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ABSTRACT

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NP PREDICATION AND FULL SATURATION

Thomas S. Stroik

Abstract: This study extends Safir's (1987) analysis of Noun Phrase (NP) Predication. It argues that, for NPs to function predicationally, they must satisfy not only Safir's Predicate Principle, but also the Predicate Condition (a condition which requires NP predicates to be fully saturated).

Introduction

Safir (1987) claims that nonanaphoric, nonpronominal Noun Phrases must be classified, in accordance with the Predicate Principle (1), as either Predicate-NPs or Argument-NPs.

(1) Predicate Principle
A potential referring expression (PRE) is a predicate or else free.

This classification, Safir argues, is empirically motivated by the grammatical differences between (2 a-b) and (2c).

(2a) There$_k$ is [a boy]$_k$ in the room

(2b) John$_k$ seems [a fool]$_k$

(2c) *John$_k$ saw [a fool]$_k$

If bound NPs are Predicate-NPs and if predicates are not arguments, hence not subject to argument relations such as Binding Principle C and the TH-Criterion, the grammatical patterns expressed in (2) have a natural explanation.[1] That is, (2 a-b) are grammatical, even though they seem to have a Binding Principle C violation in their chains (there$_k$, a man$_k$) and (John$_k$, a fool$_k$), because the Predicate-NPs are exempt from binding violations; and (2c) is ungrammatical because (a fool$_k$) as a Predicate-NP is not an argument, so the chain lacks a TH-role and the Patient TH-role is left unfilled in (2c) -- in violation of the TH-Criterion.

Although the Predicate Principle provides an explanation for (2), it does not give any insight into the grammaticality differences between (2 a-b) and (3 a-b).

(3a) *There$_k$ is [the man]$_k$ outside

(3b) *John$_k$ seems [the fool]$_k$

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Left unexplained by Safir is the reason why the definiteness of the NP affects its ability to function as a predicate.

In this paper, I will propose a condition on NP Predication to differentiate (2 a-b) from (3 a-b). This condition, the Predication Condition (4), requires the extensional properties of predicates to be shared by any NP that functions predicationally.

(4) Predication Condition (PC)
An NP can function as a predicate if and only if it is bound and fully saturated.

The PC delimits NP-Predicates to NPs that have rigidly specified reference-sets (extensions).

Predicate-NPs

The claim that NPs can act as predicates is not unique to Safir. Logicians have, for some time, given the NP 'a man' the ontological status of a predicate in propositions like (5).

(5) John is a man.

What is unique to Safir is the claim that the predicate-status of an NP is determinable syntactically, by whether or not a referential NP is bound. In this section, I will further examine Safir's Predicate Principle by investigating constraints on the predicational properties of NPs.

Safir notes that definite and indefinite NPs possess different predicational properties, as is illustrated in (6)-(7).

(6a) John_k seems a fool_k

(6b) *John_k seems the fool_k

(7a) I consider John_k a fool_k

(7b) *I consider John_k the fool_k

The indefinite NP 'a fool' in (6a) and (7a) functions as a predicate; on the other hand, the definite 'the fool' in (6b) and (7b) lacks the predicational property.

Since the Predicate Principle (1) limits the class of Predicate-NPs only in terms of free-ness, the above distribution escapes the Predicate Principle. After all, the (in)definiteness of an NP has, according to the Predicate Principle, no bearing upon predicationality. The Predicate Principle, then, does not suffice to account for the predicational property of NPs because it cannot explain the data in (6)-(7).

Now if we are to explain the predicational property fully, we must determine the range of NP-types that have this property. Limiting observations to (6)-(7), we would be tempted to enlist the notion of (in)definiteness in our explanation of the predicational property. However, if we consider a complete range of NP-types -- indefinites, nonrestricted definites, restricted definites, titles, names, quantified NPs -- we will discover that (in)definiteness does not determine the pattern of predicationality:

(8a) John is a man

(8b) *John is the man

(8c) John is the man that I like most

(8d) John is the President

(8e) That is Ronald Reagan

(8f) That is the smell of pot

(8g) John is everything bad

(9a) I consider him a man

(9b) *I consider him the man

(9c) I consider him the man I like most

(9d) I consider him the President

(9e) I consider him Ronald Reagan

(9f) I consider that the smell of pot

(9g) I consider him everything bad

(Note: In (8) and (9), I am not making any distinctions between predicational and list readings because I am following Safir in assuming the Predicate Principle -- a syntactic principle which is insensitive to the semantic predicational/list differentiation.) The sentences in (8) and (9) demonstrate that the predicational property does not conform to the (in)definiteness of an NP. That is, even though (8 c-f) are all definite NPs, they still can function predicationally. So, we cannot, as have Safir (1985, 1987) Higginbotham (1987), explain Predicate-NPs in terms of the feature [Definite].

NP Predication

The predicational distribution illustrated in (8)-(9) is best explained by appealing to the extensional property of predicates. The extension of a predicate is the set of n-tuple arguments that satisfy the predicate-relations in a given model.[2] This extension is rigidly specified for a predicate; that is, the extension provides an all and only reference-set of n-tuple arguments satisfying the predicate. Importantly, the rigid specificity of the extension is required to make semantic satisfaction of n-tuple arguments decidable -- a partial specificity for a predicate could not determine whether or not any given n-tuple satisfied the predicate.

