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FUNCTIONAL CATEGORIES AND THE SATURATION OF NOUN PHRASES

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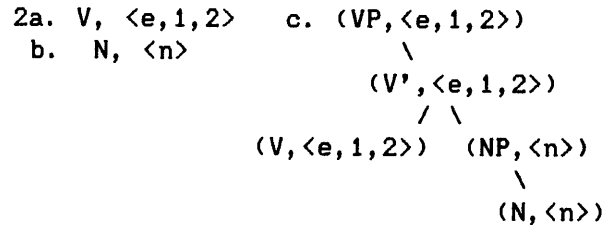
This paper addresses the question of how Noun Phrases vary between argument and predicate uses, as in (1a,1b) respectively:

- 1a. Mary kissed a teacher b. Mary is a teacher

I explore an approach in which this variation is only apparent; all instances of the category NP are predicates, syntactically and semantically. To defend this claim I propose a unification of the DP hypothesis (Abney 1987) with a refinement of the licensing conditions on non-overt argument positions (Higginbotham 1985) and show how this analysis provides a structural account of some basic distinctions in the referential properties of noun phrases.

The claim that NPs are predicates is based on two assumptions drawn from Higginbotham (1985). The first is that all lexical categories contain non-overt argument positions in their θ -grids. These open argument positions appear in addition to thematic arguments in a predicate's θ -grid (or, those positions which select lexical arguments). Non-overt argument positions encode in structural terms the view that the lexical categories that contain them all share the semantic property of being predicates of individuals, i.e., that all lexical categories are unsaturated predicates. The second assumption I adopt is that argument positions in the θ -grids of lexical items are projected onto X' structure, which I also assume to hold for thematic argument positions. Thus, the lexical categories in (2a,b), a

transitive verb and its object, project onto a syntactic representation in (2c), (where I distinguish non-overt from thematic arguments with letters and numbers respectively):



The appearance of the non-overt arguments at the NP and VP level in (2c) represents a strict version of the view that maximal projections are projections of information in lexical entries of their heads, including the property of being unsaturated.

More complex extensions of Higginbotham's analysis concern how unsaturated predicates are provided with their semantic arguments. Contrary to traditional discussions of saturation, I define the saturation of lexical categories solely in terms of requirements on the licensing of non-overt arguments:

3. Condition on Saturation

All non-overt argument positions must be identified.

The Condition on Saturation is proposed as a well-formedness condition on syntactic representations, and thus requires that an identifier for a non-overt argument be present in the syntactic representation. In turn, identification is defined as an asymmetric relation such that a identifies b in (4):

4. [...a...b...]
 if 1) a is saturated (independently/inherently identified)
 ii) b is a non-overt argument, and
 iii) a is a sister to b and is not contained in the maximal projection that contains b

Moreover, saturation, or, the identification of a non-overt position in the syntax, is the process whereby a predicate is supplied with an argument semantically. The structural configuration for identification, in which an element, a, identifies the non-overt argument, b, in a predicate, is equivalent to a mapping onto a semantic structure for predication, e.g., in which a appears as the argument of the function which contains b in its θ -grid. This equivalence is given in (5), where (*) annotates the identification relation:

5. [...a*... XP<b*>...] -----> XP(a)

THE SATURATION OF NOUN PHRASES

The way in which predicate and argument are combined in (5) is a distinct process from that involved in the relation between a predicate and its thematic arguments, as argued in Hudson (1989), since only the latter falls under the purview of the Projection Principle of Chomsky (1981). Since non-overt arguments never select lexical categories, predication need not involve thematic relations.

