This paper is an attempt to capture several symmetries and asymmetries between noun phrases and clauses, by extending the so-called DP hypothesis. It is argued that noun phrases are structurally DP with the projection of INFL in it, and that DP has no Spec in contrast to other functional projections. Introducing the projection of INFL into DP makes it possible to provide a simple and principled account for Case-marking, agreement and preposing within DP. The presence of IP and the absence of the Spec in DP have direct consequences for extraction, within the system of barriers proposed in Chomsky 1986b.*

0. INTRODUCTION. Since the early stages in the development of generative grammar, several symmetries and asymmetries have been pointed out between noun phrases and clauses, and it has been an issue how they should be captured within the theory of grammar. In what follows, I will address this issue by extending the so-called DP hypothesis, assuming the general framework of Government-Binding or Principles-and-Parameters Theory essentially as it is presented in Chomsky 1981.

This paper is organized as follows. In the next section, I will propose an internal structure of noun phrases that contains the projection of INFL. In section 2, I will consider the mechanism of Spec-licensing in order to account for an asymmetry with respect to the Spec. Finally, in section 3, I will show that these proposals have interesting consequences concerning extraction out of noun phrases and clauses.

1. THE DP HYPOTHESIS REVISITED. It has been proposed in the recent literature that noun phrases be considered DP (determiner phrase) rather

* I would like to thank Minoru Nakau, Jun Abe, Toshifusa Oka and Shigeo Tonoike for useful discussion and general commentary, as well as many others who have contributed much to my work. Thanks also go to my informants, Ronald Craig and James Ford, who have been extremely patient and helpful. The original ideas of this paper are presented in Takano 1988a, b, c.

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than NP, the so-called DP hypothesis (Brame 1982, Abney 1986, 1987, Fukui 1986, Speas 1986, Fukui and Speas 1986, Stowell 1987). According to this hypothesis, the internal structure of noun phrases is as follows:

(1) \([DP \ldots [D' D NP]]\)

Thus noun phrases consist of two maximal projections DP and NP, with the head D selecting NP as its complement.

Although we will not go into the details of this proposal, we should note that under this analysis determiners are treated as non-lexical or functional heads, just as inflection and complementizers are in some recent analyses. This makes it possible to account for the fact that determiners (except in a few instances) appear only in noun phrases, since a functional head is assumed to select a unique complement, which may fail to be an argument (cf. Abney 1986: 4). Thus as C and I select IP and VP, respectively, so D selects NP as its unique complement.

1.1. INFL in DP. As is well known, verbs agree overtly with subjects in English, though the agreement system is rather poor, as in 2:

(2) a. I like linguistics
    b. John likes linguistics

Noun phrases have also been said to have 'subject', in the sense of Chomsky 1965, in them. Although English provides no direct evidence, cross-linguistic studies have revealed the fact that there is overt agreement between the 'subject' of noun phrases and the nominal head. Observe the following Hungarian examples from Szabolcsi 1984:

(3) a. as en-ϕ vendég-e-m
    the I-nom guest-poss-lsg
    'my guest'
b. a te-ϕ vendég-e-d
    the thou-nom guest-poss-2sg
    'thy guest’
c. (a) Mari-ϕ vendég-e-ϕ
    the Mari-nom guest-poss-3sg
    'Mary’s guest’

In 3 the head N agrees with the prenominal subject just as the head V agrees with the subject, as in 2. This suggests a possibility that there is an AGR element in DP. According to Abney 1987, there are numerous languages that exhibit this agreement phenomenon in DP; other than Hungarian, Yup’ik, which is a Central Alaskan Eskimo language, Tzutujil, which is Mayan, and Turkish are such languages, to name but a few.
Another piece of evidence in support of AGR in DP can be obtained on the basis of identification of pro. Consider the following Chamorro examples from Chung 1983:

(4) a. i neni-ña si Dolores
   the baby-3sg Unm
   'Dolores' baby'
   b. i kareta-nña i famalo'an
      the car-3pl the women
      'the women's car'

(5) a. i lepblo-nña (*gui')
    the book-3sg s/he
    'his/her book'
   b. i paine-kku (*yu')
      the comb-lsg I
      'my comb'

Chung observes that if the subject of a noun phrase, which surfaces post-nominally, is a pronominal, as in 5, it is realized by AGR only and it has no surface manifestation as an overt pronoun (note that Chamorro is another language that exhibits agreement inside noun phrases). This is reminiscent of the null subject parameter discussed by Chomsky 1981, 1982, Rizzi 1982, and others. In fact, this language has typical characteristics of null subject languages: the missing subject in clauses, free inversion of the subject and apparent 'long' Wh-movement of the embedded subject. Therefore Chung extends the null subject parameter to noun phrases. If the missing subject in Chamorro noun phrases is pro, as currently assumed in clauses, and if the line of reasoning in Chomsky 1982 is correct, a local identifier, AGR with a sufficiently rich inflection, is required for pro. Again, this suggests that AGR is present in DP.