Let us now assume that an NP will function predicationally only if it has the extensional property of predicates. This assumption requires all NP-Predicates to derive from NPs with a rigidly specified extension (denotation) -- such NPs will be said to be "fully saturated."

Given that an NP can be predicational only if it is fully saturated, we can test an NP for predicate potential by checking whether or not the NP has anaphoric potential. If an NP can be anaphoric, taking reference from another source, then the NP cannot be fully saturated because its extension (reference) is not exhaustively self-contained. Testing the NPs in (8) and (9) for anaphoric potential produces the following pattern:

(10a) ?*[A man]$_k$ walked in. Then [a man]$_k$ left.

(10b) [A man]$_k$ walked in. Then [the man]$_k$ left.

(10c) *[A man (I like)]$_k$ walked in. Then [the man I like]$_k$ left.

(10d) *[A president]$_k$ walked in. Then [the President]$_k$ left.

(10e) *[A man]$_k$ walked in. Then [John]$_k$ left.

(10f) *[A smell]$_k$ arose. Then [the smell of pot]$_k$ disappeared

(10g) ?*[Men]$_k$ stood up. Then [every man sick]$_k$ left.

The sentences in (10), which are constructed so that the second NP in each example matches the possible Predicate-NPs in (8) and (9), demonstrate that the only NP with anaphoric potential is the nonrestrictive definite NP 'the man.' This result is not unexpected. We know that titles (10d) and names (10e) are fully referential; we also know that restricted definites ((10c) and (10f)) can limit the definiteness of the NP sufficiently to make it fully referential[3]; and we know that indefinites (10a) such as 'a man' is made fully referential by the existence of the class 'men'; but we also know that nonrestricted definite NPs like 'the man' place insufficient limitations on the class of things like 'men' to refer uniquely without further contextual information. So it is only nonrestricted definites that, as is shown by their anaphoric potential, can lack full saturation.

Given that only the nonrestrictive definite in (10) is not fully saturated, we would expect that all NPs but the nonrestricted definites would function predicationally. This expectation is corroborated by the distributions in (8) and (9). Therefore, by appealing to "full saturation" of an NP, we can provide a natural explanation for the distributions in (8) and (9) -- an explanation that we can formalize as the Predication Condition (11).

(11) Predication Condition (PC)
An NP can function as a predicate only if it is fully saturated.

As stated, the PC is a necessary condition for NP Predication, but it is not a sufficient condition. That is, the fact that the NP 'Ronald Reagan' in (12) is fully saturated does not make it a predicate.

(12) Ronald Reagan$_k$ is the President$_k$.

If names and titles, as fully saturated NPs, were always incorporated into the predicate, then both NPs in (12) would be predicational and (12) would be a argument-less predicate rather than a sentence. To insure sentence-hood for (12) and predicationality for only the title in (12), we need to specify a sufficiency condition on NP predication. We need not look far for such a condition -- after all, Safir stipulates this condition as a binding condition in the Predicate Principle (1). Building Safir's requirement that A-bound, referential NPs are predicates into (11), we can revise the PC as (13).

(13) Predication Condition
An NP functions as a predicate if and only if it is bound and fully saturated.

PC (13) correctly predicts that, in (12), the title 'The President' will be predicational because it is both bound and fully saturated, but the name 'Ronald Reagan' will not be predicational because it is not bound.

Some Predictions

We have argued thus far that the Definiteness Effect shown in (6) and (7) should be replaced by the Full Saturation Effect shown in (8) and (9). In this section, I will give additional support for the Full Saturation Effect by demonstrating that only by viewing NP predication in terms of full saturation can we account for There Insertions Sentences (TISs) and for Adverb Incorporation.

Recently, there has been a great deal of interest in TISs (see Reuland and Meulen (1987)). Much debate has centered around the fact that (14a), a sentence with a postverbal indefinite NP, is grammatical but that (14b), a sentence with a postverbal definite NP, is ungrammatical.

(14a) There is a man waiting for you

(14b) *There is the man waiting for you

A current GB-approach to TISs (Reuland (1985)) explains the differences in (14) by assuming (i) that there is a coindexing chain between 'there' and the postverbal NP and (ii) that coindexing the indefinite marker 'there' with a definite NP leads to a logical contradiction.

If Reuland's explanation is empirically adequate, it should be able to account for TISs with a more complete set of postverbal NPs, as in (15).

(15a) When you arrive, there will be a man waiting to talk to you

(15b) *When you arrive, there will be the man waiting to talk to you

(15c) When you arrive, there will be the man that you like most waiting to talk to you

(15d) When you arrive, there will be the President waiting to talk to you

(15e) When you arrive, there will be John waiting to talk to you

(15f) When you arrive, there will be the smell of pot in your room

(15g) When you arrive, there will be everyone there cheering

(As before, following Safir's Predicate Principle, I do not differentiate the "list" reading from the "predicational" reading.) The fact that not only indefinites -- but also names, titles, restricted definites, and restricted quantifiers -- can be postverbal in (15) is problematic for Reuland's explanation of TISs; after all (15 c-g) should, according to Reuland, produce the same logical contradiction that (14b) does because they would permit an indefinite marker "there" to be coindexed with a definite NP.