The assumptions above yield a maximally simple account for predicate nominals like that in (1b). The basic intuition behind this approach is that the subject-predicate relation is achieved by having Mary identify the open position in the NP, a teacher, (via AGR). It is beyond the scope of this paper to present a full account of copular predication. Since nothing crucial hinges on making a choice at this point, I assume a structure for (1b) given in (6), which is based on that presented in Williams (1984) in that the lexical category appears as the complement of a category containing Auxiliary elements:

6. [Mary* [AGR* Be] [a teacher<n*>]]
 IP I NP

The open position in the noun (teacher) projects to the NP level, where it requires an identifier to be saturated. I assume that AGR, co-indexed with the subject, functions to identify the non-overt argument in the NP by linking the predicate NP with the subject Mary, forming the chain of asterisks in (6). This configuration conforms to the structural conditions on saturation in (4iii), since AGR is both a sister to the non-overt argument, and external to the maximal projection which contains it. Ignoring for the purposes of this paper the intermediary role of AGR (a purely relational element that is not independently identified with respect to clause (4i), but which is linked to an independently referential subject), the identification relation between Mary and the open position in the NP, [Mary* teacher<n*>], is semantically equivalent to a function/argument structure teacher(Mary) by (5). I turn now to issues underlying the variation between argument and predicate uses of noun phrases.

One of the consequences of adopting the analysis of lexical categories as unsaturated predicates is that the central question raised by the variation displayed in (1) is no longer how an NP can function as a predicate, but how a predicate NP can function as an argument. The answer that Higginbotham provides is that determiners in the Spec of NP saturate the open argument position in the noun by a process of θ -binding:

7. [a [<n*> [teacher<n>]]
 NP N' N

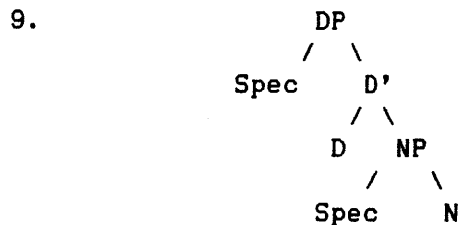
In his account, the non-overt argument position in the head noun projects up the tree to a point where it is sister-governed by the determiner at the N' level, which saturates it via 0-binding. As it stands, however, this analysis leads to a contradiction in his basic assumptions, as noted in Higginbotham (1987). If the function of determiners is to saturate an NP and yet the ability of an NP to function as a predicate depends on its being unsaturated, this incorrectly predicts that an NP which has a determiner (a teacher in 1b) can never function as a predicate.

Higginbotham's solution to this problem is to treat the class of "indefinite" determiners as optional binders; that is, non-binders just in those cases where the noun phrase occurs as a predicate. He bases his division between obligatory and optional binders on the distinction between Quantificational and Cardinal determiners developed in Milsark (1974), in terms similar to Milsark's notion of Cardinality predicates. This assumption accounts for the contrast in (8) below:

- 8a. I consider John a friend
 b.* I consider John that friend

The optionality exhibited by Cardinal determiners, which allows a friend to be unsaturated in (8a), is not possible for the class of Quantificational Determiners, to which that belongs (8b). Since that obligatorily saturates the open position in the noun, (8b) is ruled out; i.e., a saturated NP cannot function as a predicate.

To capture the variation between predicate and argument noun phrases, I propose that Milsark's distinction between Quantificational and Cardinal determiners has a structural correlate. Within this analysis, it is the properties associated with structural positions, and not solely lexical differences which account for whether a determiner involves saturation or not. Consider the structure for the noun phrase given in (9) in which an NP appears as the complement of DP (cf., Abney 1987):



There are two distinct sets of arguments by which I defend the DP structure in (9). The first involves the necessity of the two Spec positions, the only positions in which Determiners may occur. The second set concerns the nature of the abstract head D.

THE SATURATION OF NOUN PHRASES

In Hudson (1989), I argue that there is a structural correlation of the distinction between Milsark's two classes of determiners, as given in (10):

10. Quantificational Determiners are generated in the Spec of DP. Cardinal Determiners are generated in the Spec of NP, but can raise to the Spec of DP to yield a Quantificational use.

(Quantificational): the, that, every, each, both, most etc.
 (Cardinal): a, numerals, many, some (sm), etc.

One of the consequences of the assumptions in (9) and (10) is that, in conjunction with clause (4iii), the variation between argument and predicate uses of noun phrases is reflected by a difference in structural description. For instance, according to clause (4iii) the analysis of the NP in (7) is no longer a possible structural configuration for saturation. Since the determiner occurs within the maximal projection of the head noun, it cannot function to saturate the non-overt argument position. Thus, the NP in (7) is a predicate.

