entailments, singular INs are truly number neutral, as in (2).

Narrow scope

Because nominals in PredOp position are analyzed as incorporated, and therefore as restricting uninstantiated thematic arguments, they must be scopally inert. Given the interpretation rule in (30), they have to be interpreted together with the predicate whose argument they restrict, and therefore cannot scope over any operator that has that predicate in its scope. This explains the contrast between the ambiguity of (3), and the narrow scope only reading of (4) above.

Argument structure

Treating nominals in PredOp position as incorporated predicts that they will not occur as subjects of individual-level predicates. This is so because incorporated subjects, under the present approach, result in uninstantiated arguments, while individual-level predicates require their subject to be independently identified. Recall that while bare singular nominals in PredOp position may, in some cases, be subjects (5), this is not a possibility in the case of individual-level predicates, as illustrated by (6) above.

Treating INs as restricted thematic arguments means that the predicate is, in some sense, not (fully) saturated. Certain languages (e.g. Chamorro, cf. Chung and Ladusaw 2003) exploit this possibility and instantiate the thematic argument that is restricted by the IN by a discourse referent contributed by an adjunct DP. This leads to so-called doubling constructions that can be paraphrased as ‘John pet-has a dog’. It turns out that Hungarian does not have special adjunct positions the reduction of which is accompanied by A-Instantiation, so doubling does not occur in this language. But the semantic analysis we set up in this paper naturally allows for the possibility of doubling: a restricted thematic argument is still available for Instantiation.

Discourse transparency

The contrast between (12) and (13) above shows that bare singulars in PredOp, unlike ordinary singular indefinites, may not act as antecedents to overt pronouns in discourse. In the standard DRT view, discourse pronouns seek to establish a relation of identity with an accessible discourse referent that is already present in the DRS. However, morphologically singular INs introduce nothing but a predicative condition on thematic arguments. If we maintain the rules on discourse anaphora from standard DRT, we can immediately explain why an overt discourse pronoun cannot refer back to an uninstantiated thematic argument, for this kind of variable has no presence in the universe of discourse U_K of the DRS K . Since thematic arguments do have a presence in the DRS, we do not rule out the possibility of languages having pronouns that may select them as antecedents, but this implies a modification of the standard approach.

In sum, in the account given here, incorporation involves the combination of a nominal with a verb by Unification. This entails that the nominal occurs in a position compatible with combination by Unification and that by the time the nominal

combines with the predicate, the thematic argument of the nominal has not yet been instantiated by a discourse referent. The former property is signaled by the syntactic position of the nominal; the latter by its internal structure, and more particularly, by what, if anything, occurs in its D. In Hungarian, the special PredOp position triggers Unification as a mode of composition. Bare singulars may occur in this position and in this position only because their contribution to semantic representation is just a predicative condition. We treat them as incorporated nominals, that is, restricted uninstantiated thematic arguments that form a complex predicate with the verb. Our definition of truth in DRT assigns uninstantiated thematic arguments in final DRSS an entity in the model, so INs get an existential interpretation. This approach accounts for a number of semantic properties of INs, such as narrowest scope, restrictions on argument structure, reduced discourse transparency and semantic number neutrality. We will now combine the proposals made in sections 3 and 4 to arrive at an account of plural INs in Hungarian.

5. Incorporation of bare plurals

Recall that bare plurals in Hungarian occur in the preverbal PredOp position that signals incorporation (7) as well as in the postverbal position reserved for regular arguments (11). This means that the bare plural may compose either by Unification or by Instantiation. This dual nature of the bare plural follows from the account of incorporation and of morphological number developed so far.

5.1 The dual nature of bare plurals

Bare plurals in full argument position can combine with the verb by A-Instantiation because Hungarian allows for the discourse referent presupposed by the plural morphology on the noun to be accommodated. The analysis of bare plurals in argument position in Hungarian follows the approach sketched for the English bare plural in section 3.4 above.