If these facts constitute strong evidence for AGR in DP, it is fairly reasonable to posit the projection of INFL in DP in these languages, given the standard assumption concerning clauses that AGR is in INFL. Then the null hypothesis will be that IP is present in DP in all languages. So let us suppose that the internal structure of noun phrases is as in 6, an idea originally put forth by Tonoike 1988:

(6) [DP ... [D' D [IP ... [I; I(AGR) NP]]]]

Thus noun phrases are DP, in which D selects IP as its complement and I

1 Unm identifies the morphologically unmarked case marker for proper nouns.
in turn selects NP, the revised DP hypothesis. Note that 6 contrasts sharply with Abney’s 1987 assumption that AGR is contained in D. Notice also that the structure completely parallels that of clauses, as in 7, proposed in Chomsky 1986b:

(7) \[ [CP \ldots [C \ldots [[IP \ldots [I (AGR) VP]]]]] \]

With this much, let us return to our starting point, agreement within CP and within DP, as exemplified in 2 and 3, respectively. If we assume that the inflectional suffix on the verbal head and on the nominal head is a realization of AGR in INFL, the structural parallelism between, say, 2b and 3a is expressed in our terms as follows:²

(8) (=2b)
   a. \[[CP [IP John [I' [VP like linguistics]]]]\]
   b. \[[CP [IP John [I' like-s [VP t linguistics]]]]\]

(9) (=3a)
   a. \[[DP [D' az [IP èn [I' [NP vendég]]]]]\]
   b. \[[DP [D' az [IP èn-φ [I' vendég-e-m [NP t]]]]]\]

We understand that agreement both in 8 and in 9 is between the Spec and the head of IP, Spec-head agreement in Chomsky’s 1986b terms. As I mentioned above, the null hypothesis leads us to assume that the noun phrase structure 6 is universal. Assume also that ‘s in English and its counterparts in other languages are morphological realizations of Case assigned by the nominal INFL.

1.2. SOME CONSEQUENCES. This proposal has interesting consequences, both theoretically and empirically. First, it has the virtue of making it possible to avoid a conceptually undesirable aspect of Chomsky’s 1981 original account of Case-marking in noun phrases. The device of Case-marking dissociated from government, which was designed specifically for the subject of noun phrases, no longer needs to be appealed to; that is, the nominal INFL governs and Case-marks the subject of noun phrases in its Spec, just as the verbal INFL governs and Case-marks the subject of clauses in its Spec (cf. Chung 1983: 128).

At this point, however, there arises the question as to the non-occurs-

² Here I am assuming V-raising and N-raising for expository reasons. For extensive discussion on the possibility of I-lowering, see Chomsky 1988.
rence of the prenominal subject with the determiner in English. This was no problem for the traditional NP analysis, since the two elements were assumed to occur in the same position, the Spec of NP. Fukui 1986 argues on the basis of this fact that 's is a Case-assigner under the node D. Since we assume that the Case-marker of the prenominal subject is the nominal INFL and that 's is a mere morphological realization of the genitive Case, we have to answer the question in some other way. Before that, however, let us first examine other distributional facts. Consider the following, which represent the possible cooccurrences of the complementizer and the subordinate INFL:

(10) a. that ... Tense
    b. for ... to
    c. *that ... to
    d. *for ... Tense

Freidin 1983 argues that the distribution of the complementizers that and for with respect to the features [+finite] is explained by an agreement system in which that and for agree in features with [+finite] and [−finite], respectively. He further argues that the following paradigm also reflects agreement (cf. Tonoike 1988):

(11) a. this book
    b. these books
    c. *this books
    d. *these book

He states that the distribution in 11 follows from the requirement that the determiner and the lexical head N must agree in their inherent features [±plural] in the same way as the complementizer and INFL. Assuming that complementizers occur in the Spec of INFL and that, adopting the traditional NP analysis of noun phrases, determiners occur in the Spec of NP, he concludes that 10 and 11 can be subsumed under agreement between the Spec and the head. Although, as Freidin claims, this generalization is surprising and interesting, the assumption that the complementizer appears in the Spec of I clearly loses a conceptual advantage of the

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3 Tonoike 1988 cites (i):

(i) on this our wedding day

Considering the highly marked character of such examples, I regard them as peripheral phenomena, which are arguably related to the theory of core grammar by relaxing certain conditions of the core grammar.
recent proposal for 7.

Translating his argument into our terms, we can provide a more principled explanation of the facts, a second advantage of our proposal. Suppose that the plural ending on the nominal head is a realization of AGR in the nominal INFL. Since we assume that the complementizer, the determiner and INFL (verbal or nominal) are all heads, 10 and 11 can be considered to reflect agreement between two heads, head-head agreement, again in Chomsky’s 1986b terms. Specifically, the complementizer and the verbal INFL agree in their inherent features in 10, and the determiner and the nominal INFL in 11.