In essence, the general effect of clause (4iii) is to disallow internally saturated predicates. With respect to argument noun phrases, clause (4iii) forces the existence of a position for the determiner that is outside the maximal projection NP -- the Spec of DP in (9). Moreover, the government condition in clause (4iii) requires that the predicate NP be saturated by the DP. Thus, DPs are saturated maximal projections and cannot function as predicates. This accounts for the data involving small clause predicates in (8) as a result of different syntactic structures; only Cardinal determiners can appear in small clause structures because only they can appear in the Spec of NP. Quantificational determiners are specifiers of D, and DPs cannot function as predicates (8b). For the moment, we can account for the ability of noun phrases that contain only Cardinal determiners to appear as arguments, as in (1a), by assuming that determiners base-generated in the Spec of NP can raise to the Spec of DP, by a local form of Spec to Spec movement, in which configuration the NP complement can be saturated. 1

A number of questions remain concerning the integration of the Condition on Saturation in (3) and the DP structure in (9). I have claimed that all instances of the category NP are predicates and that the structural relation of identification is predication. It is not obvious how this approach can be extended to the relation between the determiner and the noun proposed by Higginbotham. In fact, the Condition on Saturation states that the saturation of open argument positions always involves identification, and therefore, there is no separate process available for the relation between determiners and nouns distinct

from that involved with predicate nominals. Within this analysis, these questions boil down to the question of what the NP complement of DP is predicated of.

Structurally it is clear that the representation of the predicate nominal in (6) and NP complements of D (9) are the same. In both, an unidentified argument position projects to the maximal node in the NP where it requires an identifier which governs the maximal projection i.e., they are both unsaturated maximal projections. To show how the semantics of NP complements of DP pattern with that of predicate nominals, I propose, contrary to the analysis in Higginbotham (1985), that D in structure (9) and not the determiner saturates the NP; an NP is predicated of D.

In the theory of functional heads proposed in Hudson (1988), D is an inherently identified referential head which refers to individuals in the sense that it requires an antecedent in the discourse. Its function can be seen as linking a lexical category (or the non-overt argument in a predicate) to discourse referents within a specific context of use. From a syntactic point of view, D is an abstract R-expression which functions in the same way as other indexical noun phrases (e.g., pronouns and names), the referential properties of which are subject to both the context of use and the syntactic constraints of binding theory. The function of D can be seen as similar to the notion of D-linking (Pesetsky 1987), within a formal discourse representation (Heim 1982).

To see how the structural and semantic properties of D interact for a simple case, consider the DP object with a Quantificational determiner in the sentence, John hit the table. The definite noun phrase, the table, receives the structural analysis [the [D* [table<n*>]]]. The fact that the noun phrase must be understood as referring to a previously established, or otherwise contextually salient individual is due to the presence of D, which independently refers to individuals. The open position in the NP table, is identified by D, which conforms to the Condition on Saturation. As with predicate nominals, this configuration for identification is equivalent to a function/argument structure in which D appears as the argument of the predicate, table(D).

I assume that the specifier of D, in this case the, serves to direct how D is to be linked to a discourse referent at the appropriate level of representation. The NP predicated of D restricts the choices for the possible discourse referents that D is mapped onto. In this way, both the syntactic licensing and semantic interpretation of the category NP are consistent in the two environments, predicate nominals, and complements of D. In addition, the process by which the noun is saturated can be stated in terms of identification, and thus, predication; there is no need for the less general O-binding as a form of saturation.