Bare plurals can incorporate because the discourse referent they contribute is presupposed and no nominal internal rule requires it to combine with the predicative condition contributed by the nominal. By the time the nominal is fully interpreted in the asserted box, its contribution reduces to a predicative condition, which makes application of Unification possible provided it occurs before the resolution of the presupposition. After Unification, the derivation proceeds with the resolution of the presupposition, which involves the accommodation of the presupposed discourse referent, followed by Secondary Instantiation. To illustrate, we work out the details of example (35). Figure 15 is the result of the reduction of the bare plural:

- (35) Az orvos beteget vizsgált.
 The doctor patient.Pl.Acc examine.Past
 'The doctor patients-examined.'

<p>[S [DP [D the] [NP doctor(t)]] [VP [v' [Npl patient(z)] [v examined(x,y)]]]]</p>	<p>u_z plural(u_z)</p>
--	---

Figure 15 Contribution of the plural noun

The plural morphology contributes the material in the presupposed box. Since there is no D, the nominal argument is now fully reduced. The bare plural here occurs in PredOp position and therefore must combine by Unification. The contribution of the nominal to the asserted structure amounts to a predicative condition only, so Unification may apply. In figure 16, *examine(x,y)* is replaced by *examine(x,z)*.

$[S [DP [D \text{ the }] [NP \text{ doctor}(t)]]$ $[VP [V' [Npl \text{ patient}(z)] [v \text{ examined}(x,z)]]]]]$	u_z $\text{plural}(u_z)$
--	-------------------------------

Figure 16 Unification of thematic arguments

Unification has replaced the relevant thematic argument of the verb by the thematic argument of the nominal. We continue to build the DRS for the rest of the sentence, carrying the presupposition introduced by the plural morphology along. We proceed with the interpretation of the full DP in subject position. After D-Instantiation and A-Instantiation of the subject, we obtain the DRS in figure 17.

$[S [DP [D \text{ the }] [NP \text{ doctor}(v_t)]]$ $[VP [V' [Npl \text{ patient}(z)] [v \text{ examined}(v_t,z)]]]]]$	u_z $\text{plural}(u_z)$
--	-------------------------------

Figure 17 D- and A-Instantiation of the subject

No other construction rules apply to this configuration. In order to complete the interpretation, we resolve the presupposition introduced by the plural morphology on the object. The discourse referent v_t is not an appropriate binder for the presupposed discourse referent u_z , because it is not coindexed with z . In the absence of a proper binder for the presupposed discourse referent, the presupposition is resolved by accommodation. Accommodation triggers Secondary Instantiation as before. The result is the final DRS in figure 18.

$v_t \quad u_z$ $\text{plural}(u_z)$ $\text{doctor}(v_t)$ $\text{patient}(u_z)$ $\text{examine}(v_t, u_z)$
--

Figure 18 ‘The doctor patients-examined’, final DRS

Under this analysis, incorporation of bare plurals is possible because the discourse referent they introduced is contributed by the feature *pl*. This discourse referent is presupposed and instantiates the relevant thematic argument only after the resolution of the presupposition. Consequently, the contribution of the bare plural to the asserted structure is a predicative condition on a thematic argument. When the bare plural occurs in PredOp position, combination by Unification is possible before the resolution of the presupposition. When the bare plural occurs in full argument position, combination by A-Instantiation is possible after the resolution of the presupposition. The contribution of bare plurals to the asserted box makes them composable by Unification. Their contribution to the presupposition structure renders them composable by A-Instantiation. The special properties of bare plurals in this analysis derive from the absence of a D and the presence of the *pl* feature. Our account of the dual nature of bare plurals exploits the multi-level approach to presupposition. The contribution of bare plurals at the asserted level makes them compatible with Unification; their contribution to the presupposed level, on the other hand, renders possible combination via Instantiation. The fact that the discourse referent contributed by bare plurals is introduced by a morphological feature is responsible for their local scope.