Returning to the question raised above, that is, why the determiner and the prenominal subject are not allowed to cooccur, we may answer it along the same lines; that is, we can invoke head-head agreement to account for the fact in question, too, as Toshifusa Oka (personal communication) has suggested to me. Recall that the prenominal subject is assumed to appear in the Spec of the nominal IP and to receive Case from the nominal INFL. Since we have already established that head-head agreement exists between D and the nominal INFL, all we have to say about the restriction in question is that the determiner agrees with the non-Case-marking INFL in their inherent features. Then it follows that the prenominal subject occurring with the determiner is excluded by the Case filter, since it cannot receive Case from the nominal INFL agreeing with the determiner. Therefore we can overcome a potential problem to the DP analysis by making use of head-head agreement, which is an independently motivated device, a third merit.4

Finally, consider the following, which was first pointed out by Williams 1985:

(12) yesterday’s destruction of the city [to prove a point] If Roeper 1983 is correct in arguing that the Agent PRO must be syntactically present in DP to control, hence license PRO in a rationale clause, 12 poses a serious problem to the traditional NP analysis, since there is no room for the Agent PRO to license the rationale clause, because of the presence of the prenominal subject yesterday. Our analysis, however, is quite consistent with 12. Let us assume that θ-marking of N takes place

4 Note that unlike English and French, some languages including Hungarian, Chamorro, Italian, and German do exhibit cooccurrences of the determiner and the subject. Such languages are considered to allow the determiner to match the Case-marking INFL in their agreement features. For a different approach appealing to a filter, see Abney 1987.
within its projection, as opposed to that of V, as represented in 13:5

(13) \[dp [ip yesterday I [np proi [n' destruction of the city] [proi to
prove a point]]]\\]

Thus at D-structure, the Agent DP is generated within NP, whereas the
Possessor DP is generated in the Spec of IP.6 Hence our analysis makes
room for the Agent PRO to control PRO in the rationale clause.7

Next consider the following contrast from Roeper 1983:

(14) a. the destruction of the city [to prove a point]

b. *the city's destruction [to prove a point]

If we assume that the so-called passive nominal is derived through move-
ment, the S-structure representation of 14b will be as follows in our
terms:

(15) \[dp [ip the cityi I [np pro [n' destruction ti] [pro to prove a
point]]]\\]

Apparently, we cannot rule out 15. But the key factor is the position the
prenominal subject occupies. Following Chomsky 1981, let us define an
A-position as follows:

(16) An A-position is a potential \(\theta\)-position.

Then we find that the Spec of IP (verbal or nominal) is an A-position,
since it is a \(\theta\)-position in clauses, except for cases involving a few predi-
cates such as appear and seem. It follows then that the city and its trace in
15 constitute an A-chain, which is subject to condition (A) of binding
theory. According to the binding theory proposed in Chomsky 1986a,
which we adopt here, the governing category for the trace, an anaphor, is
NP.8 But the trace is not bound in that NP, a violation of condition

5 It seems that there is good reason to assume that V externally \(\theta\)-marks outside VP,
since the sentential counterpart of 12 is ill-formed:

(i) *Yesterday destroyed the city (to prove a point)

6 The overt Agent generated within NP moves to the Spec of IP to get Case (cf.
Fukui 1986). I am using 'Agent' and 'Possessor' as cover terms, to distinguish argu-
ments of N from nonarguments. Thus Agent refers to an (external) argument of N
while Possessor refers to an element that has no thematic relation to N.

7 We have to ensure that PRO is not governed within NP. For relevant discussion,
see Takano 1988b, c.

8 This line of approach is adopted in Takano 1988b. Simply put, condition (A) of
the binding theory of Chomsky 1986a is as follows:

(i) An anaphor must be bound in its governing category, the least CFC con-
taining its lexical governor and its possible binder.

(ii) \(\alpha\) is a Complete Functional Complex (CFC) if all the grammatical func-
tions compatible with a head dominated by \(\alpha\) are contained in \(\alpha\).
(A). Then it follows that the Agent PRO must not be present when preposing takes place within DP. This excludes the possibility that the rationale clause is licensed in 14b. Thus, again, the revised DP hypothesis can explain the facts that are potentially problematic to any analysis of noun phrases.

So far, we have seen the revised DP hypothesis and some of its consequences concerning DP-internal phenomena. The remainder of this paper will concern other consequences of the hypothesis with respect to extraction out of DP, a topic to which much work has been devoted in generative grammar. As a point of departure, however, let us begin by considering the projection of D in detail in the next section.

2. LICENSING THE SPEC. Chomsky 1986b claims that the Wh-element moves to the Spec of CP and the subject of clauses occurs in that of IP. I argued above that the prenominal subject (Agent or Possessor) appears in the Spec of the nominal IP at S-structure. It seems that no elements appear in that of DP. Why should this be so? The reason I will give here is quite simple: it is because there is no Spec licensed in DP. In order to support this claim, I will address the issue of how the Spec is licensed.

