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IMMEDIATE DOMINANCE AND IDENTITY DELETION

ABSTRACT. A non-universal Immediate Dominance Condition on identity deletion is proposed to explain the systematic differences between languages like Chinese and languages like English in their respective patterns of coordination, topicalization, dislocation, and relativization. By assuming that this condition holds for languages of the Chinese-type, but not for those of the English-type, it is possible to account for the well-formed coordinations of all languages by means of a single universal principle of coordination reduction, and it is possible to derive the well-formed topicalizations, dislocations, and relative clause constructions of all languages by means of the same set of universal principles of Copying, Deletion, and Pronominalization.

INTRODUCTION

In this paper we will propose that there is a non-universal Immediate Dominance Condition on identity deletion which is capable of providing a systematic explanation of various differences between languages like Mandarin Chinese and languages like English. It will be shown that this condition is justified for languages like Chinese but not for those like English, and that this grammatical difference is sufficient to account for a number of superficial differences between these language types in diverse constructions involving identity deletion.

In the first part of the paper, we will show how the Immediate Dominance Condition serves to account for the distinctive patterns of coordination which are characteristic of each of the two language types. In the second and third parts, we will show that this condition is also capable of explaining certain interesting differences between the two types in their patterns of pronominalization and deletion in relative clauses and other subordinate constructions.

1. COORDINATION

In all known natural languages it appears to be the case that, for any sentential coordination with identical superficial subjects, there is a reduced

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* Foundations of Language 8 (1972) 161-198. All rights reserved.
paraphrase with coordinate predicates; and, for any sentential coordination with identical predicates, there is a reduced paraphrase with coordinate subjects. For example, both in English and Chinese, (1b) and (2b) are well-formed paraphrases of (1a) and (2a), respectively.

(1) (a) John hit the boy, and John kicked the girl.
John dâle nánhâizi, John tîle nîhâizi.
   (hit) (boy) (kicked) (girl)
(b) John hit the boy and kicked the girl.
John dâle nánhâizi, tîle nîhâizi.
(2) (a) John hit the boy, and Bill hit the boy.
John dâle nánhâizi, Bill dâle nánhâizi.
(b) John and Bill hit the boy.
John gên Bill dâle nánhâizi.¹
   (and)

Both of these relations can be accounted for in terms of a single universal principle of Coordination Reduction which justifies the reduction of coordinate structures by the deletion of identical constituents. This principle would thus allow for the reduction of (1a) to (1b) by deletion of one of its two identical subjects, and of (2a) to (2b) by deletion of one of its two identical predicates. This process of Coordination Reduction is governed by certain general constituency restrictions on deletion and is also associated with a number of restrictions on ordering and regrouping.² We will be concerned here only with the matter of constituency restriction.

¹ The conjunction AND is represented in Chinese by the morpheme gên when it conjoints noun-phrase conjuncts. For all other kinds of conjuncts, AND is represented by an intonational break.

² The restrictions we are discussing are independent of any differences between particular theories of coordination. For example, there is a general directionality restriction to the effect that left branching identical constituents may be absent only in the right branching conjuncts of a reduced coordination, and right branching identical constituents may be absent only in the left branching conjuncts. The problem of how this directionality relation is accounted for, however, is independent of any of the principles which we are going to be concerned with here. (See Ross (1967a) and Sanders (1969) for discussion and alternative explanations of this relation.) Also, our proposals are independent of the particular ways in which the process of Regrouping in Coordination Reduction is handled. (For a detailed discussion of the various formulations of Coordination Reduction, see Tai (1969).) It should also be noted that we will not be concerned here with also, but, too, or do so coordinations, or with interrogative coordinations of the disjunctive type, since some of these constructions appear to involve anaphoric as well as elliptical reduction processes, and they all differ significantly from other coordinate structures in the directionality and constituency restrictions which they observe.
For English and many other languages, there are, in addition to the reduced coordinations derivable by the deletion of identical subjects or predicates, other coordinations which can be derived by Coordination Reduction from their synonymous unreduced sentential coordinations by the deletion of one of two identical verbs or by the deletion of one of two identical objects. Thus, for example, (3b) can be derived from (3a) by deletion of an identical verb, and (4b) from (4a) by deletion of an identical object.

(3) (a) John hit the boy, and Bill hit the girl.
       (b) John hit the boy, and Bill the girl.
(4) (a) John hit the boy, and Bill kicked the boy.
       (b) John hit and Bill kicked the boy.

In Chinese, on the other hand, both of these types of reduction are ungrammatical. Thus (5a) cannot be reduced to (5b) by identical verb deletion; nor can (6a) be reduced to (6b) by identical object deletion.

(5) (a) John dāle nǎnháizi, Bill dāle nǔháizi.
       (John hit the boy, and Bill hit the girl.)
       (b) *John dāle nǎnháizi, Bill nǔháizi.
           (John hit the boy, and Bill the girl.)
(6) (a) John dāle nǎnháizi, Bill tīle nǎnháizi.
       (John hit the boy, and Bill kicked the boy.)
       (b) *John dāle, Bill tīle nǎnháizi.
           (John hit and Bill kicked the boy.)

When we compare the coordinate structures of English and Chinese, then, we observe that there is a correlation between deletability of verbs and deletability of objects in sentential coordinations, both types of reduction being possible in English and neither type being possible in Chinese. That this correlation is not merely accidental to the grammars of these two languages is strongly suggested by the fact that for each of a large number of languages of various families investigated thus far in this respect, the same correlation holds, the language being either of the English-type, permitting both verb and object deletion, or of the Chinese-type, permitting neither of these deletions.³

³ Koutsoudas (1971) has investigated more than thirty languages of different families to test this correlation. According to him, Akuapem, Hausa, Indonesian, Lebanese, Mam, Maninka, Susu, Toba Batak, Temne, Thai, Wolof, and Yoruba belong to the class of Chinese-type languages, while Arabic, Croatian, Estonian, Finnish, French, German, Hungarian, Japanese, Korean, Latvian, Modern Greek, Norwegian, Rumanian, Russian, Swedish, Telugu, and Zulu belong to the class of English-type languages. In addition, there are two languages, Swahili and Turkish, exhibiting dialects of both types.
For example, Greek, Japanese, and Russian are like English in this respect, and Thai, Hausa and Lebanese Arabic are like Chinese. Thus, in Japanese, sentential coordinations can be reduced both by identical verb deletion (as illustrated in (7)) and by identical object deletion (illustrated in (8)), while in Lebanese, as shown in (9) and (10), neither verb deletion nor object deletion is possible.

(7) (a) John ga syonen o nagutte, Bill ga syozyo o nagutta.
        (boy)    (hit)       (girl)
         (John hit the boy, and Bill hit the girl.)
 (b) John ga syonen o, Bill ga syozyo o nagutta.
         (John hit the boy, and Bill the girl.)