We assume that presuppositions introduced by morphological features have to be resolved by the time the minimal clause in which the nominal bearing them occurs is reached. This corresponds to the intuition that we do not move on to the interpretation of higher clauses until the predicate-argument structure of the lower clause has been completely interpreted. Note that even if the minimal S involves other DPs, the discourse referents introduced by the determiners in these DPs do not qualify as binders for the presupposed discourse referent, because they are not coindexed with the thematic argument of the N that the plural morphology occurs on.

The above account of incorporation combined with our proposals concerning plural morphology allows for the possibility of incorporated bare plurals, a welcome result given the facts of Hungarian and Hindi. We do not predict, however, that languages that allow incorporation will necessarily allow the incorporation of plurals. There may be various reasons why a plural N(P) does not incorporate in a language that allows incorporation of morphologically unmarked N(P)s. The language in question may mark plurality only on Ds and not on nouns, as is the case in Niuean (Massam 2001). In such a language, the discourse referent introduced by D renders composition by Unification impossible, independently of the presence of plural morphology. Alternatively, a language could restrict incorporation morpho-syntactically to ‘Baker style’ incorporation of bare nominal stems. This situation is exemplified in West Greenlandic, where neither inflection nor adjectival modification is possible on an incorporated nominal (Bittner 1994, Van Geenhoven 1998). Finally, a language may disallow the accommodation of the presupposed discourse referent introduced by the feature *pl* thereby ruling out both the incorporation of bare plurals and their occurrence in full-fledged argument positions.

5.2 *Semantic properties of plural INs*

We now briefly review the properties of plural INs in contrast with their singular counterparts.

Number

Recall that the analysis of incorporated singulars developed in section 4 above accounted for their being semantically number neutral. In this section we have argued that bare plurals in PredOp are incorporated as well. As a consequence of the presence of the feature *pl*, these nominals trigger the introduction of a discourse referent that is predicated to be plural. We therefore predict that plural INs, unlike their singular sisters, are semantically plural. This prediction is correct, as previewed in section 2.

Our asymmetric analysis of the singular/plural contrasts captures the cross-linguistically stable generalization that singular is the unmarked morphological form in languages where this contrast exists. One question that arises is how to reconcile this view with the frequently made claim in the literature according to which it is the plural form, rather than the singular, which is semantically unmarked. Thus, Ojeda (1992), following earlier claims made by McCawley, notes that the question in (36),

(36) Do you have children?

can be answered affirmatively even if one has a single child. However, plurals are not number neutral in the sense in which singular INs in Hungarian and elsewhere are. Thus, a plural nominal is incompatible with contextual or lexical atomicity entailments, as shown by the oddness of (37) in a monogamous society:

(37) Do you have wives?

The pragmatic oddness of (37) suggests that plurals are not number neutral in our sense. We suggest that the data are explained if one takes the presence of plural morphology to override the atomicity default and force groups to be part of the domain from which the relevant discourse referent may take values. This explains why such nominals may be used when the issue of the atomicity of the discourse referent is open (as in 36), but not when groups are excluded, as in (37).

Scope

Our analysis predicts that incorporated and non-incorporated bare plurals pattern with incorporated singulars rather than with ordinary full-fledged DPs with respect to scope. This is due to the fact that bare plurals just like bare singulars, are bare, i.e., have no determiner. The discourse referent that the plural feature introduces in the absence of a determiner is locally accommodated within the minimal DRS in which its descriptive content occurs. This view on local scope of incorporated plurals fits with both the Hungarian and Hindi data.