Fukui 1986 argues under his projection system that the Spec of a functional category is licensed by 'Kase' assigned to that position. Kase means both Case in the standard sense and what he calls 'F-features' assigned by functional categories, which include nominative Case assigned by Tense/AGR, genitive Case assigned by 's, and +Wh assigned by a Wh-COMP. Briefly, the Spec can appear only when Kase is assigned. In other words, the Spec necessarily holds an overt element.

Although we will not go into the details of his discussion, it appears that this line of approach is promising for our present purposes. Suppose that the Spec is licensed by Spec-head agreement, which implies feature-discharging. What are the relevant features, then? When an overt element occupies a Spec, we might naturally consider that a feature with a positive value is discharged from its head: [+Wh] from C and [+C(ase)] from the verbal I and from the nominal I. Further, it seems to be reasonable to expect that these positive features each have their negative counterparts: [−Wh] in C and [−C] in the verbal I and in the nominal I. These negative features presumably license a Spec for a covert element such as a trace or PRO to occupy. Thus, at this point, we depart from Fukui, who assumes only positive features. Along this line of reasoning, let us suppose that the relevant features are [±Wh] in C and [±C]
in the nominal I and in the verbal I.

A Spec licensed by one of those features must hold an element that is compatible with that feature, at the level (perhaps S-structure or LF) where checking for this feature-compatibility takes place. Thus the examples in (17-20)b represent feature-incompatibility:

(17) a. I wonder \[CP \text{ who}_i \text{ John loves } t_i\]
   b. *Who\(_i\) do you wonder \[CP \text{ } t'_i \text{ (that) John loves } t_i\]

(18) a. Who\(_i\) do you believe \[CP \text{ } t'_i \text{ (that) John loves } t_i\]
   b. *I believe \[CP \text{ who}_i \text{ (that) John loves } t_i\]

(19) a. We'd prefer \[CP \text{ for } \text{IP John to leave}\]
   b. *We'd prefer \[CP \text{ for } \text{IP PRO to leave}\]

(20) a. John tried \[CP \text{ [IP PRO}_i \text{ to be examined } t_i \text{ by the doctor}]\]
   b. *I tried \[CP \text{ [IP e to be likely that John is here]}\]

(Lasnik and Uriagereka 1988)

The embedded C has [+Wh] in 17b and [−wh] in 18b, and the embedded I has [+C] in 19b and [−C] in 20b, perhaps as a result of head-head agreement with the matrix V in the former and with the dominating C, which is empty, in the latter.\(^9\)

Note that 20b is still ungrammatical if PRO appears in place of e, since in that case PRO is not \(\theta\)-marked, a violation of the \(\theta\)-Criterion, which requires that every argument have a \(\theta\)-role. Notice in passing that examples like 20b can be treated by the Extended Projection Principle of Chomsky 1982. Given its rather stipulative nature, however, one might naturally want to reduce the ‘extended’ part of this principle to some other general requirement. As a solution to this problem, one might pursue Case-theoretic considerations, assuming that every Case must be assigned. Since tensed INFL is a Case-assigner, it follows that the subject of a clause is necessarily required as a Case-assignee. But such a treatment cannot cover 20b, where the relevant INFL is not a Case-assigner (cf. Lasnik and Uriagereka 1988: 29). Thus the treatment of this problem in terms of the system of projection-licensing like the one proposed here might be considered quite plausible (see also Fukui 1986).

Here it is important to distinguish between having features with values

\(^9\) Assume that the overt DP and PRO are incompatible with [−C] and [+C], respectively. Hence the ungrammaticality of 19b and the following:

(i) *John tried [Mary to leave]

Of course, this account is redundant with the Binding Theory in the former and with the Case Theory in the latter.
and having no features. Then we might expect a functional head either to have a feature with a value or not to have any features to discharge. It seems that C has the latter option and examples like 21, where the Spec is not needed, shows that it takes this option:

(21) I believe [CP (that) John is smart]
The nominal INFL also takes this option when the subject is arguably absent in DP, whereas the verbal INFL possibly may not have the option, given that clauses must have subjects. What about D? Since the Spec of DP seems to hold nothing, we might conclude that D contains no features with a positive value, along the line of reasoning taken here. If D contains no features with a positive value, the null assumption forces us to consider that there are no negative features, either. Thus I conclude that D has no features to discharge. It thus follows that the Spec, not licensed by D, does not appear in DP. Therefore we see no elements occur to the left of D.

Both Fukui's system and ours differ from those of Stowell 1983 and Tonoike 1988 in that in the former two the Spec is present only when it is licensed while in the latter two it is assumed to be always present, even if empty throughout the derivation. It seems that the former analyses are plausible from the 'economical' point of view put forth by Chomsky 1988. Chomsky has introduced the notion of 'least effort', according to which both derivations and representations must be minimal without superfluous derivations and symbols. Given this, it can be argued that an empty Spec is a superfluous symbol contrary to 'least effort'.