(8) (a) John ga syonen o nagutte, Bill ga syonen o ketta.
        (kicked)
         (John hit the boy, and Bill kicked the boy.)
 (b) John ga syonen o nagutte, Bill ga ketta.
         (John hit and Bill kicked the boy.)

(9) (a) John ḏarab il walad, wa Bill ḏarab il bint.
        (hit) (the) (boy) (and)       (girl)
         (John hit the boy, and Bill hit the girl.)
 (b) *John ḏarab il walad, wa Bill il bint.
         (John hit the boy, and Bill the girl.)

(10) (a) John ḏarab il walad, wa Bill rafas il walad.
         (kicked)
         (John hit the boy, and Bill kicked the boy.)
 (b) *John ḏarab wa Bill rafas il walad.
         (John hit and Bill kicked the boy.)

Thus far, in other words, it appears to be true for all natural languages that while some coordinations of sentences are always reducible by the deletion of identical subjects or predicates, reductions by verb deletion and by object deletion will either be jointly grammatical in a language or else jointly ungrammatical.4

4 More precisely, no instances have been found thus far of a language which permits object deletion in conjunctive coordinations but does not permit verb deletion, or of a language which permits verb deletion but does not permit any form of object deletion. There appear to be some languages of the English-type, however, such as French, Greek, and Portuguese, which allow verb-deletion under exactly the same conditions as English does, but are reported to have certain additional restrictions on object-deletion which do not hold for English. Thus, in some dialects of modern Greek, as reported by Koutsoudas (1971), object reduced coordinations are grammatical only if a clitic object pronoun occurs on at least the first verb of the coordination. Thus (1) and (2) are grammatical versions of "The girl saw and the boy hit the cat" while (3) and (4) are not:
There are actually two correlations, then, which must be accounted for here. First, the correlation between superficial subjects and predicates, which are both deletable in the sentence coordinations of all languages. Second, the correlation between superficial verbs and objects, which are always either both deletable in a language, or both non-deletable. Comparing these two sets of constituents, it can readily be seen that there is only one essential difference between them: subjects and predicates are immediate constituents of sentences, while verbs and objects are not. This suggests that the operant restriction on coordinate identity deletion in languages of the Chinese-type is a restriction against the deletion of any constituent which is not immediately dominated by a conjunct sentence. We call this restriction the Immediate Dominance Condition.

By assuming that the Immediate Dominance Condition is included in the grammars of languages like Chinese, Thai, and Lebanese, but not those of languages like English, Japanese, or Russian, we can explain all of the facts discussed thus far in a very simple and straightforward way. Thus the fact that all languages permit subject and predicate deletion in sentence coordinations follows from the fact that subjects and predicates are immediately dominated by sentences and thus satisfy the constituency conditions for deletion both in languages which observe the Immediate Dominance Condition and in those which don’t. Similarly, the correlation between verb-deletion and object-deletion in languages follows from the fact that neither of these constituents is immediately dominated by S and thus that neither can be deleted in any language that observes the Immediate Dominance Condition, while both will be deletable in any language which doesn’t observe this condition.

It should be noted that the motivation for this condition can be demonstrated quite independently of any facts of a comparative or typological nature. It can be readily shown, in fact, that the Immediate Dominance Condition is not merely sufficient but necessary for a language like Chinese, since there is no other principled basis for the differentiation of grammatical from ungrammatical coordinations in such a language or for the differentia-

\[
\begin{align*}
(1) & \quad \text{to koritsi } \textit{tin} \text{ i}öe \text{ ke to peöi } \textit{tin} \text{ xtipise tin yata.} \\
& \quad \text{the girl } \textit{it} \text{ saw and the boy } \textit{it} \text{ hit the cat.} \\
(2) & \quad \text{to koritsi } \textit{tin} \text{ i}öe \text{ ke to peöi xtipise tin yata.} \\
(3) & \quad *\text{to koritsi i}öe \text{ ke to peöi } \textit{tin} \text{ xtipise tin yata.} \\
(4) & \quad *\text{to koritsi i}öe \text{ ke to peöi xtipise tin yata.}
\end{align*}
\]

While the existence of these restrictions makes sentences derived by object-deletion less common in these languages than those derived by verb-deletion (a fact which may be true for English too), it obviously does not contradict the generalization that if there is any situation in which either verb-deletion or object-deletion is possible in a language, there will be some situation in which the other is also possible.
tion of coordinate paraphrases from non-paraphrases. Thus, for example, sentence (11) and (12)

(11) (a) John dā kêi̍g nántâi, Bill dā kêi̍g nántâi.
   (that)
   (John is hitting that boy, and Bill is hitting that boy.)
(b) John gê Bill dā kêi̍g nántâi.
   (John and Bill are hitting that boy.)
(12) (a) John yâo dā kêi̍g nántâi, Bill xiāng dā kêi̍g nántâi.
   (plan)
   (John wants to hit that boy, and Bill plans to hit that boy.)
(b) *John yâo, Bill xiāng, dā kêi̍g nántâi.
   (John wants, and Bill plans, to hit that boy.)

demonstrate that the required differentiation of correct and incorrect reductions cannot be possibly achieved by any restriction defined simply on the labels or categorial properties of constituents—for we see that precisely the same constituent, here a predicate or verb-phrase, is deletable when it is immediately dominated by a conjunct sentence as in (11a), but is not deletable when it is not dominated by a conjunct as in (12a), where the identical predicates are immediately included in the predicates of the conjuncts and not in the conjuncts themselves. This is also shown in (13) and (14),

(13) (a) John zuótian dâle nántâi, Bill zuótian tile nûhâi.
   (yesterday)
   (John hit the boy yesterday, and Bill kicked the girl yesterday.)
(b) *John zuótian dâle nántâi, Bill tile nûhâi.
(14) (a) zuótian John dâle nántâi, zuótian Bill tile nûhâi.
   (Yesterday John hit the boy, and yesterday Bill kicked the girl.)
(b) zuótian John dâle nántâi, Bill tile nûhâi.

where it is seen that adverbial constituents can also be deleted in sentence coordinations subject to exactly the same Immediate Dominance restriction that holds for noun-phrases and predicates. Thus, when an adverb is preposed as in (14a) it is an immediate constituent of a sentence and is thus subject to deletion, but when not preposed as in (13a) it is a constituent of the predicate and is thus not deletable in any coordination of sentences. Thus while the reduction of (14a) to (14b) is possible in Chinese, (13b) is not a possible reduction of (13a).

Proof that the restrictions on deletion in Chinese coordinations are independent of underlying case properties and non-superficial constituency relations is provided by sentences (15–18).
(15) (a) nánháizi John dāle, nánháizi Bill tīle.
(16) (a) nánháizi bèi John dāle, nánháizi bèi Bill tīle.

(The boy was hit by John, and the boy was kicked by Bill.)