THE SATURATION OF NOUN PHRASES

One advantage of this analysis is its ability to capture in structural terms what ties together the wide range of meanings exhibited by determiners which make up Milsark's class of Quantificational determiners in (10). In extending the above characterization of DPs with the definite determiner, I draw upon an analysis proposed in Enc (1987b). In her discussion of quantificational noun phrases in sentences like, Every student failed the test, Enc shows that we can encode the fact that natural language quantifiers quantify over contextually restricted sets of individuals by specifying head nouns, (e.g., student), as well as their maximal projections for the features (+) or (-) definite. In this way, a noun can independently pick out a set previously introduced into the discourse over which the quantifier ranges. It is possible to translate this approach straightforwardly into the theory of D as a referential functional head. That is, in structures in which an NP is identified by, or predicated of D, it is the function of D to pick out a previously established set of individuals. Thus, as discussed with respect to the above, the specifier every is applied to the (definite) set picked out by D, but, in this case, yields an indefinite/quantificational XP. As in Enc, the fact that Quantificational determiners can only appear as Specifiers of D, as assumed in (10), may follow from a semantic constraint that they require something referential to "quantify" over.

To characterize in structural or semantic terms what ties together the interpretations of argument noun phrases with Cardinal determiners is a complex matter. In what follows, I will be concerned with defining three classes of readings for a woman below: an indefinite reading (a), a generic or "modal" reading (b) and a specific reading (c):

- 11a. He met a woman yesterday
- b. He needs to meet a woman (that he can marry)
- c. He met/needs to meet a woman that I had lunch with yesterday

Contrary to the approach taken with Quantificational determiners above, I claim that these three readings are not characterized by a uniform structural description; of the three readings in (11), only the specific reading in (c) involves a DP structure. I argue that the readings in (11a,b) are examples of bare NP arguments and address a number of issues raised by allowing predicates in argument position. I turn first to the need for this conclusion.

An important, theory-internal, consideration forces the conclusion that bare NPs appear in argument position. In the above discussion of how noun phrases with Cardinal Determiners vary between predicate and argument uses, I assumed that a Cardinal determiner could raise from its base-generated position in the Spec of NP to the Spec of DP in order to saturate

the NP. This analysis predicts that all noun phrases with Cardinal determiners must be DPs when they appear in argument position, which is clearly incompatible with the indefinite interpretation of the NPs in (11a,b) since the analysis of D entails definiteness of the kind discussed above.

There is also independent evidence which supports the need for an NP/DP distinction in argument position. One set of data involves a type of ambiguity discussed by Milsark (1974). In developing his analysis of the Quantificational/Cardinal distinction, Milsark noted that noun phrases that contain indefinite determiners are ambiguous between Quantificational and Cardinal interpretations, as in (12):

12. Many students went to the party
 a) It is a fact about many students, but not others
 that they went to the party
 b) A lot of students went to the party

(12a) represents the Quantificational, or what has also been called the proportional reading, while (12b) is the Cardinal reading, that picked out by There-Insertion contexts (as in: There were many students at the party). The ambiguity in (12) is interesting in that there is no obvious way to account for the ambiguity of many in terms of scope (QR) since there is no plausible candidate for the element that many would interact with to yield the different readings. I argue below that this ambiguity follows from whether many appears in the Spec of DP or the Spec of NP. In addition, I show that this kind of ambiguity is more widespread than Milsark assumed.

Another set of data which independently confirms the need for bare NP arguments involves noun phrases in which no determiner need appear at all: bare plurals and mass nouns. These noun phrases, which also vary freely between argument and predicate uses, clearly show that the question of how to account for bare, or unsaturated NPs in argument position is not a question specific to the structural analysis of noun phrase adopted here, but will arise for any approach to noun phrases that takes the existence of non-overt arguments seriously.

In making explicit the relation between the two types of bare NPs, those with determiners and those without. I will show that they share certain properties not shared by DP's: they are all predicates. To characterize the differences between NPs and DPs in argument position, I draw on a central concept in the analysis of bare plurals in Carlson (1977).

Simply put, in Carlson's approach the interpretation of a bare plural is dependent on the predicate that selects it. Two of the focal points of his analysis concern the behavior of the bare

THE SATURATION ON NOUN PHRASES

plurals in (13) below:

- 13a. Men are intelligent
- b. There are men in the garden
- c. Minnie wants to talk with young psychiatrists

In (13a), the bare plural, men, receives a generic interpretation, while in (13b), men is interpreted like noun phrases with the indefinite determiner some, (or the unstressed version, glossed as sm). The crucial point underlying this ambiguity is that there is a complementary distribution of the interpretations, in (13a) men can only have a generic interpretation, while in (13b) it cannot, and has only an indefinite interpretation. Carlson's analyzes bare plurals as names of "kinds", by which he differentiates the behavior of bare plurals from NPs with indefinite determiners; since names do not involve a quantificational structure (do not bind a variable), he captures the predilection of bare plurals for narrow scope, as evidenced by the lack of a specific reading for young psychiatrists in (13c).