With the Predication Condition (13), we can provide a more adequate account of TISs than does Reuland. Assuming, as does Chomsky (1981), Reuland (1985), and Safir (1987), that existential 'there' and the postverbal NP are coindexed, we can appeal to the PC to explain the distribution in (15). That is, since coindexed referential NPs are predicates by (1), they must satisfy the Predication Condition. But the only NPs that satisfy the PC are fully saturated NPs; therefore, only fully saturated postverbal NPs will be well formed predicates. The PC correctly predicts that only (15b), a There Insertion Sentence with an unsaturated postverbal NP, will be ungrammatical in (15).

The PC also makes a prediction about the predicate potential of bare-NP adverbials like those in (16).[6]

(16a) Mary will see John [some day]

(16b) I saw John [everywhere imaginable]

(16c) Max pronounced my name [every way imaginable]

Given that Predicate-NPs must satisfy the binding condition in (13), we would expect that none of the NP adverbials in (16) would incorporate into the predicate since none of the NP adverbials are bound. However, if we assume, following Enc (1985, 1987), that the Tense-element of INFL is coindexed with the temporal adverb and that this Tense-element is a Referential Expression that provides the temporal argument of the verb, we can assign (16a) the indexing relations expressed in (17).

(17) Mary $INFL_k$ see John $[some\ day]_k$

If we further assume, following Stroik (1987), that the NP adverbial is VP-internal, then we can assign (16a) the GB S-structure stated in (18).

(18) $[Mary\ [_{I'}\ I_k\ [_{VP}\ see\ John\ [some\ day]_k]]]$

Under the above assumptions, NP adverbials like those in (16a) are predicational, according to the Predication Principle (1), because they are bound. This conclusion, together with the fact that neither place nor manner adverbials are bound leads to two predictions: (i) NP adverbials of time will show the full saturation effects that arise in (15) and (ii) NP adverbials of place or manner, which do not have predicational status, will not distribute like NP adverbials of time. The sentences in (19) and (20) test the above predictions.

(19a) Mary will see John [some day]

(19b) *Mary sees John [the day]

(19c) Mary will see John [the day that Reagan arrives]

(19d) Mary will see John [Monday]

(19e) Mary saw John [Christmas morning]

(19f) Mary saw John [the day before last]

(19g) Mary sees John [every day]

(20a) John will see Mary [some place]

(20b) *John sees Mary [the place]

(20c) *John will see Mary [the place that Reagan arrives]

(20d) *John will see Mary [Wisconsin]

(20e) *John saw Mary [The Garden State]

(20f) *John saw Mary [the place near here]

(20g) John sees Mary [every place]

The sentences in (19) and (20) confirm our predictions: NP adverbials of time in (19) distribute as do the predicates in (15), denying predicate status only to NPs that are not fully saturated (nonrestricted definite NPs (19b)), while NP adverbials of place, which are not predicates, have a distribution which is saturation-insensitive.

Toward a Theory of Full Saturation

My approach to NP predication is built around the notion of "full saturation." In this secion, I will develop a theory of full saturation that links the level of saturation of an NP to its internal structure.

My sense of "saturation" diverges from Frege's -- Frege introduced "saturation" to differentiate terms that denote (saturated terms) from the terms that do not denote (unsaturated terms). I use the term, not as a binary feature that distinguishes referring from nonreferring categories, but as a feature sensitive to the degree of reference possessed by any NP. Motivation for my sense of "saturation" comes from the fact that although both "the smell" and "the smell of pot" refer (hence, both are saturated), only the latter term rigidly expresses its referent (is fully saturated). "Saturation" then is extended here to mark the differing degrees of referentiality that NPs possess.

It is my claim that the saturation of an NP can be calculated from the syntactic structure of the NP. This claim develops out of some observations made by Higginbotham (1987). Higginbotham notes that indefinite articles differ from definite articles in that the former are interpreted as if they were adjectives. That is, just as "brown cow " is interpreted as (21a), "a lawyer" is interpreted as (21b).

(21a) brown(x) & cow(x)

(21b) a(x) & lawyer(x)

To explain the adjectival nature of various quantifiers Q, including the indefinite article, Higginbotham proposes (22).

(22) A quantifier Q is of adjectival character if and only if it is symmetric, in the sense that "Q A are B" is always equivalent to "Q B are A" (ranging over pluralities A, B).

Under Higginbotham's semantic interpretation rule (22), indefinite Determiners are adjectival in character, but definite articles are not. This "semantic" difference can be observed in (23) and (24), where the (a)-example is logically equivalent to the (b)-example in (23), but not in (24).

(23a) Some men are barbers

(23b) Some barbers are men

(24a) The men are barbers

(24b) The barbers are men

Higginbotham uses the adjectival differences between articles to explain, among other grammatical phenomena, TISs. He claims that TISs require the postverbal NP to have a Q with adjectival character. Hence, (25a), a TIS with an adjectival Q, is grammatical; whereas (25b), a TIS without an adjectival Q, is ungrammatical.