(b) nánháizi John dāle, Bill tīle.
(b) nánháizi bèi John dāle, bèi Bill tīle.

(17) (a) nège nánháizi, wō dāle tā, nège nánháizi, nī tīle tā.

(I) (him) (you)

(18) (a) wō dāle tā, nège nánháizi, nī tīle tā, nège nánháizi.

(I hit him, that boy, and you kicked him, that boy.)

(That boy, I hit him and that boy, you kicked him.)

Thus, while non-agentive noun-phrases are not deletable when they occur as superficial objects (as seen in (6)), they are deletable when they occur as superficial subjects of passive sentences, as in (15) and (16), or as raised, copied, or dislocated constituents of sentences such as (17) and (18). The latter sentences also demonstrate that the restrictions on deletability here are entirely independent of the relative linear order of constituents, since a dislocated object is deletable regardless of whether it precedes or follows the clause it is in construction with, and a non-dislocated object is non-deletable either before or after its sister verb.

In short, then, there is no common property of the constituents which are deletable in Chinese coordinations, as opposed to those which are not deletable, except for the fact that all of the former are immediately dominated by conjunct sentences, while all of the latter are not. The Immediate Dominance Condition is thus clearly necessary for Chinese and all other languages which observe the same restrictions on deletion.

Traditionally, (b) is regarded as the topicalized form of (a), and only (c) is taken to be the passive of (a):

(a) John dāle nánháizi.
    (John hit the boy.)
(b) nánháizi John dāle.
(c) nánháizi bèi John dāle.

In the present work, we treat both (b) and (c) as passives of (a). Some of the reasons for this treatment are given in Section 2.
The Immediate Dominance Condition is not only necessary to account for those restrictions on coordination reduction which are peculiar to languages of the Chinese-type, but it is also sufficient in these languages to account for all those restrictions which are observed universally by immediate-dominance and non-immediate-dominance languages alike. The latter follows from the fact that Immediate Dominance is the strongest and most general condition on identity deletion known, a condition whose restrictive powers properly include those of all other constituency restrictions of a less general character.

Thus, for example, the derivation of (19b) from (19a) must be prevented both in English and in Chinese.

(19) (a) I know that John hit the boy, and you believe that John kicked the girl.

wo zhidaọ John dâle nánháiizi, ni xiăngxin John tìle nǔháiizi.

(know) (believe)

(b) *I know that John hit the boy, and you believe that kicked the girl.

*wo zhidaọ John dâle nánháiizi, nǐ xiăngxin tìle nǔháiizi.

For English, the necessary restriction here could be effected by means of a general condition to the effect that subjects of complement clauses are not deletable. In Chinese, on the other hand, the required restriction follows automatically from the Immediate Dominance Condition, and no special conditions on subordinate subject deletion are needed. The same could be shown for all other restrictions on deletion shared by English and Chinese. Thus while non-immediate-dominance languages like English might require a number of different conditions on identity deletion, any immediate-dominance language like Chinese will require only one constituency condition on deletion, namely the Immediate Dominance Condition.

There is one important exception, however, to the claim that the Immediate Dominance Condition is sufficient as well as necessary for the explanation of all of the distinctive aspects of coordinations in languages of the Chinese type. This involves the characteristic non-occurrence of verb coordinations in these languages.

Thus, while sentences with object coordinations, such as (20),

(20) wǒ dâle nánháiizi gēn nǔháiizi.

(I hit the boy and the girl.)

are apparently grammatical in all languages, sentences with verb coordinations, such as (21)
(21) *wō dāle, tīle nánháizi.
(I hit and kicked the boy.)

are found to be fully grammatical thus far only in non-immediate-dominance languages like English. In other words, our evidence thus far indicates that a language will have verb coordination if and only if it does not observe the Immediate Dominance Condition, verb coordination being ungrammatical, deviant, or acceptable only in very highly restricted contexts in any language which observes this condition. This correlation, however, cannot be accounted for in terms of the Immediate Dominance Condition itself.

To account most simply for the properties and relations of sentences with object coordinations and other permitted coordinations of inferior constituents, it is necessary to assume that the process of Coordination Reduction is recursive, and that it may thus apply repeatedly to its own products to effect a progressive optional reduction of sentences containing coordinations of higher constituents to synonymous sentences containing coordinations of lower constituents. This assumption, of course, entails that the reduction of both lower and higher constituents in any given language must be governed by exactly the same set of constituency restrictions on deletion. This assumption is not inconsistent with any of the facts thus far known about coordination in natural languages.

The principle of recursive coordination reduction successfully explains why object coordinations like (20) are grammatical in languages like Chinese, in spite of the fact that these must necessarily involve a deletion of identical verbs, a deletion which is prohibited in all cases of sentence coordination. This fact can be explained, that is, provided that the Immediate Dominance Condition is generalized from the case of immediate dominance by a conjunct of a sentence coordination to the case of immediate dominance by a conjunct of any coordination whatever. With this extension, then, sentences like (22c) can be derived in an entirely regular way from structures like (22b) where the identical verbs are immediately dominated by predicate conjuncts and thus subject to deletion.

(22) (a) John dāle nínháizi, John dāle nánháizi.
(John hit the girl, and John hit the boy.)
(b) John dāle nínháizi, dāle nánháizi.
(John hit the girl and hit the boy.)
(c) John dāle nínháizi gēn nánháizi.
(John hit the girl and the boy.)

Although verb coordination is not acceptable in spoken Chinese, it is often found in written texts. Verb deletion and object deletion on the other hand are never found in either written or spoken Chinese.
Since sequential reductions like (22) are possible in immediate-dominance and non-immediate dominance languages alike, this explains why sentences with object coordinations like (22c) are found to be universally grammatical in natural language.

Similar lines of derivation would also account for the occurrence of various other coordinations of lower-order constituents. However, since objects (as well as complements) are sister constituents of their verbs (or of some constituent including the verb), if predicate coordinations are reducible to object coordinations by deletion of an immediately dominated verb, we should expect that they should also be reducible to verb coordinations by the deletion of an identical object, which is presumably also immediately dominated by the predicate conjuncts. But for all languages of the Chinese-type the latter reduction would yield sentences which are consistently ungrammatical or deviant, as shown in (21). The characteristic deviance of verb coordinations in immediate dominance languages thus remains unexplained at present.\(^7\)

2. TOPICALIZATION AND DISLOCATION

If the Immediate Dominance Condition is a valid principle governing the deletion of identical constituents in coordinate structures, it would be reasonable to expect that this condition might also play some role with respect to processes of identity deletion in other types of constructions. If this is the case, then, we would also expect to find that there are systematic syntactic differences between languages which observe the Immediate

\(^7\) Our progress on this problem has been limited thus far to the successful falsification of a large number of logically possible hypotheses, including some based on assumptions about the internal structure of predicates, about the relative order and head-attribute relations of constituents, and about the referential indexing of verbs and complements. There is in fact only one of our tentative hypotheses which has not yet been definitively falsified. This hypothesis requires the assumption of an additional non-universal condition on deletion to the effect that a constituent is deletable only if it is in the highest possible position for such a constituent in the given language. This Highest Possible Condition would permit the deletion of noun-phrases when they are subjects but not when they are objects, since only in the former case does the noun-phrase occupy the highest possible position for noun phrases, the position of immediate dominance by S. Verbs, on the other hand, would always be deletable in predicate coordinations, since the highest possible position for verbs, unlike that for noun-phrases, is presumably as an immediate constituent of a predicate.