Assuming the structural distinction between NP and DP, I outline an approach based on the ways in which bare NPs like a man and men pattern together. For instance, in the environments identical to those in (13), bare NPs with Cardinal determiners and bare plurals share three out of four readings: generic in (14a), indefinite in (14b), and non-specific in (14c).

- 14a. A man is intelligent
- b. There is a man in the garden
- c. Minnie wants to talk to a psychiatrist

That is, abstracting away from the possibility in (14c), and more marginally in (14a), that a Cardinal determiner can occur as the specifier of D to yield a specific reading (a possibility that doesn't exist for the bare plural by the stipulation that functional heads require specifiers), there is no difference in the way the environment determines the interpretation of these NPs. In fact, there is a fourth environment in which the two NPs pattern similarly; bare plurals can function as predicate nominals as well: I consider them fools. This fact, which follows naturally from a structural analysis of bare plurals as bare NPs, casts doubt on Carlson's analysis of bare plurals as names, at least in the syntactic sense in which John is a name (inherently saturated, or having no open argument position).

Following Carlson's intuition, I offer an analysis of how the interpretations of bare NPs depend on the nature of the matrix predicate. My main concern is showing how these dependencies can be stated in terms of the syntactic requirements of the Condition on Saturation. In particular, I defend the following claim regarding the appearance of bare NPs in argument position: a bare

NP is predicated of the thematic argument in the O-grid of the verb which selects the X' position in which the NP occurs.

To evaluate this claim solely in structural terms note that, since the Condition on Saturation is stated in terms of sisterhood, the thematic argument in the verb's O-grid is the only possible identifier that meets the proper structural conditions. Consider the following representation for the licensing of the bare NP object in (2c) above: $(V, \langle e, 1, 2^* \rangle) (NP, \langle n^* \rangle)$. I assume that only the internal thematic argument, $\langle 2 \rangle$, can enter into an Identification relation with the object NP, since it is $\langle 2 \rangle$ that selects the lexical complement in the sense of the Projection Principle (Chomsky 1981). In this configuration, both structural conditions for identification are met: $\langle 2 \rangle$ is a sister to the non-overt argument in the NP, and is external to the NP. To see how the analysis of bare NPs as predicated of thematic arguments captures the variation in NP interpretation in (11a,b) in terms of the properties of the matrix predicate, we must first turn to an account of what determines the interpretation of that predicate.

By adopting the analysis of the non-overt argument in the verb, $\langle e \rangle$ in (2a), I have implicitly been assuming the Davidsonian approach to the semantic structure of events developed in Higginbotham (1985) and Schein (1984). I now make explicit this assumption, but with two caveats. The first is that I assume a richer set of semantic, or ontological primitives than that provided by an event logic. At the basis of this assumption are examples like those in (15):

- 15a. John lifted two tables at once
 b. John can lift two tables at once

The intuition that I explore below is that (15a) refers to an event while (15b) does not. The second caveat concerns the use of Existential Closure in event formulas. Assuming that the mapping onto semantic formulas is constrained by the Condition on Saturation, I propose a more syntactically explicit account of what licenses the $\langle e \rangle$ position. To understand what the above claims mean in syntactic terms, we must compare the assumptions underlying treatment of events in the two approaches.