(25a) There is some smell lingering in your room

(25b) *There is the smell lingering in your room.

Since the definite article is not adjectival in nature, Higginbotham would predict that it should be impossible to have a grammatical There Insertion Sentence with a postverbal NP that has a definite article in the SPEC-position. The examples in (26) disconfirm this prediction.

(26a) There is the smell of pot in your room

(26b) There is the smell you hate most lingering in your room

The evidence in (26) suggests that Higginbotham's appeal to adjectivized articles as an explanation for TISs, and for NP predication in general, is in principle incorrect.

Although Higginbotham's theory cannot explain NP predication, its core assumption (that definite articles have different relations with the head N of an NP than do indefinite articles) is correct and forms the basis of a theory of saturation.

Let us assume, following Higginbotham's analysis suggested in (21), that an indefinite article has an "adjectival" relation with the head N; however, let us depart from Higginbotham's approach by assuming that the above relation is expressed both syntactically and semantically. (This latter assumption, if correct, would establish a natural connection between the form and the meaning of an NP and would free our theory from requiring interpretative rules such as (22).) From the above assumptions, we can conclude that the reason that an indefinite article has an adjectival relation with the head N, while a definite articles does not, is that the articles have different structural relations with N. Since this conclusion flies in the face of current GB-representations of the internal structure of NPs, it bears further investigation.

In the GB-framework, the internal structure of a phrase (X") is stipulated by X-bar Theory. According to X-bar Theory, any head (X) can take two types of argument: an external argument and an internal argument. These arguments have specific structural relations with the head (X) — relations expressed in (27).

(27a) X" --> SPEC X'

(27b) X' --> X Y"

(Note: read (27) as stating that the external argument of X is in SPEC, the sister of X' and that the internal argument (Y") of X is the sister of X.) Applied to the structure of N", (27) assigns representation (29) to both (28a) and (28b).

(28a) the man

(28b) a man

(29) $[_{N''} [_{SPEC}\ \mathrm{DET}] [_{N'} [_{N}\mathrm{man}]]]$

Given that current GB-analyses of N" structure place all Determiners in the external argument position, the NPs in (28), under these analyses, cannot be differentiated structurally.

Although X-bar Theory, as expressed in (27), is incompatible with my earlier assumption that the NPs in (28) have different structural representations, some recent research into X-bar Theory resolves the incompatibility. Stroik (1987) argues that the argument-head relations required for natural language are not those stipulated in (27), but the relations stated in (30).[4]

(30a) $X^{j} \dashrightarrow \mathrm{SPEC}\ X^{j-1}$

(30b) $X^{k} \dashrightarrow X^{k-1} Y''$
for $j,k \in \{1,2\}$ and $i \neq j$ and where
$X^{1} = X'$ and $X^{2} = X''$.

(30) generalizes X-bar Theory: it permits the argument-head relations given in (31) as well as the relations in (27).

(31a) $X' \dashrightarrow \mathrm{SPEC}\ X$

(31b) $X'' \dashrightarrow X'\ Y''$

That is, Stroik's version of X-bar Theory allows the argument in SPEC (the external argument in (27)) to be either the internal argument (sister of X) or the external argument (sister of X') of a head X.[5]

Now if we apply (30) to the NPs in (28), we can derive the following structures for them.

(32a) $[_{N''} [_{SPEC}\ \mathrm{the}] [_{N'} [_{N}\mathrm{man}]]]$

(32b) $[_{N''} [_{N'} [_{SPEC}\ \mathrm{a}\ ] [_{N}\mathrm{man}]]]$

Importantly, the structures in (32) not only can provide a structural differentiation for the NPs in (28), but they also can explain why the indefinite article has an adjectival interpretation that the definite article lacks. That is, under the assumption that X modifies Y if and only if X and Y are sisters (see Zubizarreta (1982) for support for this assumption), the indefinite article in (32b) has an adjectival (sister) relation with N, while the definite article -- which is a sister of N', not of N -- does not enter into an adjectival relation with the head N.[6]

Although (32) affords an explanation for the adjectival interpretation (or absence of it) given to the examples in (28), we need to motivate (32) indenendently and we need to demonstrate that (30) derives only (32) and not any other representation seemingly compatible with (30).

Support for (32), as the structural representation of (28), comes from conjunction data and from scopal data. Conjunction data do not directly demonstate that (32) gives the correct structure for the NPs in (28), but the data do show that the NPs in (28) must, as (31) suggests, have different structural relations between the articles and the head Ns. Consider the conjunctions in (33).

(33a) a man and a woman that love each other

(33b) the man and the woman that love each other

(33c) *a man and the woman that love each other

(33d) *the man and a woman that love each other

The grammaticality of the phrases in (33) depends on whether or not the reciprocals in the relative clauses have antecedents. Since a plural antecedent for the reciprocal will emerge only if the structures [Det man] and [Det woman] can be conjoined, the results of (33) suggest that the appropriate conjunction occurs in (33 a,b), but not in (33 c,d). Now if we assume that identical categories can be conjoined, then we must conclude that [Det N]'s in (33 a,b) are identical categories, while the [Det N]'s in (33 c,d) are not. Importantly, this conclusion requires that the articles in (33 c,d) have different relationships with the head Ns; hence the evidence in (33) is only compatible with versions of X-bar Theory like (30), which can allow multiple argument relations between SPEC and the head of a category.