Since the Highest Possible Condition is logically independent of the Immediate Dominance Condition, this hypothesis predicts that there should not only be languages which observe both conditions (like Chinese) and languages which observe neither (like English), but also that there should be some languages which observe each one of the conditions without observing the other. A language which observes Immediate Dominance but not the Highest Possible Condition would be just like Chinese except that it would
DOMINANCE CONDITION and those which don't not only with respect to coordination but also with respect to other classes of structures derived by means of identity deletion. We find that both of these expectations are in fact fulfilled.

All natural languages are assumed to have some sentences in which a nominal constituent occurs in a raised, or superordinate, position relative to a clause which is a reduced reflex of a simple sentence containing the raised constituent. Sentences of this sort which have pronominal reflexes of the raised constituent have been described (cf. Ross, 1967b) in terms of a transformational process called Dislocation, and those which have null reflexes of the raised constituent have been treated in terms of a process called Topicalization.

While the Dislocation-type is apparently universal, the Topicalization-type is not. Thus while English has both Topicalization and Dislocation, Chinese and Lebanese have only Dislocation. We have found thus far that the set of languages with Topicalization is in fact precisely identical to the set of languages which do not observe the Immediate Dominance Condition in coordination reduction. This correlation can be explained by the notion of immediate dominance itself.

In general, any topicalization rule can be analyzed into a sequence of copying and deletion, and any dislocation rule can be analyzed into a sequence of copying and pronominalization. Thus a universal grammar for topicalization and dislocation can be formulated containing the set of three ordered rules of (23), an optional copying and raising rule, followed by an optional deletion of the subordinate source constituent by its raised copy, followed by an obligatory pronominalization of the subordinate constituent.8

allow rather than prohibit verb coordination. A language which observes the Highest Possible Condition but not Immediate Dominance would have sentences derived by verb deletion (such as The boy hit the dog, and the girl the cat, and The boy hit the dog and the cat) but no sentences derived by object deletion (that is, neither The boy hit and the girl kicked the dog, nor The boy hit and kicked the dog.) Since no languages of the second type have been found yet -- and only one instance of the first type, Tagalog, as reported to us by G. Schaarschmidt -- there is little that can be said in favor of the Highest Possible hypothesis beyond the mere fact that it has not yet been shown to be false.

8 Since there are both Left and Right Dislocations, as shown in (1b) and (1c) respectively,

(1) (a) My brother likes to drink beer.
   (b) My brother, he likes to drink beer.
   (c) He likes to drink beer, my brother.

we have to assume either that the rules in (23) apply to unordered structures before the ordering of constituents, or else that they are mirror image rules. It will be shown in Section 3 that Relative Clause Formation in all languages involves at least (23). Thus, this assumption allows (23) to apply to languages like Chinese and Japanese, where the relative clause precedes the head noun phrase, as well as languages like English and Thai.
(23) (a) Copying (optional)
    $s[X \text{ NP } Y] \rightarrow s[\text{NP} \# s[X \text{ NP } Y] \#].$
(b) Deletion (optional)
    $z[\text{NP} \# s[X \text{ NP } Y] \#] \rightarrow z[\text{NP} s[X \text{ NP } Y]].$
(c) Pronominalization (obligatory)
    $z[\text{NP} \# s[X \text{ NP } Y] \#] \rightarrow z[s[X \text{ NP } \text{ Pro } Y]].$

If this analysis of topicalization and dislocation is correct, and if the constraints on identity deletion in subordinate clauses are generally parallel to those that apply to deletion in coordinate ones, it follows that immediate-dominance and non-immediate-dominance languages should differ from each other with respect to Topicalization, which involves identity deletion, but not with respect to Dislocation, which involves only Copying and Pronominalization. This is indeed the case for all languages that have been investigated thus far. Thus, for example, (24)–(27) show that English has both dislocation and topicalization of objects while Lebanese has only dislocation.

(24) (a) the boy John hit.
    (b) *il walad John darab.

(25) (a) the boy, John hit him.
    (b) il walad John darabu.

(26) (a) the boy John was standing near.
    (b) *il walad John kaan wa?if jumb.

(27) (a) the boy, John was standing near him.
    (b) il walad John kaan wa?if jumbu.

To explain this contrast we need only to generalize the Immediate Dominance Condition to include constituents immediately dominated by non-conjoined as well as conjoined sentences.

which have the reverse order. This assumption, however, would also allow (23) to convert (2a) to (2c) in addition to (2b).

(2) (a) John hit the boy.
    (b) The boy John hit.
    (c) *Hit the boy John.

Sentences like (2c) appear to be universally excluded in languages like English in which Topicalization does exist. To account for the fact that such languages allow Left Topicalization but not Right Topicalization, we presumably can impose a condition on the Deletion rule of (23) to the effect that it can operate to the left only in relative clause constructions.
With this extension, if follows that in languages like Lebanese, after Copying has applied, it will not be possible to delete either the object of a verb or the object of a preposition in the subordinate clause, since neither of these constituents will be immediately dominated by that clause. Since the Deletion rule cannot apply, these constituents will always undergo Pronominalization, and the ultimate product of every object copying in Lebanese will thus always be a sentence with a dislocated rather than topicalized object. On the other hand, since English does not observe the Immediate Dominance Condition, the object of a verb or preposition can always undergo Deletion after Copying in this language. Since deletion is optional, these constituents may also be pronominalized. The Immediate Dominance Condition thus explains why English has both topicalized and dislocated objects, while Lebanese has only dislocated ones.

Since Chinese and Lebanese both observe the Immediate Dominance Condition with respect to coordination reduction, we should expect that Chinese, like Lebanese, does not permit topicalization of objects. Example (28) shows that this is true for objects of prepositions in Chinese.

(28) (a) John zuótián gēn nèige nánhái zi lái le.  
        (with)               (came)  
         (John came with that boy yesterday.)
(b) nèige nánhái zi, John zuótián gēn tā lái le.  
         (him)  
         (that boy, John came with him yesterday.)
(c) *nèige nánhái zi, John zuótián gēn lái le.  
         (that boy John came with yesterday)

But, unlike Lebanese, Chinese not only has dislocation of objects of verbs, but also sentences which appear to have direct object topicalization. Thus sentences like (29c)

9 It should be noted that the contrast between immediate-dominance and non-immediate-dominance languages with respect to topicalization out of prepositional phrases is restricted to the case of adverbial phrases. There is, in fact, a restriction in English against the topicalization or relativization of NP's in adjectival prepositional phrases. For example, the garden in (a) cannot be topicalized or relativized, regardless of whether or not the modifying clause has been reduced (by who is deletion) to a modifying phrase.