Argument structure

In section 4, we argued that singular INs are barred from the subject position of individual-level predicates (6), because such predicates must be interpreted in terms of properties of an independently introduced subject. Plural INs cannot be subjects of individual-level predicates either, given our analysis, because the process of incorporation involves building a complex predicate by Unification of the thematic arguments of the NP and the verb. Even though a discourse referent is introduced after Unification has applied, it does not qualify as an independently established subject, because Secondary Instantiation affects the thematic argument of the NP and the argument of the verb at the same time. The close linking of the NP and the verb means that the subject does not qualify as independently introduced. This explains the ungrammaticality of the plural counterpart of (6) in (38):

- (38) *Gyerekek okos(ak).
*Child.Pl clever(.Pl)

If Hungarian were like English in allowing generic bare plurals in argument position, we would expect (38) to be acceptable. The fact that the sentence is not felicitous shows that Hungarian is like Greek and Romance languages in that it resists a generic interpretation of bare plurals. For a treatment of generic bare plurals in languages like English within our framework, see Farkas and de Swart (2003).

Discourse transparency

Our analysis, together with standard assumptions concerning discourse transparency, predicts that bare plurals in full argument position as well as incorporated bare plurals contrast with incorporated singulars in that they are fully discourse transparent. This is so because bare plurals, whether incorporated or not, have dynamic force and involve the introduction of a discourse referent. Incorporated singulars, on the other hand, modify an uninstantiated thematic argument. Data confirming this prediction are given in the contrast between (13) and (14) above. Similar examples are discussed for Hindi in Dayal (1999).

6. Conclusions and open issues

We have now completed the analysis of the three-way contrast in Hungarian that we set out to accomplish. We have an account for why bare singulars in this language can occur only in incorporated positions, must get a number neutral interpretation, have local scope and have reduced discourse transparency. We have also explained why bare plurals may occur either as full-fledged arguments or in incorporated position. The analysis we proposed predicts, correctly, that bare plurals, whether incorporated or not pattern with their singular sisters with respect to scope but pattern with plural DPs in that they are fully discourse transparent, and are interpreted as semantically plural. Given the account developed here, we also predict that full DPs contrast with bare nominals in that they may only occur in argumental position and are not necessarily restricted to local scope. With respect to number interpretation, we predict that full DPs are not number neutral. Unlike bare singulars, they are semantically singular if unmarked for number, and like bare plurals, they are semantically plural if marked as plural. Argumental bare plurals in Hungarian parallel existential bare plurals in English. The special properties of these nominals in both languages are connected, in our account, to their being bare and to their being plural. Note, however, that Hungarian differs from English in that it does not allow argumental bare plurals to be interpreted generically.

The analysis given here provides the bare bones of the proposals developed in full detail in Farkas and de Swart (2003). The interested reader is referred to that work for more technical details on the framework, applications of the analysis to other languages, a comparison with related approaches (such as Van Geenhoven 1998, Dayal 1999, Kamp and Bende-Farkas 2001, Chung and Ladusaw 2003), and a number of empirical issues that we did not have room to treat here, such as the generic interpretation of bare plurals in languages like English. In the book, we also work out a more fine-grained view of reduced discourse transparency, which accounts for the observation that the contrast between (13) and (12)/(14) disappears when we switch from overt to covert pronouns. The analysis of ‘discourse translucency’ such data call

for relies on the assumption of weaker discourse saliency of thematic arguments as compared to discourse referents. This more fine-grained view accounts for the existence of languages like West Greenlandic and Chamorro, in which singular INs are discourse transparent. Also discussed in the book is the cross-linguistic relevance of discourse translucency in relation to the typology of anaphora.

We conclude here that the enrichment of DRT with the distinction between thematic arguments and discourse referents not only allows a better connection to standard views from lexical semantics, but opens new doors for the account of implicit arguments, incorporated nominals and reduced discourse transparency of various kinds.