Although the evidence in (33) supports the assumption underlying (30) (i.e., that the SPEC and the head of a category can enter into multiple structural relations), it does not support the specific formalization given in (30). For this latter support, we turn to scopal relations. Let us consider the scopal readings for the NPs in (34).

(34a) The man that everyone gave money to today

(34b) A man that everyone gave money to today

The NPs in (34) permit different scopal relations between [Det man] and 'everyone'. The NP in (34a) is ambiguous, having the reading in which everyone gave money to the same man and the reading in which there is possibly a different man given money by everyone. On the other hand, the NP in (34b) is unambiguous; it has only the reading in which everyone gave money to the same man. If both NPs have structure (35) — the structure generated by (27) -- then the scopal differences cited above are surprising.

(35) $[_{NP}$ [Det] $[_{N'}$ man $[_{S'}$ O_k that $[_S$ everyone$_j$ $[_S$ e_j gave money to $e_i]]]]]_k$

That is, given that (35) describes the structure of the NPs in (34) and given May's (1985) Scope Principle, which states that two operators will engage in free scopal relations if they are included in all the same maximal projections, we would predict that both NPs in (34) would be ambiguous because O_k and everyone$_j$ in (35) are included in the same maximal projections: S' and NP_k.[7] This prediction, although correct for (34a), is ~correct for (34b). So, to explain the NP-reading of (34b), we must assume that (35) is not the structure of of (34b).

We can deduce the correct NP-structure for (34b) by determining the structural relations that are required to account for the scopal properties of (34b). Since (34b) is unambiguous, the structure for (34b) must prevent the operator O_k in the restrictive clause from having scopal relations with the universal quantifier 'every', or else the operators will engage in free scopal relations (and (34b) will be predicted to be ambiguous). Importantly, the above relations are prevented for an operator O_k if it is coindexed with an operator that c-commands it, as in (36)-(37).

(36a) John told some stories$_k$ to everyone$_j$

(36b) Some stories$_k$ are hard $[_{S'}$ O_k to tell e_k to everyone$_j]$

(37a) Who$_k$ does everyone$_j$ like e_k

(37b) Who$_k$ did John convince e_k $[_{S'}$ O_k that everyone$_j$ would give money to $e_k]$

Notice that the a-examples in (36)-(37) are ambiguous, but the b-examples are not. The difference in ambiguity can be explained in the following way. In the a-examples of (36)-(37), the i-operators share maximal projections with the j-operators, so the operators engage in free scopal relations. On the other hand, in the b-examples, even though the j-operators and O_k appear to engage in free scopal relations, these relations are obviated by the fact that the j-operators enter into scopal relations only with the most dominant i-operator, the operators that are coindexed with and structurally superior to O_k.

The evidence in (36)-(37) suggests that, in (34b), the wh-operator O in the relative clause does not participate in scopal relations with the universal quantifier 'every' because the operator O is coindexed with some other operator. Since the relative clause in (34b) modifies something in the NP itself, the wh-head of the relative clause must be indexed to an operator within the NP. The only logically possible operator that is both in the NP and outside the relative clause is the quantified phrase that could be formed out of the remaining elements in the NP: Det and N. In other words, conditions on scopal relations have forced us to assign (34b) structure (38).

(38) $[_{NP}\ [_{A}\ \mathrm{Det}\ N]_k\ [_{S'} O_k \ldots]]$

The fact that A_k and O_k are coindexed in Structure (38) prohibits scopal relations between O_k and any quantifier in S' since the only scopal relations licensed in (38) between an i-indexed operator and any quantifier within S' are relations between A_k and the quantifiers. Given structure (38), we can make a prediction about scopal relations in (34b): we can predict that the maximal boundary S' intervening between A_k and the quantifiers in the relative clause in (38) will prevent free scopal relations between [a man] and the universal quantifier (thereby allowing only the reading in which the structurally superior quantifier [a man] has broad scope).

One question about (38) remains. That is, what is the category A? Is it N" or N'? The answer seems to be that A is N' There are two arguments that favor the N'-analysis. First, if A is N", then the relative clause would modify the NP and it would be a non-restictive relative. As such a relative, we would predict that (40), like (39), would be ungrammatical because NPs cannot be modified by two non-restrictive relatives.

(39) *My sisters, who voted for Reagan, whoever they are

(40) A man that Mary saw today, whoever he is

The grammaticality of (40) then contradicts the N"-analysis of A. Second, as Williams (1986) notes, t_k in (41 a,b) can be reconstructed as N' (41a), but not as N" (41b).

(41a) I saw [the $[_{N'}$pictures of each other$]_k$ that John and Mary took t_i]

(41b) *I saw [[$_{N''}$ each other's pictures of it]$_k$ that John and Mary took t_k]

If Williams's analysis is correct, we are forced to conclude that A in (38) must be N', rather than N".