(a) I like the boy (who is) in the garden.
(b) *the garden I like the boy (who is) in
(c) *the garden which I like the boy (who is) in is pretty.

For a detailed discussion of restrictions on the movement of an NP out of prepositional phrases, see Ross (1967b; pp. 196–240).

10 Superficially, it might also seem that an inanimate object can be topicalized but not dislocated in Chinese. For example,
(29) (a) wǒ dāle nèige nánháizi.
    (I hit that boy.)
(b) nèige nánháizi, wǒ dāle tā.
    (That boy, I hit him.)
(c) nèige nánháizi wǒ dāle.
    (That boy I hit.)

would seem to constitute a counterexample to our hypothesis, since if
Chinese is an immediate-dominance language, it should have exactly the
same restriction against object deletion in copied sentences as Lebanese has.

However, there is some evidence that the superficial difference here is not
really due to any difference at all with respect to object deletion in the two
languages. Thus there are reasons for believing that sentences like (29c)
are actually passives rather than topicalizations, and that the reason that
such sentences occur in Chinese but not in Lebanese is simply because
Chinese has a process of passivization while Lebanese does not.

Thus (29c) is very closely related to (30), which has traditionally been
considered to be the passive of (29a).

(30) nèige nánháizi bèi wǒ dāle.
    (That boy was hit by me.)

All three of these sentences appear to have the same semantic properties
and selectional restrictions. Sentence (30) has exactly the same form as
(29c) except that it has a passive marker bèi attached to the agent phrase.
In addition, superficially topicalized sentences like (29c) have the same syn-
tactic restrictions as the corresponding passives with bèi, but have different
restrictions from sentences with dislocated objects. This can be seen in (31).

(31) (a) wǒ àì nèige rén.
    (love) (man)
    (I love that man.)

(a) wǒ mǎile shū.
    (I bought the book.)
(b) *shū wǒ mǎile tā.
    (The book, I bought it.)
(c) shū wǒ mǎile
    (The book I bought.)

The ungrammaticality of (b), however, can be most simply explained by the fact that
in general there is no overt anaphoric pronoun for inanimate noun phrases in Chinese.
If pronominalization is applied in the same way to animate and inanimate noun phrases,
with inanimate pronouns simply having a null spelling in this language, it is not necessary
to assume that there is any difference at all between inanimate and animate noun phrases
with respect to dislocation, topicalization, pronominalization, or relativization. Thus
according to this analysis, (c) is a dislocation and not a topicalization, the null spelling
of the pronominal reflex of the inanimate shū being entirely regular.
(b) nèige rén wǒ ài tā.
    (That man, I love him.)
(c) *nèige rén wǒ ài.\textsuperscript{11}
    (That man I love.)
(d) *nèige rén bèi wǒ ài.
    (That man is loved by me.)

The fact that sentences like (31c) and (31d) jointly observe restrictions which
differ from those observed by sentences with dislocated objects, such as
(31b), suggests that both of the former are derived not by means of copying
and raising but by means of a separate Passive transformation. This is
strongly supported by the fact that Lebanese has no true (two-place) passives
at all.\textsuperscript{12} Thus the difference between Chinese and Lebanese with respect to
the objects of verbs can be explained as due simply to the presence of a
passive transformation in Chinese and the absence of any such rule in
Lebanese.

3. RELATIVIZATION

We have seen that the Immediate Dominance Condition is capable of
explaining a number of systematic differences between languages in their
patterns of coordination and topicalization. We will now show that there are
certain non-universal features of relative clause constructions which are also
correlated with the observance and non-observance of the Immediate
Dominance Condition. This correlation will be shown to follow from the
principle of Immediate Dominance itself, given a general theory of relativiza-
tion which includes a process of identity deletion as the necessary and suffi-
cient well-formedness condition for all relative constructions.

One of the most characteristic differences between the relative clause
constructions of immediate-dominance languages like Chinese and those of
non-immediate-dominance languages like English involves the occurrence
of pronouns in a relative clause which are anaphoric to the noun-phrase
that the clause modifies. Consider, for example, the contrasting patterns of
pronominalization in the corresponding English and Chinese relative clauses
in sentences (32)-(37).

\textsuperscript{11} While sentences like (31c) are acceptable as constituents of contrastive discourses such
as nèige rén wǒ ài, zhège rén wǒ bù ài. (That man I like, but this man I don't like), this
fact is irrelevant to the present discussion, which is concerned only with topicalizations
which are semantically non-contrastive and potentially independent in discourse distri-
bution.

\textsuperscript{12} Although there is a Lebanese verb form that is traditionally called passive, it is restricted
to occurrence in sentences without agents and occurs with only a small restricted class
of verbs. Thus, there is no motivation for assuming that underlying objects can ever
be raised into surface subject position in this language.
(32) (a) The boy that hit me came.
     (b) dāle wǒ de nèige nánháiži láíle.
(33) (a) *The boy that he hit me came.
     (b) *tā dāle wǒ de nèige nánháiži láíle.
(34) (a) The boy that I hit came.
     (b) wǒ dāle de nèige nánháiži láíle.
(35) (a) *The boy that I hit him came.
     (b) wǒ dāle tā de nèige nánháiži láíle.
(36) (a) The boy that I was hit by came.
     (b) *wǒ bèi dāle de nèige nánháiži láíle.
(37) (a) *The boy that I was hit by him came.
     (b) wǒ bèi tā dāle de nèige nánháiži láíle.

Sentences (32) and (33) show that a subject anaphoric pronoun of the head noun-phrase cannot occur in a relative clause in either English or Chinese. (34) and (35) show that, while an object anaphoric pronoun of the head also cannot occur in English, such a pronoun can occur in Chinese. (36) and (37) show that while English also excludes prepositional object anaphoric pronouns of the head, Chinese requires the occurrence of such pronouns in all prepositional phrases within relative clauses. In other words, these sentences show that while English has no anaphoric pronouns of the head at all, Chinese excludes such pronouns only in subject positions, permitting them for objects of verbs, and requiring them for objects of prepositions. The Lebanese pattern is exactly like that of Chinese except that the object pronoun is obligatory in Lebanese relatives for objects of verbs as well as prepositions. This is shown by (38) and (39).

(38) (a) The boy that John hit came.
     (b) *il walad illi John ḏarab iẓza.

     (that)                (came)

(39) (a) *The boy that John hit him came.
     (b) il walad illi John ḏarabu iẓza.