In Schein (1984), the logical form of an event sentence involves a decomposition of the predicate into event participants which correspond to the thematic roles provided by the verb. In addition to the $\langle e \rangle$ argument position, theta roles in the verb's O-grid are themselves relativized to an event by providing an event variable for each thematic argument. All of these hidden event positions end up bound by existential quantification over events. Thus, the sentence in (15a) above corresponds to a structure like that in (16a) which translates as (16b):

THE SATURATION OF NOUN PHRASES

- 16a. [INFL(e,NP) [V(e) (e,NP)]]
 b. Ee [e a lifter and the lifter in e was John and the liftee in e were two tables]

The main discrepancy between the formulas in (16) and the approach developed here is that (16) does not conform to the structural constraints on the identification of non-overt arguments in (3) and (4). The reason for this is the use of existential closure and the assumption that the <e> position is interpreted as a bound variable. The Condition on Saturation requires all non-overt argument positions present in the syntactic representation be identified in the syntax. Without the stipulative device of existential closure, an artifact of the semantic representation, the non-overt event argument in the verb is not identified in the syntax. Below, I outline an approach in which INFL is the syntactic identifier of the <e> position in the verb, and how differences in syntactic identifiers of <e> in INFL, tense or modals, are responsible for the variation between event and non-event interpretations, respectively.

Structurally, treating tense or modals as identifiers of the <e> position conforms to both requirements on the saturation of predicates given in clause (4iii); INFL is outside the VP, and sister to the <e> position, assuming the projection of grid positions proposed by Higginbotham. Under this account the condition on saturation is satisfied since there is a syntactic identifier of the non-overt argument position.

The semantic characterization of the intuition for the differences in (15) is that the interpretation of an event is subject to the same kinds of variation in reference as indexical expressions in general, and that the interpretations of sentences with modals and generic statements are not. An event interpretation's sensitivity to the context of use can be seen in the possibility of uttering the sentence in (15a) today, and for the sentence to be false, whereas it may be true if uttered tomorrow, depending on what John has done in the meantime. Sentences like those in (15b), or generics like, Beavers build dams, are not sensitive to the context of utterance in this way.

To account for the indexical nature of event interpretations as the result of the identification of <e> by tense, I draw on the theory of tense as an indexical nominal expression in Enc (1987a). Enc argues convincingly against an analysis of tense as a sentential operator. In her theory, tense is a deictic referring expression whose semantics pattern with that of other indexical referring expressions, (e.g., demonstratives, and deictic pronouns). The difference between the two lies in the type of individual referred to.

In this system, INFL is a functional head that can be referential in a parallel way to that by which the functional head D is referential, as reflected in their parallel structural relations with their lexical complements. For both, reference is achieved by the same mechanism as other indexical expressions. The difference between the two lies in the types of individuals they refer to. D is a syntactic primitive which directly refers to individuals in discourse. Tense picks out a temporal interval. By identifying the non-overt argument in a verb, the referential index of tense identifies the event argument to which the event concept, the verb, is applied. A tensed INFL is what maps a VP onto an event formula. Unlike D, the individual referred to does not correspond to a syntactic primitive but is a semantic primitive composed of two syntactic primitives, the (action lexically determined by the) verb and tense.

It is beyond the scope of this paper to present the details of the syntactic reflexes of the presence of modals in INFL. In Hudson (1989), I propose that INFL without deictic tense maps the VP onto a property, where property is used in a highly restricted sense that contrasts structurally with the decomposition involved in event formula. In a property reading the VP is a complex predicate defined on the tree structure through the incorporation of argument positions. This complex predicate is applied to the subject in the Spec of IP, not "predicated" of an event individual. What the two configurations have in common is that neither an event nor a property is a syntactic primitive, but are distinct semantic primitives derived from two syntactic primitives, INFL and the verb.

To capture the difference in NP interpretation in (11), I posit a similar function for tense with respect to the thematic arguments of the verb. That is, having eliminated existential closure for the <e> position in the verb, I must also account for how theta roles map onto an event structure that does not involve operator-binding of their event position as in (16). I propose that tense also functions to syntactically identify the thematic arguments in the O-grid of the verb. This form of identification is different from that for the <e> position in the verb in that thematic arguments are not subject to the constraints on non-overt arguments in clause (4iii). The identification of thematic argument positions by tense is optional, and can take place from within the maximal projection of the verb, through the lowering of the tense morpheme to the V-level. In place of a treatment of theta roles as variables of event participants in (16a,b), I take thematic argument positions identified by the tense morpheme to be referential arguments which denote sets of event participants. We can therefore understand tense as what relativizes theta roles to events, in that a thematic argument in the O-grid of a verb identified by tense denotes a set of individuals who enact that role within the particular event referred to via deictic tense.