The two foregoing arguments support an analysis of (34b) in which the indefinite article combines with the head N to form an N' category. Importantly, in combination with our analysis of (34a), our analysis of (34b) requires X-bar Theory (30) -- a theory that provides the NPs in (34) with two different argument structures: one in which the definite Det-argument of N is the sister of N' and one in which the indefinite Det-argument is the sister of N.

Although X-bar Theory (30) permits the variant NP-structures that are required to explain (34), it does not guarantee that only the indefinite articles are sisters of the head N. To insure the appropriate relations between Determiners and Head nouns in (28) and (34), we need to postulate the Determiner Generalization (42).

(42) Determiner Generalization
A determiner is an N'-sister if and only if it is [+Def]

The Determiner Generalization forces the definite article to be the sister of the N'-category and the indefinite article to be the sister of the Head N; consequently, it correctly allows (34a) to have only structure (35) and (34b) to have only structure (38).

If the sole function of the Determiner Generalization were to derive constituent structure for (34), the Determiner Generalization (42) would be but an ad hoc mechanism. However, (42) has explanatory power beyond (34); it serves to explain three other types of data. First, the Determiner Generalization will allow us to offer a syntactic explanation for (43)-(45).

(43a) The only man *(in the room) died

(43b) *An only man in the room died

(44a) The tallest man *(in the room) died

(44b) *A tallest man in the room died

(45a) The bigger man *(of the two) died

(45b) *A bigger man of the two died

The fact that the grammaticality of the above a-examples depends upon on the presence of the PP-argument strongly suggests that the quantifiers (only, biggest, and bigger) modify N' (N + PP). Therefore the NPs in (43)-(45) all have the same structure -- (46).

(46) $[_{NP}$ [Det] $[_{N'}$ ...]]

Since the Det in (45) is the sister of N', our Determiner Generalization lets us correctly predicts that only the definite article will be able to replace Det in (46); hence, the grammaticality of the a-examples and the ungrammaticality of the b-examples.

The second type of data that the Determiner Generalization allows us to explain is data involving Wh-Extraction out of NPs. Consider the following examples.

(47a) Who did you see a picture of e

(47b) *Who did you see the picture of e

(47c) *Who did you see John's picture of

(48a) Which country don't you know any man from e

(48b) *Which country don't you know the man from e

(49a) What would they enjoy a discussion of e

(49b) ?*What would they enjoy the discussion of e

(49c) *What would they enjoy her discussion of e

In (47)-(49), a wh-element can be extracted out of an NP only if it has an indefinite SPEC-argument. Finding an explanation for why the definiteness of the SPEC-argument affects the grammaticality differences in (47)-(49) has escaped GB Theory. The problem for GB Theory is that its explanation for the ungrammaticality of the above (b)- and (c)-examples cannot explain the grammaticality of the (a)-examples. That is, the GB-account of, say, (47b) is that the sentence violates Bounding Theory by crossing more than one bounding node (NP or S, in English).[8] Although this account will mark (47b) as ungrammatical, it also predicts that (47a) should be ungrammatical because the wh-element in (47a) crosses the same two bounding nodes that the wh-element in (47b) does. So, GB theorists simply claim (47a) to be marked in terms of Bounding Theory and offer no real explanation for its grammaticality.

We can, however, avoid the explanatory problems cited above if we accept X-bar Theory (30) and the Determiner Generalization. Since (30) and the Determiner Generalization syntactically differentiate the (a)-examples in (47)-(49) from the (b)- and (c)-examples by assigning the SPEC-argument in the former an N'-sisterhood and the SPEC-argument in the latter an N-sisterhood, we can account for the grammaticality differences in (47)-(49) through the following line of argument. Let us assume that NP and S provide the only bounding nodes in English, but an NP or an S is a bounding node if and only if its SPEC-argument is an external argument (i.e., a sister of N' or INFL'). From this assumption, we can explain the data in (47)-(49). That is, in the (a)-examples, the SPEC-argument, in accordance with the Determiner Generalization, is not an external argument of N, so the NP-node is not a bounding node -- therefore the wh-element can be extracted because it crosses only one bounding node (S); in the (b)- and (c)-examples, on the other hand, the SPEC-argument is an external argument of N, so the NP-node is a bounding node and, consequently, wh-extraction out of the node would cross two bounding nodes (NP and S), in violation of Bounding Theory. Besides explaining (47)-(49), the above analysis accounts for Extraction out of the multiply embedded NPs given in (50)-(51).