It is clear that an anaphoric pronoun of the head noun-phrase can occur in a relative clause only if a noun-phrase that is identical to the head has not been deleted. We have already seen that Chinese and Lebanese have more severe restrictions on identity deletion than English has, both in coordinate clauses and in clauses subordinate to a copied and raised constituent. It would thus be natural to expect that in relative clauses too there will be some constituents which are subject to identity deletion in English but not in Chinese or Lebanese—and hence that the latter languages should have some pronominal reflexes of the head where English has only null reflexes. It would also be reasonable to expect that this should be the case
precisely when an identical noun-phrase is not immediately dominated by the relative clause.

These expectations are strongly reinforced by the fact that for objects in both Chinese and Lebanese there is a precise parallelism between the set of well-formed relative clauses and the set of well-formed dislocated sentences. Thus, in both languages, a noun-phrase can be dislocated but not topicalized out of a prepositional phrase. And in both languages we find that pronominal reflexes must also always occur in the prepositional phrases of relative clauses. In Lebanese, objects of verbs can be dislocated, but can never be topicalized or passivized. In Chinese, on the other hand, objects of verbs can be either dislocated or passivized. Parallel to this distinction is the fact that while anaphoric object pronouns are obligatory in Lebanese relative clauses, they are optional in the well-formed relatives of Chinese.13

It should be noticed that object anaphoric pronouns of the head in the relatives of Chinese are obligatory for indirect objects as well as for objects of prepositions. For example,

13 (a) wǒ yào sòng gěi nèige nánháizi yī běn shū.
   (send) (to) (one) (copy) (book)
   (I want to send that boy a book.)
(b) wǒ yào sòng gěi tā yī běn shū de nèige nánháizi hěn gāo.
   (very) (tall)
   (The boy that I want to send a book to hěn gāo. (The boy that I want to send a book to is very tall.)
(c) *wǒ yào sòng gěi yī běn shū de nèige nánháizi hěn gāo.
   (The boy that I want to send a book to is very tall.)

Parallel to this is the fact that indirect objects, like objects of prepositions, can be dislocated but not topicalized. Thus,

(2) (a) wǒ yào sòng gěi nèige nánháizi yī běn shū.
   (I want to send that boy a book.)
(b) nèige nánháizi wǒ yào sòng gěi tā yī běn shū.
   (That boy, I want to send hěn gāo. (That boy I want to send a book to.)
(c) *nèige nánháizi wǒ yào sòng gěi yī běn shū.
   (That boy I want to send a book to.)

(1) and (2) further support the observation that in languages like Chinese there is a precise parallelism between the set of well-formed relative clauses and the set of well-formed dislocated sentences.

The difference between direct and indirect objects with respect to the optionality of occurrence of anaphoric pronouns in relatives can be readily explained if we assume that gěi in (1) and (2) is a preposition that is equivalent to ‘to’ in the dative noun phrases of English. Under this assumption, gěi nèige nánháizi (to that boy) is a prepositional phrase and the fact that indirect objects behave like all ordinary objects of prepositions is thus accounted for.

If we further assume that (4) is derived from (3) by deleting the hypothetical deep structure verb GIVE, gěi nèige nánháizi in (4) is then also a prepositional phrase, and not a verb-object construction, as it has been traditionally viewed in Chinese grammars (see, e.g., Chao, 1968).

(3) wǒ yào GIVE gěi nèige nánháizi yī běn shū.
(4) wǒ yào gěi nèige nánháizi yī běn shū.
   (I want to give that boy a book.)
This parallelism can be accounted for, of course, only if there is some common set of grammatical principles for the derivation of topicalizations, dislocations, and relative clause constructions. Such a set of principles is already available: namely the three rules of Copying, Deletion, and Pronominalization which have been proposed to account for topicalization and dislocation in all languages. In generalizing this theory to accommodate relativization as well, the only adjustment needed is a condition on the Deletion rule to the effect that deletion is obligatory for any constituent of a clause that is included in a noun-phrase. This added restriction expresses the generalization that a relative-clause construction can be well-formed only if every one of its deletable constituents is deleted.

Given the Immediate Dominance Condition and these three general rules of Copying, Deletion, and Pronominalization, we can readily account for the well-formedness of relative clauses in all those languages which observe this condition. In these languages, as in the non-immediate-dominance-languages, an identical subject noun phrase in a relative clause will always be obligatorily deleted, regardless of whether it has undergone copying or not. For example, the underlying structure from which (32b) is derived can be represented as (40).

(40)

This assumption explains why nèige nánháizi in (4) can be dislocated but not topicalized or passivized, and why it requires the obligatory presence of an anaphoric pronoun in relatives.

(5)  (a)  nèige nánháizi wǒ yào gěi tā yì bèn shū.  
(That boy I want to give him a book.)

(b) *nèige nánháizi wǒ yào gěi yì bèn shū.  
(That boy I want to give a book to.)

(6)  (a)  wǒ yào gěi tā yì bèn shū de nèige nánháizi hěn gāo.  
(The boy that I want to give a book to him is very tall.)

(b) *wǒ yào gěi yì bèn shū de nèige nánháizi hěn gāo.  
(The boy that I want to give a book to is very tall.)
If the subject (NP₂) in the relative clause of (40) has not undergone Copying, the head noun-phrase (NP₁) will delete it to yield (32b). Alternatively, if the optional rule of Copying is applied to (40), the result would be (41).

(41)

When Deletion is applied to (41) then, the copied constituent (NP₂) will delete the source constituent (NP₃), and the head noun-phrase will then delete the copied constituent to yield (32b). Since both deletions are allowed by the Immediate Dominance Condition, and since they both apply within clauses in noun-phrases, identical subjects will always be obligatorily deleted in relatives, and pronominal reflexes will thus always be absent.

Where the identical constituent of a relative clause is an object of a verb or preposition, that constituent will never be deletable in an immediate-dominance language because it is not an immediate constituent of the relative clause; it will thus undergo the obligatory rule of Pronominalization. For example, the underlying structure of (35b) can be represented as (42).

(42)

If the identical object (NP₂) does not undergo the optional Copying rule,
it cannot be deleted by the head noun-phrase (NP₁), since it is not immediately dominated by the subordinate clause (S₂). Pronominalization thus will apply to (42) to yield (35b). If (42) undergoes Copying on the other hand, it will be converted into (43).

(43)

In (43), the copied noun-phrase (NP₂) is immediately dominated by the subordinate clause (S₂) and thus has to be deleted by the head noun-phrase (NP₁). But the deletion of the source constituent (NP₃) is prohibited by the Immediate Dominance Condition, and it will thus be obligatorily pronominalized. Thus, we will always have a pronominal rather than null reflex of an identical object of a verb or preposition in the relative clauses of the languages which observe this condition.