References

- Baker, Mark (1988). *Incorporation: a theory of grammatical function changing*, Chicago: Chicago University Press.
- Bittner, Maria (1994). Cross-linguistic semantics, *Linguistics and Philosophy* 17, 53-108.
- Carlson, Greg (1978) *Reference to kinds in English*, New York: Garland.
- Chierchia, Gennaro (1998). Reference to kinds across languages, *Natural Language Semantics* 6, 339-405.
- Chung, Sandra and Ladusaw William (2003). *Restriction and Saturation*, Cambridge: MIT Press.
- Condoravdi, Cleo and Gawron, Mark (1996). The context-dependency of implicit arguments, in: Kanazawa, M., Piñón, C. and H. de Swart (eds.). *Quantifiers, Deduction, and Context*, Stanford: CSLI publications, 1-32.
- Dayal, Veneeta (1999). Bare NPs, reference to kinds and incorporation, *SALT 9*, Ithaca, NY: Cornell University Press.
- Farkas, Donka (2001) Vers une typologie sémantique des syntagmes nominaux, Kleiber, G., Laca, B. and Tasmowski, L. (eds). *Typologie des groupes nominaux*, Rennes: Presses Universitaires de Rennes, 17-46.
- Farkas, Donka and de Swart, Henriëtte (2003). *The semantics of incorporation: from argument structure to discourse transparency*, Stanford, CA: CSLI Publications.
- Fodor, Jerry, A. and Janet D. Fodor (1980). Functional structure, quantifiers and meaning postulates, *Linguistic Inquiry* 11, 759-770.
- Grimshaw, Jane (2000). Extended projection and locality, in: Coopmans, P., M. Everaert and J. Grimshaw (eds.), *Lexical specification and insertion*, Amsterdam: John Benjamins, 115-133.
- Hoop, Helen de (1992). *Case configuration and noun phrase interpretation*, diss. University of Groningen.
- Kamp, Hans and Reyle, Uwe (1993). *From discourse to logic*, Dordrecht: Kluwer.
- Kamp, Hans and Agnes Bende-Farkas (2001). *Indefinites and binding: from specificity to incorporation*, Lecture notes from the 13th ESSLI summer school in Helsinki, ms. Stuttgart University.
- Kamp, Hans and Antje Rossdeutscher (1994). Remarks on lexical structure and DRS construction, *Theoretical Linguistics* 20, 97-164.
- Koenig, Jean-Pierre and Mauner, Gail (2000). A-definites and the discourse status of implicit arguments, *Journal of Semantics* 16, 207-236.

- Krifka, Manfred et al. (1995) Genericity: and introduction, in: G. Carlson and F. Pelletier (eds.) *The generic book*, Chicago: University of Chicago Press, 1-124.
- Ladusaw, William (1994). Thetic and categorial, stage and individual, weak and strong, *SALT* 4, 220-229.
- Laserson, Peter (1993). Lexical distributivity and implicit arguments, in: *Proceedings of Salt III*, Cornell Linguistics Publications.
- Massam, Diane (2001). Pseudo noun incorporation in Niuean, *Natural Language and Linguistic Theory* 19, 153-197.
- Mithun, Marianne (1984). The evolution of noun incorporation, *Language* 60, 847-894.
- Partee, Barbara (1989). Binding implicit variables in quantified contexts, *CLS* 25, Chicago, IL, 342-365.
- Roberts, Craige (1998). The place of centering in a general theory of anaphora resolution, in: Walker, M., Joshi, A., Prince, E. (eds.). *Centering theory in discourse*, Oxford, England: Clarendon Press, 359-399.
- Sadock, Jerrold (1980). Noun incorporation in Greenlandic: a case of syntactic word formation, *Language* 56, 300-319.
- Sandt, Rob van der (1992). Presupposition projection as anaphora resolution, *Journal of Semantics* 9, 333-377.
- Schlenker, Philippe (2003). A plea for monsters, *Linguistics and Philosophy* 26, 29-120.
- Szabolcsi, Anna (1997). Background notions in lattice theory and generalized quantifiers, in: A. Szabolcsi (ed.) *Ways of scope taking*, Dordrecht: Kluwer Academic Publishers, 1-27.
- Thomas, Andrew (1979). Ellipsis: the interplay of sentence structure and context, *Lingua* 47, 43-68.
- Van Geenhoven, Veerle (1998). *Semantic incorporation and indefinite descriptions*, Stanford, CA: CSLI publications.