Now we can summarize the discussion on features to license the Spec as follows:

<table>
<thead>
<tr>
<th>head</th>
<th>Spec-licensing features</th>
<th>featureless</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>[±Wh]</td>
<td>+</td>
</tr>
<tr>
<td>Verbal I</td>
<td>[±C]</td>
<td>-</td>
</tr>
<tr>
<td>Nominal I</td>
<td>[±C]</td>
<td>+</td>
</tr>
<tr>
<td>D</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>lexical</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>

Note that lexical heads, like D, are assumed to have no features, and hence to license no Spec.

3. **Extraction out of DP.** I argued above that DP has no Spec.
This will be relevant to the discussion concerning movement in this section. Before examining the relevant data, let us introduce the bounding theory, the Empty Category Principle (ECP), and the system of barriers that have been proposed by Chomsky 1986b. Chomsky presents the following bounding theory:

(23) In a well-formed chain with link \((a_i, a_{i+1})\), \(a_{i+1}\) must be 1-subjacent to \(a_i\).

(24) \(\beta\) is \(n\)-subjacent to \(\alpha\) iff there are fewer than \(n+1\) barriers for \(\beta\) that exclude \(\alpha\).

The ECP is formulated as in 25 in terms of proper government 26:

(25) A nonpronominal empty category must be properly governed.

(26) \(\alpha\) properly governs \(\beta\) iff \(\alpha\) \(\theta\)-governs \(\beta\) or antecedent-governs \(\beta\).

\(\theta\)-government, government, and antecedent-government are given in 27, 28, and 29, respectively:

(27) \(\alpha\) \(\alpha\)-governs \(\beta\) iff \(\alpha\) is a zero-level category that \(\alpha\)-marks \(\beta\), and \(\alpha, \beta\) are sisters.

(28) \(\alpha\) governs \(\beta\) iff \(\alpha\) \(m\)-commands \(\beta\) and there is no \(\gamma, \gamma\) a barrier for \(\beta\), such that \(\gamma\) excludes \(\alpha\).

(29) \(\alpha\) antecedent-governs \(\beta\) iff \(\alpha\) governs \(\beta\), and \(\alpha, \beta\) are coindexed.

M-command is defined as follows, with the proviso that domination is irreflexive:

(30) \(\alpha\) \(m\)-commands \(\beta\) iff \(\alpha\) does not dominate \(\beta\) and every \(\gamma, \gamma\) a maximal projection, that dominates \(\alpha\) dominates \(\beta\).

The notion ‘exclusion’ as it is appealed to in 24 and 28 plays a crucial role in this system, and is defined as in 31:

(31) \(\alpha\) excludes \(\beta\) if no segment of \(\alpha\) dominates \(\beta\).

With respect to the notion ‘segment’, Chomsky argues that adjunction structure consists of two ‘segments’ of a category, following May 1985, and that a category is dominated by another category only if the former is dominated by both segments of the latter. Thus in a typical adjunction structure of the form 32, with \(\alpha\) adjoined to \(\beta, \gamma\), but not \(\alpha\), is dominated by the category \(\beta\):

(32) \([_\beta \alpha [_\beta \ldots \gamma \ldots]]\)

As for ‘barriers’, Chomsky introduces the concept ‘blocking category’ (BC), as shown in 33, which is defined in terms of L-marking in 34, and then defines ‘barrier’ in terms of BC, as in 35:

(33) \(\gamma\) is a BC for \(\beta\) iff \(\gamma\) is not L-marked and \(\gamma\) dominates \(\beta\).

(34) \(\alpha\) L-marks \(\beta\) iff \(\alpha\) is a lexical category that \(\theta\)-governs \(\beta\).
(35) \( \gamma \) is a barrier for \( \beta \) iff (a) or (b):
   a. \( \gamma \) immediately dominates \( \delta \), \( \delta \) a BC for \( \beta \);
   b. \( \gamma \) is a BC for \( \beta \), \( \gamma \neq \text{IP} \).
Immediate domination in 35 is construed as a relation between maximal projections. Space limitations preclude a thorough discussion of the system. So, for our present purposes, let us adopt it without any arguments.\(^{10}\)

3.1. DP as a Barrier. It seems to be rather clear that preposition stranding is more difficult in DP than in CP. Observe the following data:

(36) a. What subject did you read [a book about ti]
b. Which city did you witness [the destruction of ti]
c. ??Which shelf did you read [a book on ti]d. ??What manner did you witness [the destruction of the city in ti]

(37) a. Who do you believe [that John talked to ti]
b. Which table do you think [that John put the vase on ti]
c. ??Which concert do you think [that John fell asleep during ti]d. ??What manner do you believe [that John sang the song in ti]

From the above data one naturally conjectures that one of the crucial factors responsible for the difference in acceptability between (a), (b) and (c), (d) is the status of the PP whose head is stranded: argument in the former and adjunct in the latter. From a theoretical point of view, the latter cases can be considered to be violations of the Subjacency Condition. If Huang's 1982 observation that Subjacency effects are not found in LF-movement is correct, it will be predicted that their counterparts involving LF-movement are perfect. This prediction is borne out:

(38) a. Who read [a book on what]

Thus the line of approach that explains the lower acceptability in (c) and (d) of 36 and 37 in terms of Subjacency might be considered to be in the

\(^{10}\) For problems with Chomsky's system and alternative systems of barriers, see Lasnik and Saito forthcoming and Takano 1988a, c.
right direction. But note that there is more to be explained: we have to explain the more degraded status of 36c and 36d than 37c and 37d at the same time.