The difference between Lebanese and Chinese with respect to objects of verbs – pronominal reflexes being obligatory in Lebanese but superficially optional in Chinese – is explainable, of course, in the same way as the parallel difference in their respective patterns of topicalization and dislocation. Since Chinese has a Passive rule, an underlying non-agentive noun-phrase can occur optionally as a superficial subject of a relative clause, in which case it will be obligatorily deleted like all other subjects. On the other hand, since Lebanese has no Passive rule, underlying non-agentives in the transitive clauses of this language can never occur as superficial subjects, but only as superficial objects. Non-agentive sources will thus never satisfy the Immediate Dominance Condition for deletion in Lebanese, and will hence always occur superficially as pronouns.

It should be noted that the Immediate Dominance Condition is again found to be necessary here for languages like Chinese and Lebanese, since there is no other general principle which can correctly predict the occurrence
of anaphoric pronouns of the heads in the relative clauses of these languages. Thus, for example, (44) and (45).

(44) (a)  
tá lái de shíhou, nǐ bú zài de nèige rén yòu lǎile.  
(came) (time) (you) (not) (in) (again)
(The man that, when he came, you were not in came again.)

(b)  *
lái de shíhou, nǐ bú zài de nèige rén yòu lǎile.

(45) (a)  
tá (de) múqin hěn lǎo de nèige nánháizi láile.  
(mother) (very) (old)
(The boy whose mother is very old came.)

(b)  *
(de) múqin hěn lǎo de nèige nánháizi láile.

show that it is not the case that an identical noun phrase can be deleted whenever it is in the initial position of a relative clause. Similar evidence could be provided to falsify any attempted explanation of relative pronoun occurrence in Chinese on the basis of underlying constituency or case properties, evidence that is precisely parallel to that given previously to demonstrate the necessity of Immediate Dominance for the explanation of coordination reduction in this language. The occurrence of the anaphoric pronoun of the head in relative clauses in the (b) forms of (32)–(37) and (44) and (45) can thus be consistently and generally explained only by means of the Immediate Dominance Condition.

If we assume that relativization in English involves the same general processes as in Chinese and Lebanese, we can also explain why there are no anaphoric pronouns of the head at all in the well-formed relative clauses of English. Thus, since English does not observe the Immediate Dominance Condition, all identical noun-phrases in relative clauses, whether copied constituents or sources, will be deleted obligatorily, subject only to those particular conditions on deletion which do hold for English.14 All other non-immediate-dominance languages appear to be exactly like English in this respect. Thus any language which permits verb and object deletion in sentence coordinations will be a language which also requires the non-occurrence of anaphoric pronominal reflexes of identical objects in its well-formed relative clauses. Conversely, any language which has pronominal reflexes of objects in relatives will be a language which has no well-formed verb or object reductions of sentence coordinations. Although the presence or absence of object pronouns in relatives is a phenomenon that is superficially quite distinct from the phenomenon of verb- and object-reduced coordination, the Immediate Dominance Condition provides a singular explanation for their observed covariance in natural language.

14 We will discuss some of these conditions presently. The ungrammatical sentences in (50)–(52) are examples in which these conditions are violated.
In claiming that relative clause formation involves the same set of rules as dislocation and topicalization, we have assumed that there is free copying and raising in relative clauses as well as in matrix sentences. We have seen thus far from (40)–(43) that this assumption is consistent with all facts about relativization in those cases where the copied constituent is identical to the head noun-phrase of the relative clause. We have also assumed that the necessary and sufficient condition for the well-formedness of relative constructions in all languages is that the head noun-phrase must delete at least one identical noun-phrase in the relative clause which is attributive to it. Given these assumptions, then, the independent general conditions on identity deletion will assure that if a constituent of a relative clause which is not identical to the head has been copied, deletion will be prevented by these conditions and the given structure will thereby be characterized as grammatically ill-formed.

15 To account for the correlation between well-formed thematicizations and relativizations in languages like Japanese and Tagalog, it might ultimately be most appropriate to assume that the well-formedness condition for relativization in all languages is that the derivation of any relativized noun-phrase must include at least one line in which the phrase is analyzable as a structure of the form \( s_2[L_1 s_1[L_1 s_2[X]]] \) with its constituents either unordered or in any of their possible permutations. The reason for our present choice of the deletability condition for relative well-formedness rather than this analyzability condition is that the latter is apparently inconsistent with any principled explanation of the fact that in languages like English the clause-initial occurrence of a relative connective (either THAT or a WH-word) is obligatory when the identical constituent is the subject of the relative clause but optional when it is a non-subject. As will be shown subsequently, this fact can be explained in a very simple way if the deletability condition for relative well-formedness is assumed.

It is important to note, though, that the choice between these two alternative characterizations of relative well-formedness is irrelevant to any of the major points which are discussed in the present paper. Thus it is clear that the Immediate Dominance Condition and the general rules of Copying, Deletion, and Pronominalization are just as necessary in theories which assume the analyzability condition for relative well-formedness as in those which assume the deletability condition. The only real difference between these hypotheses, in fact, is that, given the analyzability condition, it will be the case that every well-formed relative clause is a clause that has undergone the optional rule of Copying, while this will be true of only some of the well-formed relative clauses generated by a theory that assumes the alternative deletability condition. Given either of these conditions, it will always be the case that a copied noun-phrase will obligatorily delete its source constituent if and only if the appropriate universal and language-specific conditions on identity deletion are satisfied, e.g., in languages like Chinese only if the Immediate Dominance Condition is satisfied. Source constituents which are not deletable will similarly undergo obligatory pronounization in theories of either type. In those which assume the analyzability condition, the head of every well-formed relative construction will always delete the copied noun-phrase of the relative clause in every language, since this deletion is consistent with the Immediate Dominance Condition. The substitution of the analyzability condition for the deletability condition would thus require no modifications whatever in any of the general rules and constraints which have been proposed here.
For example, if the result of Copying in a Chinese relative clause is a structure such as (46),

(46)

\[
\begin{array}{c}
S \\
| \\
NP \\
| \\
nǔhăizi \\
| \\
S \\
| \\
NP \\
| \\
nánhăizi \\
| \\
NP \\
| \\
nánhăizi \\
| \\
năle \\
| \\
nǔhăizi \\
\end{array}
\]

in which the copied constituent (nǔhăizi) is not identical to the head (nánhăizi), the head cannot delete the identical noun phrase within the relative clause because the latter is also within a clause that is subordinate to the copied constituent and is thus not immediately dominated by the relative clause and hence, according to the Immediate Dominance Condition, not subject to deletion. Thus according to the condition that the head noun-phrase must delete at least one identical noun-phrase in its relative clause, any structure such as (46) is explicitly characterized as ungrammatical.

So far we have shown that by permitting free copying in relative clauses, we need not assume any independent movement or deletion process for relative clause formation in any language which observes the Immediate Dominance Condition. We want to show now that the assumption of free copying, and the general principles (23) of the theory of subordinate clause reduction for immediate-dominance languages, are also consistent with the facts about relativization in non-immediate-dominance languages like English.