THE SATURATION OF NOUN PHRASES

The claim I make with respect to (15b) is that, in general, in the absence of deictic tense there is no reference to events. Since <e> does not denote an event, the thematic arguments of a verb fail to denote sets of event participants, as reflected by the absence of an identifying tense morpheme. As opposed to an event structure then, the arguments in the O-grid of the verb in (15b) are not referential. Although they still serve to license lexical arguments which may themselves be referential (names, DPs, or pronouns), they cannot in the absence of tense independently denote entities whose existence is entailed by successful reference to an event.

I take the distinction between the referential properties of the thematic arguments outlined above as the basis for the difference in the interpretation of the bare NP object two tables in (15a,b). Abstracting away from the specific readings, the object two tables has individuals as an extension in (15a) but does not in (15b). To capture this variation in interpretation, note that thematic arguments in the O-grid of a predicate identified by deictic tense denote sets of event participants whose existence is entailed by the existence of the event referred to. In this way, we can take the bare NP, two tables in (15a) to be predicated of a referential argument, (e.g., the <2> in the verb's O-grid). Just as in the other configuration for predication, this structure is equivalent to a function/argument structure: <2*> two tables<n*> ----> two tables(<2>). Given that we may represent the denotation of the thematic argument identified by tense as a set of individuals that are lifted in the specific event identified by tense, the above function/argument structure is equivalent to: two tables(liftee) or, liftees were two tables. In fact, a predication relation is implicitly assumed in the event formula given in (16). In the translation for the relation between the theta role and the bare NP object in (16b), the bare NP appears as a predicate nominal. In addition, tense is needed on the copular in (16b) to get the interpretation right, which, in this approach follows from tense identifying the thematic argument. In one sense, then, I have simply made these semantic relations syntactically explicit.

The lack of an extension for the bare NP in (15b) in turn follows from the assumption that a thematic argument which is not identified by tense has no extension. In the absence of reference to an event, there is no entailment of the existence of a set of actual "liftees." Since the thematic argument fails to denote a set of liftees, the bare NP predicated of it will appear not to as well.

This analysis captures the intuition that the elements that affect the "referentiality" of the verb phrase, deictic tense, or modals, are the same elements that affect the bare NPs, as mediated through the thematic arguments. In addition, this

analysis conforms to the claim that all NPs are predicates, as required by the Condition on Saturation and the structural constraints on identification in (4).

A question thus arises concerning the existence of indefinite noun phrases that have extensions in the absence of deictic tense: He can lift a table in the bedroom, and (11c). This question brings us to the claim made above that noun phrases with Cardinal determiners are three-ways ambiguous. In addition to the two classes of readings that we saw for bare NPs (the indefinite and "modal" readings that reflect the NPs dependence on the environment), I have also claimed that Cardinals can appear in DP structures. I propose that this is instantiated by noun phrases with Cardinal determiners which are interpreted independently of their environments, which, in turn, follows from the properties of D. Consider the data in (17):

- 17a. A horse runs fast
- b. A horse that I bought yesterday runs fast
- c. A horse is running fast
- d. A horse that I bought yesterday is running fast

Remaining neutral as to the question of whether the descriptive material used in (17b,d) to tease apart these readings is a structural requirement on indefinite DPs or whether there is free variation between NP and DP arguments constrained only by pragmatic conditions, I assume that the specific noun phrases in (17b,d) are DPs and those in (17a,c) NPs. This structural difference reflects the invariance in interpretation for (17b,d) versus the complementary distribution exhibited in (17a,c). This difference is particularly clear for the contrast between (17a), which is interpreted generically, and (17b) which refers to a unique individual, since the only way for an NP to have individuals as extensions in the presence of a modal is if it is predicated of D. The difference between the noun phrases in (17c) and (17d) is harder to detect because in the presence of deictic tense, a bare NP also has an extension. The difference between the two lies in how the extensions are derived: the bare NP in (17c) is predicated of a referential thematic argument identified by tense, and yields a indefinite reading whereas the DP in (17d) is independently D-linked, resulting in reference to a unique individual.