Our proposals put forth in the previous sections and Chomsky’s system of barriers conspire to predict the desired results in the relevant cases. To illustrate, let us see the following:\(^{11}\)

(39)  a. \( \ldots \text{DP} \text{D} \text{IP} \ldots \text{NP} \text{t}' \text{NP} \text{N} \text{PP} \text{P} \text{t} \ldots \]| |
       b. \( \ldots \text{CP} \text{t}'' \text{C} \text{IP} \ldots \text{VP} \text{t}' \text{VP} \text{V} \text{PP} \text{P} \text{t} \ldots \]| |

Since each PP is not L-marked, it constitutes a barrier for an element within it and movement out of it crosses one barrier. Since there is no barrier other than PP in 39b, the examples 37c and 37d result in weak violations of Subjacency, with the initial trace 1-subjacent to the VP-adjoined trace. 39a, on the other hand, involves crossing of one more barrier. Recall that I argued above that D has no features to discharge and hence licenses no Spec. It follows then that DP constitutes a barrier for t' in 39a, since it inherits barrierhood from the immediately dominated IP (note that IP is a BC, since it is not L-marked, though not a barrier). This barrierhood of DP, in effect, corresponds to that of CP involving a Wh-island, as in 40a below (see Chomsky 1986b). Movement from t' then crosses a barrier again.

Note that although 36c and 36d contain two barriers, PP and DP, those barriers are not crossed in one fell swoop. Chomsky argues, noting such contrasts as in 40, that cases of ‘double weak violations’ of Subjacency are less severe violations than those of a strong violation, which include a link with more than one barrier, but are more degraded than cases of a single weak violation, the ‘cumulative’ nature of violations:

(40)  a. ??Which theory, do you know [how John explained t_j]
       b. ?*What, did you wonder [who knew [who saw t_j]]
       c. *What language, did you meet [[a girl] [who speaks t_j]]

It can be argued that 36c and 36d also exhibit the cumulative nature of violations.

At this point, however, a problem may arise as to 36a and 36b. In our system, these examples weakly violate Subjacency because of a barrier DP. In fact, we predict that every instance of extraction out of DP results in a weak violation at best. Apparently, such examples as 36a and 36b,

\(^{11}\) I am assuming without any arguments that the adjunct PP appears within VP and NP, and that adjunction to PP and IP is not permitted.
which seem to be perfect, refute our arguments (note that under Chomsky's 1986b system instances of weak violations of Subjacency are grammatical, though less acceptable than instances involving no violations). But it also appears that there is empirical evidence to show that our arguments are substantially correct. First, not all instances of extraction out of DP are perfect, as has been noted in the literature. According to Erteschik-Shir 1981, judgments of the following examples vary from speaker to speaker, none of them perfect:

\[(41)\]
\[
a. \text{Who} \text{ did John destroy [a book about } t_i]\]
\[
b. \text{Who} \text{ did John edit [a book about } t_i]\]
\[
c. \text{Who} \text{ did John revise [a book about } t_i]\]

Koster 1978 claims that acceptability of 'marked' sentences varies, depending upon such extra-grammatical factors as lexical and structural contexts, and that they are only acceptable when lexical and structural complexities are minimal. We can construe a 'marked' sentence as one violating some principle or other. Given that acceptability of sentences involving extraction out of DP is affected by some extra-grammatical factors, our claim that extraction out of DP necessarily crosses at least one barrier will be substantiated.

Second, consider extraction out of 'stacked' DP, as exemplified in 42:

\[(42)\]
\[
a. \text{the man [Op, I saw [a picture of [a friend of } t_i]]}\]
\[
b. \text{Who} \text{ did you hear [a story about [pictures of } t_i]}\]

The lessened acceptability needs an explanation. In our terms they are instances of double weak violations of Subjacency: two barriers, the upper and the lower DPs, are crossed, but not at one step. In other words, they reflect the cumulative nature of violations again. Thus our approach can provide an explanation for the degraded status of extraction out of stacked DP.\(^{12}\)

Third, the semi-acceptability effects can be found in other languages besides English as well. Although Japanese lacks obligatory Wh-movement in Syntax, several constructions have been claimed to involve syntactic movement. For instance, Hoji 1985 argues that contrastive wa-phrases have been moved in contrast to topic wa-phrases, and Kikuchi

\(^{12}\) Note that the following examples from Ross 1967 and Takano 1988a are fairly good:

\[(i)\]
\[
a. \text{the reports which, the government prescribes [the height of [the lettering on [the cover of } t_i]]}\]
\[
b. \text{the city Op, that I read [a book about [the destruction of } t_i]]}\]

It appears that lexical choices make it easier to process these sentences.
1987 claims that Japanese comparative constructions involve movement of the empty operator. Consider the following contrasts:\(^{13}\)