(50a) Who does John have a picture of a picture of e

(50b) *Who does John have the picture of the picture of e

(50c) *Who does John have the picture of a picture of e

(50d) *Who does John have a picture of the picture of e

(51a) Who is John a character in a novel by e

(51b) *Who is John the character in the novel by e

(51c) *Who is John the character in a novel by e

(51d) *Who is John a character in the novel by e

Since my analysis of Bounding Theory does not count NPs with indefinite SPEC-arguments as bounding nodes, I predict that it will be possible to wh-extract out of an NP embedded in another NP only if all the NPs have indefinite SPEC-arguments. My prediction is corroborated by the examples in (50)-(51), where only the (a)-examples -- those with NPs with indefinite SPEC-arguments -- permit wh-extraction.[9]

The third type of data that the Determiner Generalization explains is the full saturation of NPs.[10] That is, the Determiner Generalization leads to a Theory of Full Saturation, a theory that specifies conditions on the rigidity of reference that an NP possesses. In a Theory of Full Saturation, what needs to be accounted for is why, although both (52a) and (52b) are saturated (referential), only (52b) is fully referential.

(52a) the man

(52b) a man

As mentioned earlier in this paper, (52b) gets its full referentiality from the existence of the class 'man' and (52a) lacks full referentiality because the exact specification of the definite NP is not established in the NP.

Higginbotham (1983) anticipates a solution to the full saturation problem in (52). To explain saturation, Higginbotham suggests that the N'-category has an open position in it which must be bound by the specifier if the NP is to be saturated. So, Higginbotham assigns structure (53) to an NP.

(53) $[_{NP} \text{ Det } [_{N'} \text{ man, } <1>]]$

If the Det-node is filled, it can bind the argument slot <1> in N', thereby saturating the NP.

Since I do not accept (53) as the representation for all NPs permitted by X-bar Theory (30), I cannot directly use Higginbotham's analysis of saturation to develop a theory of full saturation. However, I will accept Higginbotham's primary assumption that there is an empty slot in the NP that must be bound. From a referential perspective, what needs to be bound within an NP is the referential restrictions that are to be placed on the class term, the N head. That is, the open slot in the NP is not in N', but in N; it is only by limiting, through binding, the possible ways that the class term can be selected that full reference can be guaranteed. If we assume that open referential slot is in N, then we can assign the NPs in (52) the following structures derived from X-bar Theory (30) and the Determiner Generalization:

(54a) $[_{NP} [_{SPEC} \text{ the}] [_{N'} [_{N} \text{ man } <1>]]]$

(54b) $[_{NP} [_{N'} [_{SPEC} \text{ a}] [_{N} \text{ man } <1>]]]$

With the structures given in (54), we can make a strong hypothesis about the saturation differences between (52a) and (52b): (52b) is fully saturated because its open N-slot is bound by a sister argument of N and (52a) is not fully saturated because its open N-slot is not bound by a sister-argument of N. We will formalize the above hypothesis as the Full Saturation Condition (55).

(55) Full Saturation Condition
An NP headed by an N is fully saturated if and only if the the open slot of the head N is bound by a sister argument of N.

(Since reference restriction is a form of modification and since modification is a relationship between sister constituents (see Zubizaretta (1982), the role of the sister argument in determining full saturation has a great deal of intuitive appeal.)

Besides correctly predicting the saturation differences of the NPs in (52), the Full Saturation Condition (FSC), in combination with the Predicate Condition (13), makes two other correct (and important) predictions. For one, the FSC predicts that, due to the N-sisterhood of indefinite SPEC-arguments, all NPs with an indefinite determiner will be fully saturated; hence these NPs will have predicate status. The sentences in (56) test this prediction.

(56a) He is a baseball player

(56b) He is a baseball player on a major league team

(56c) He is a baseball player on the best major league team

(56d) He is a baseball player that likes to slide

As predicted, all the NPs in post-copular position do have predicational status.

The other prediction that follows from the FSC and the Predicate Condition is that NPs with definite SPEC-arguments will function predicationally only if the head N has a N-sister argument to bind the open N-slot. In other words, only definite NPs with structure (57) can be predicational.

(57) $[_{NP} [_{SPEC}\ \mathrm{Det}]\ [_{N'}\ N\ \ X]]$, where X is an argument of N

Now consider the sentences in (58).

(58a) *That is the smell

(58b) That is the smell of pot/a man

(58c) *That is the smell of the man

(58d) That is the smell that makes me gag

We can see that (58 a,b,d) accord with our prediction: (58a) is ungrammatical because the post-copular NP is unsaturated, hence non-predicational; (58c) is grammatical because the PP in the post-copular NP binds the open N-slot, making the NP fully saturated and predicational; and (58d) is grammatical because the S' argument in the post-copular NP binds the open N-slot, also making the NP fully saturated and predicational. Unfortunately, we mispredict (58c). We would expect (58c) to be predicational for the same reasons that (58b) and (58d) are; so, the ungrammaticality of (58c) is surprising in our theory.

By comparing (58b) and (58c), we can get some insight into the reason why (58c) is ungrammatical. Since the only difference between (58b) and (58c) concerns the prepositional argument, let us assume that this argument is the source of the ungrammaticality of (58c). Careful scrutiny of (58 b,c) suggests that the prepositional arguments differ only in their degree of saturation: the prepositional argument being fully saturated in (58b) 'a man', but not in (58c) 'the man'. Assuming that the degree of saturation is indeed the cause of the ungrammaticality of (58c), we would expect (58c) to be grammatical if we make the prepositional argument suily saturated. We can fully saturate the prepositional argument by giving the NP head a sister argument.