Support for the prediction concerning the independence of indefinite DPs can be drawn from the analysis of referential indefinites in Fodor and Sag (1981). They argue for a class of indefinite noun phrases which function similarly to that, but which pick out unique individuals through a form of non-overt, or private demonstration. One property that they ascribe to this class of indefinites is that they do not involve operator-variable binding relations, but, like definite referential noun

THE SATURATION OF NOUN PHRASES

phrases, receive the equivalent of a wide scope interpretation in environments which would otherwise violate island conditions on extraction. As the data in (18) show, it is the noun phrases which refer to unique individuals (17b,d), which prefer the equivalent of a wide scope interpretation. Unlike the quantificational every horse, the scope of which is restricted to the embedded clause in (18c), the referential indefinites (DPs) in (18a,b) can be interpreted as having scope over the quantifier in the matrix subject position:

- 18a. Everyone said that Jack knows that a horse that I bought yesterday runs fast
- b. Everyone said that Jack saw a horse that I bought yesterday running down the street
- c. Someone said that Jack saw every horse (that I bought yesterday) running down the street

That this difference can be stated in terms of D is seen by the fact that specific readings pattern with definite DPs. Replacing the indefinite DP in (18a) above with the corresponding definite DP specifier yields the same "scope" facts: Everyone said that Jack knows that that horse runs fast. The main difference between the two is that the indefinite in (18) must conform to some form of novelty condition (Heim 1982), whereas this is not the case for that, which can be anaphoric or deictic. This difference can be attributed to the semantics of the determiners; the function of D, which is what links noun phrases to discourse referents, is the same in the definite/indefinite pair of DPs.

I conclude by returning to the contrast in (12) with many students, which shows the difference that results from whether many occurs in the Spec of DP or the Spec of NP. It has been noted in a number of discussions that the proportional reading of many (12a) requires that there be a particular set of students that has been previously established about which it is asserted that a proportion of them went somewhere. This contrasts with the Cardinal reading in (12b), in which an indefinite set of students is involved. It is exactly this contrast between the sets of individuals involved which is predicted by the difference between a DP and a bare NP. In the DP structure, the head D must be linked to a previous set of individuals, and many in the Spec of D will carve out a certain proportion of the members of this set (of which the noun student is predicated). Since a bare NP is not identified by a D, no reference to a previously established set of students is possible. However, the approach to bare NP arguments above also explains why the set of students in (12b) is interpreted as a restricted set of individuals (i.e., the head noun students does not denote the set of all students in the world). Intuitively, the set of students denoted by the subject noun phrase in the Cardinal reading in (12b) is restricted to just those who went to the party. This restriction follows from the

analysis of how bare NP predicates are licensed as lexical arguments. In an event sentence, the thematic argument position that selects the lexical argument is identified by tense, which restricts the set denoted by the thematic argument to just those participants in the event referred to. Thus, the bare NP is predicated of a temporally bounded set of individuals and in this way we arrive at the restriction on the set denoted by the bare NP given in (12b). In closing, note that the theory of bare NPs as predicates of individuals captures the fact that bare plurals pattern with the Cardinal reading of many students (students went to the party) and not the Quantificational reading, as predicted by the unavailability of a DP structure in the absence of a determiner. This confirms the claim that a basic structural dichotomy underlies certain general distinctions in the referential properties of noun phrases; e.g., the stage level reading of Carlson (1977). Questions concerning structural constraints on the "kind" reading must await future research.

1. Note that, with few exceptions, the only order for co-occurring determiners is Quantifier/Cardinal; those two men, the many problems, every three miles, the three books. This distribution not only confirms the word order predicted by (9) and (10), but also the need for an NP internal position for Cardinals from which it is impossible to saturate the noun by clause (4iii).

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