(43) a. Gengogakui-wa John-ga kinoo \(t_i\) benkyoos-ita linguistics-contr -nom yesterday study-past
   ‘John studied LINGUISTICS (as opposed to ...) yesterday’

   b. ?Gengogakui-wa John-ga kinoo [DP \(t_i\) hon]-o linguistics-contr -nom yesterday book-acc
      yon-da
      ‘John read a book about LINGUISTICS (as opposed to ...) yesterday’

(44) a. Boku-wa [PP [CP Opi kimi-ga \(t_i\) motteiru] yorimo] I-top you-nom have than
      takusan-no shashini-o tot-ta
      many-gen picture-acc take-past
      ‘I took more pictures than you have’

   b. ??Boku-wa [PP [CP Opi kimi-ga [DP \(t_i\) shashin]-o
      I-top you-nom picture-acc motteiru] yorimo] takusan-no joyuu]-ni at-ta\(^{14}\)
      have than more-gen actress-dat meet-past
      ‘I met more actresses than you have pictures of’

(Kikuchi 1987)

(43-44)b, which involve extraction out of DP, are somewhat marginal as compared with the perfect (43-44)a, in which DP itself is extracted. If English and Japanese are identical with respect to the relevant parts of the structure of DP, these facts might lend support to our proposals.

Fourth, let us consider extraction of the adjunct out of DP. As Hornstein and Weinberg 1981 point out, marginal cases involving preposition-stranding, 37c and 37d, improve when pied-piping takes the place of preposition-stranding, as shown in 45:

(45) a. During which concert, do you think [that John fell asleep \(t_i\)]

   b. In what manner, do you believe [that John sang the song \(t_i\)]

Interestingly, this improvement cannot be found in the case of extraction

\(^{13}\) I thank Toshifusa Oka for pointing out to me the facts in Japanese.

\(^{14}\) Although Kikuchi 1987 judges 44b as out, I find it better, if not completely acceptable.
out of DP, 36c and 36d. In fact, their counterparts are completely ungrammatical, as shown in 46:\textsuperscript{15}

(46) a. *On which shelf, did you read [a book $t_i$]
   b. *In what manner, did you witness [the destruction of the city $t_i$]

Under our system this sort of argument/adjunct asymmetry is attributed to DP, which is a Spec-less maximal projection. Consider the relevant part of the structure:

(47) $\ldots [\text{DP D [IP I [NP $t_i'$ [NP N $t_i$]]]]}$

Simply assume, for our present purposes, that every adjunct trace must satisfy the ECP (see Chomsky 1988). Since DP inherits barrierhood from IP, it follows that $t_i'$ cannot be antecedent-governed, violating the ECP.\textsuperscript{16}

Note that, again, facts of exactly the same kind can be obtained in Japanese, as in 48, which are completely ungrammatical as compared with (43-44)b:

(48) a. *Ano teeburui-wa John-ga kinoo [DP $t_i$ kabin]-o that table-contr John-nom yesterday vase-acc wat-ta
   ‘John broke a vase on THAT TABLE (as opposed to $\ldots$ yesterday’
   ‘I destroyed more tables than you broke vases on’

Finally, let us turn to another aspect of DP as a barrier. One might wonder if DP always constitutes a barrier for an element within it. But there is empirical evidence to show that this is not the case. Consider 49:

(49) a. This is the house, [Opi that John was [the first person to live in $t_i$]]
   b. *This is the house, [Opi that John met [the first person to live in $t_i$]]

Naoki Fukui (personal communication) has pointed out that 49a is better

\textsuperscript{15} Stowell 1987 notes similar facts.

\textsuperscript{16} For a different treatment, see Stowell 1987.
than 49b and that this may be attributed to the fact that DP is non-referential in the former, whereas it is referential in the latter. At first glance 49a seems to be a counterexample to our analysis, since it suggests that DP is not always a barrier. But this is not the case; rather it might even support our approach. The referential/nonreferential asymmetry might be translated into the argument/nonargument asymmetry. Thus DP in the former is not an argument but a predicate while DP in the latter is an argument. If we assume with Chomsky 1986b that adjunction is possible only to a maximal projection that is a nonargument, it follows that adjunction to DP is possible in 49a, as illustrated in 50 (irrelevant details are omitted):

\[(50) \ldots [\text{DP } t_i'] [\text{DP the first person to live in } t_i]\]

The first step of movement does not cross a barrier, since DP does not exclude \(t_i\); nor does the second step. Thus the barrierhood of DP is voided through adjunction.

Note that the examples in 49 involve argument extraction. Recall that all adjunct traces must be properly governed and that one barrier suffices to cause an ECP violation in the case of adjunct movement; hence the ungrammaticality in 46. Now, given our treatment of 49a, we are naturally led to predict that adjuncts can be extracted from the predicative DP. This prediction is borne out:

\[(51)\]
\[a. \quad \ast \text{This is the shelf [on which, I read [a book } t_i\text{]}\]
\[b. \quad \text{This is the shelf [on which, Barriers was [the first book } t_i\text{]}\]

\[(52)\]
\[a. \quad \ast \text{This is the dress [in which, I met [a pretty girl } t_i\text{]}\]
\[b. \quad \text{This is the dress [in which, I think Mary would be [the prettiest girl } t_i \text{ at the party]}\]

These considerations imply that the line of approach taken here is quite reasonable.