(59a) That is the smell of the man that I hate most

(59b) That is the smell of the man near Bill

(59) strongly suggests that the argument binder of the open N-slot in an NP must itself be fully saturated for the NP to be fully saturated. The ungrammaticality of (58c) and the grammaticality of (59 a,b), then, requires us to reformulate the Full Satruation Condition as (60).

(60) Full Saturation Condition
An NP headed by an N is fully saturated if and only if its open N-slot is bound by a fully saturated argument-sister of N.

As we have seen in the sentences in (56), (58), and (59), the Full Saturation Condition and the Predicate Condition give us a syntactic explanation for the predicate status of an NP: for an NP to be a predicate, it must have a well defined extension, so it must be fully saturated (referential) itself -- a condition that arises only if the sister-arguments of an N sufficiently restrict the reference of the class N.

<u>Conclusion</u>

In this article, I propose a new approach to the NP Predication. I show that the attempt to reduce NP Predication to the Definiteness Effect is wrong in principle because the Definiteness Effect is but one manifestation of a more general condition on NP Predication, which I call the Full Saturation Effect. I demonstrate that the Full Saturation Effect (hence, NP Predication) is the effect that the rigidity of denotation has on predication. Finally, I develop a syntactic explanation for the Full Saturation Effect in terms of the internal structure of the NP itself, arguing that the predicational capability of an NP is a function of its own internal argument relations.

NOTES

1 Binding Principle C states that all R(eferring) Expressions must be free (i.e., not c-commanded by, and coindexed with, an expression in an A(rgument)-position. The TH-Criterion guarantees that every argument is assigned a TH-role (agent, patient, etc.).

2 In model theoretic semantics, the extension of any n-place predicate P is the set S of all n-tuples of arguments such that for any n-tuple $<a_1,...,a_n>$ in S

(i) $P(<a_1,...,a_n>) = 1$

That is, the extension of P exhaustively lists all the arguments that make a predicate a true proposition in a given model.

3 My claim that only NPs with a rigid extension can function predicationally predicts that restricted definite NPs will be predicational under a referential interpretation, but not under an attributive interpretation. Notice that in (i) the NP must have a referential reading.

(i) That is [the man that shot Bill]

4 X-bar Theory (30) is my revision of Stroik (1987). Stroik's version of X-bar Theory is stated in (i).

(ia) $X^k = X^{k-1}, Y"$

(ib) $X^{max} = Z", X^n$

for $1 \leq k \leq n$ and where n is the number of modifiers and complement arguments (Y") of X

X-bar Theory (i) parameterizes the directionality of predicate-argument relations (permitting, for example, a right branch subject and a left branch object in English). My revision (30) of (i) also parameterizes the above directionality (assuming that "subject" is the external argument of a predicate and "object" is an internal argument), while referring to the constituents of X" currently accepted in GB (i.e., SPEC, X, X', and Y").

5 Stroik (1987) finds motivation for his revision of X-bar Theory in Experiencer constructions, constructions that reverse grammatical relations (anaphoric relations, scopal relations, and binding relations).

6 Zubizarreta (1982) formal definition of modification is as follows:

(i) in the configuration $[_C \ldots A \ldots B \ldots]$, where
  (a) C is a projection of B
  (b) C immediately dominates A and B
  (c) A = Adj, Adv
  Then A modifies B.

Condition (i.a) guarantees that a modifier must be the sister of the term it modifies.

7 For May, if two operators O_k and O_j are such that O_k governs O_j, then the operators are free to take on any type of relative scope relation (May 34).

8 Chomsky (1986) defines the basic concept of Bounding Theory as (i).

(i) B is n-subjacent to A iff there fewer than n+1 barriers for B that exclude A.

For links in an argument chain $(\ldots A_k, A_{k+1} \ldots)$, the links must be 0-subjacent, crossing less than 2 barriers.

9 My approach to bounding, although it explains the data in (50)-(51), needs some refinement because it incorrectly predicts that the wh-movement in (i) should be well formed.

(i) Which country did a man from leave

10 In the Fregean sense of "saturation," the NPs in (52) are both saturated (referential). The referentiality of these NPs differs from the referentiality assignable to the nominal constructions in (i). (Note: read the constructions in (i) as non-generics.)

(ia) man
(ib) man in the bathtub
(ic) man that lives Mary

The constructions in (i) are unlike the NPs in (52) in that they do not select any referent; these constructions then are unsaturated. Since the saturation differences between (52) and (i) can be located in the presence or absence of the SPEC-argument, we can hypothesize the following Principle of Saturation.

(ii) Principle of Saturation
  An NP is saturated if and only if its

SPEC-argument is filled.

Even though (ii) explains the saturatedness of (52) and (i), it needs to be revised if it is to account for the saturation of the NPs in (iii).

(iiia) John

(iiib) Mrs. Reagan

The Principle of Saturation, as stated in (ii), could be read as predicting that the NPs in (iii), which lack SPEC-arguments, should be unsaturated. To differentiate (i) from both (52) and (iii), we can revise (ii) as (iv).

(iv) Principle of Unsaturation
An NP is unsaturated if and only if its SPEC-argument is not filled.

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