3.2. A NOTE ON THE FACTIVE CP. As Toshifusa Oka (personal communication) has suggested to me, the present analysis might be extended to cover cases involving extraction out of the factive CP. Zubizarreta 1982 remarks that in such languages as English, French, and Spanish, factive verbs are not as good bridge verbs as nonfactive ones, and that while extraction from the object position is marginally possible, as in 53a, subject extraction is impossible, as in 53b:\[17\]

\[17\] Subject extraction is possible in Spanish for reasons that do not concern us here.
(53) a. *Who do you regret [that Mary punished t₁]
b. *Who do you regret [t₁ punished the children]

Moreover, as Stowell 1987 argues, adjuncts cannot move out of the factive CP:

(54) *Why do you regret [that John resigned t₁]

These facts show that the factive CP constitutes an island. It seems to be obvious that the way it blocks extraction is exactly the same as the way DP does. Interestingly, the factive CP may be preceded by an overt determiner in Spanish and Portuguese, as Zubizarreta points out. These observations suggest that the factive CP and DP have something in common in some structural sense.

One way to implement this idea within our system is to argue that the head C of the factive CP is featureless just like D. We might attribute this rather peculiar property of the factive C to head-head agreement with the factive V. Specifically, the featureless C is required through agreement with the factive V. This is not unreasonable, given that the determiner appears in some languages, which implies a nominal character. It follows then that the factive CP is Spec-less and that argument extraction yields a weak violation of Subjacency, and subject/adjunct extraction and ECP violation (note that the subject trace is required to be antecedent-governed), since CP inherits barrierhood from IP.

3.3. IP AS AN EXTRA BARRIER. It has been noted in the literature that the prenominal subject makes extraction more difficult. Stowell 1987, who attributes the original observation to Chomsky, notes that extraction out of DP with Agent results in marginality, as shown in the following contrast:18

(55) a. Who did you sell [a picture of t₁]
b. ??Who did you sell [Mary’s picture of t₁]

It has often been pointed out that the tensed clauses in some way constitute an island. Rizzi 1982, for example, has shown that the tensed clause boundary counts as a bounding node for Subjacency, whereas the infinitival clause boundary does not, except in the case of the [+Wh] infinitive or the infinitive with an auxiliary verb in COMP. Chomsky 1986b proposes in this connection that in English the most deeply embedded

18 When Mary is Possessor, extraction is impossible. We will not address the matter, however. For different proposals, see Stowell 1987 and Takano 1988c.
tensed IP is an inherent barrier (possibly weak) to movement, not to
government. Thus the difference in acceptability between 56a and
56b follows from the presence of this 'extra' barrier in the latter:

| (56) | a. ??What, did you wonder [to whom to give t\_i t\_j] 
      | b. ??What, did you wonder [to whom John gave t\_i t\_j] |

We might generalize this argument about an inherent barrier to cover
the case at hand. Suppose that we have 57:

(57) The most deeply embedded IP 'with a Case-marking head'
     constitutes an inherent barrier in English.

Then it follows from 57 that 55b is worse, since the nominal IP is an extra
barrier with its head Case-marking Mary. This line can solve the prob-
lem Fukui and Speas 1986 face in handling 58:19

| (58) | a. ??Who, do you believe [the claim that Mary likes t\_i] 
      | b. ?*Who, do you believe [Susan's claim that Mary likes t\_i] |

They admit that their system predicts that 58b is as bad as a strong Sub-
jacency violation, which it is not. Given 57, the level of acceptability in
58b is predicted, a desirable consequence. Crucial in this discussion is
the original assumption that DP includes the projection of INFL. Thus,
in this sense, our analysis seems to be a promising one.

4. CONCLUSION. In this paper I have argued for introducing the pro-
jection of INFL into DP, proposing an internal structure for noun phrases
that is completely parallel with that of clauses. Further, I have claimed
that the Spec is licensed by a feature of the head and that the Spec of DP
is not licensed for lack of such relevant features in D. The revised DP
hypothesis and the proposal for the Spec-less DP have been shown to
have both theoretical and empirical consequences on the issue concern-
ing symmetries and asymmetries between noun phrases and clauses. In
particular, I have argued that the former has a direct impact on empirical
domains concerning DP-internal phenomena, and the latter concerning
extraction out of DP.

19 We depart from Chomsky's 1986b claim with respect to extraction out of the so-
called pure complex NP, since we consider that a relevant barrier is DP, as in other
cases, while Chomsky argues that it is the embedded CP. It seems that Chomsky's
argument is based on problematic assumptions, though. For relevant discussion, see
Takano 1988a, c.
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