We have seen that there is a parallelism between well-formed dislocated sentences and well-formed relative constructions in languages of the immediate-dominance type, and have shown that this parallelism can be accounted for by means of the Immediate Dominance Condition and the three general principles of Copying, Deletion, and Pronominalization. In English we find precisely the same kind of parallelism, except that it holds here between relatives and copied sentences of the Topicalization-type rather than the Dislocation-type. This is exactly what we would expect, given the fact that Deletion is obligatory in relative clauses, and the fact that English is not an immediate-dominance language.
The parallelism between topicalization and relativization in English can be illustrated by sentences (47)–(52):

(47) (a) the girl hit the boy.
(b) the boy the girl hit.
(c) the boy that the girl hit is my brother.

(48) (a) the boy gave the book to the girl.
(b) the girl the boy gave the book to
(c) the girl that the boy gave the book to is pretty.

(49) (a) it is unfortunate that the boy hit the dog.
(b) the dog it is unfortunate that the boy hit
(c) the dog that it is unfortunate that the boy hit is barking.

(50) (a) it is unfortunate that the boy hit the dog.
(b) *the boy it is unfortunate that hit the dog
(c) *the boy that it is unfortunate that hit the dog is my brother.

(51) (a) that the boy hit the dog is true.
(b) *the dog that the boy hit is true.
(c) *the dog that (that) the boy hit is true is barking.

(52) (a) the boy who hit the dog kicked the girl.
(b) *the dog the boy who hit kicked the girl.
(c) *the dog that the boy who hit kicked the girl is barking.

All these examples show that whenever there is a well-formed topicalized sentence there is a corresponding well-formed relative construction, and vice-versa. This relationship can be explained in exactly the same way as the relationship between dislocation and relativization in Lebanese, namely as the consequence of the application of the same set of Copying, Deletion, and Pronominalization rules, in conjunction with the respective general constraints on deletion of each language.

To treat both topicalization and relativization as products of free copying

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16 It should be observed that corresponding to each of the ungrammatical sentences (50c), (51c), and (52c) there is a marginally acceptable sentence in which the relative clause includes a pronominal rather than a null reflex of the source constituent that is identical to the head:

(50c') ? the boy who it is unfortunate that he hit the dog is my brother.
(51c') ? the dog which that the boy hit it is true is barking.
(52c') ? the dog which the boy who hit it kicked the girl is barking.

The marginal status of these imperfected relativizations could be accounted for in terms of either the deletability or analyzability condition for relative well-formedness, since their surface structures can be derived either with or without the application of Copying, the conditions for relative well-formedness being satisfiable in the former case but not in the latter. We have been unable to determine, however, whether this situation of multiple derivations of differential well-formedness holds generally for other types of semi-grammatical or marginally acceptable sentences.
and deletion, we must assume the translation of all constraints on movement, such as those proposed by Ross (1967b), into constraints on deletion. This translation is not only sufficient for all known linguistic purposes, but also necessary. The translation of any movement constraint into a deletion constraint will clearly be possible for all cases, since one could simply replace any statement of the form "X cannot be moved out of the context Y" by a statement of the form "X cannot be deleted in the context Y", the latter being empirically equivalent to the former, of course, provided only that each specification of derivational movement is analyzed into its constituent elementary transformations of identity adjunction (or copying) and identity deletion. Moreover, since such analysis is always possible, and since the product of any single movement rule will always be derivable as well by means of a pair of separate copying and deletion transformations, any constraint on unanalyzed movement will always be insufficient to exclude the class of structures that it is intended to exclude. The corresponding deletion constraint, on the other hand, will be sufficient in every case, since there is no possible way to achieve the product of a deletion transformation except by deletion. The translation of all movement constraints into deletion constraints is not only sufficient, therefore, but also necessary.

Thus a condition against deletion of subjects of complements will account for the ungrammaticality both of topocalized sentences like (50b) and of their parallel relativizations as in (50c). A condition against deletion of elements of a sentential subject, which is equivalent to Ross's (1967b) Sentential Subject Constraint, will similarly account for the ungrammaticality of sentences such as (51b) and (51c). A condition against deletion by a head noun-phrase of any constituent of a relative clause included in the relative clause attributed to the head, which corresponds to Ross's Complex NP Constraint, will similarly account for the ungrammaticality of topocalized sentences like (52b) and relativizations like (52c). Moreover, it seems possible to collapse these three particular constraints against deletion into one general condition to the effect that a constituent cannot delete any identical constituent that is separated from it by more than one subordinate S node unless it is also separated by the same number of VP nodes with no intervening NP node. This general condition on deletion would thus correctly block identity deletion in (53a), (53b), (53c), and (53d), but not in (53e).

This general condition on deletion will also ensure that free copying in relatives will yield only well-formed relative clauses. For example, assume that Copying applies to the boy in (54a) to yield (54b). Although the higher instance of the boy will delete the lower one, the head noun-phrase the girl cannot delete the lower instance of the girl, since these two phrases are separated by two subordinate S nodes and no VP nodes. Since we require
(53) (a) \[ S \rightarrow NP \rightarrow \text{the boy} \rightarrow S \rightarrow VP \rightarrow \text{know} \rightarrow S \rightarrow NP \rightarrow \text{the boy} \rightarrow VP \rightarrow \text{hit the girl} \]

(53) (b) \[ S \rightarrow NP \rightarrow \text{the boy} \rightarrow S \rightarrow VP \rightarrow \text{is obvious} \rightarrow S \rightarrow NP \rightarrow \text{that the boy likes the girl} \]

(53) (c) \[ S \rightarrow NP \rightarrow \text{the boy} \rightarrow S \rightarrow NP \rightarrow \text{the girl} \rightarrow S \rightarrow NP \rightarrow \text{is pretty} \rightarrow S \rightarrow NP \rightarrow \text{the girl hit the boy} \]
(53) (d)

\[
S \\
\downarrow \ NP_1 \\
the \ boy_i \\
\downarrow \ NP \\
I \\
\downarrow \ V \\
know \\
\downarrow \ NP \\
the \ girl_j \\
\downarrow \ VP \\
\downarrow \ NP \\
the \ girl_j \\
\downarrow \ V \\
\downarrow \ NP \\
the \ girl_j \\
\downarrow \ VP \\
\downarrow \ NP_1 \\
the \ boy_i
\]

(53) (e)

\[
S \\
\downarrow \ NP_1 \\
the \ boy_i \\
\downarrow \ NP \\
I \\
\downarrow \ V \\
know \\
\downarrow \ NP \\
the \ girl_j \\
\downarrow \ V \\
\downarrow \ NP_1 \\
the \ boy_i
\]

(54) (a)

\[
S \\
\downarrow \ NP \\
\downarrow \ NP_1 \\
the \ girl_j \\
\downarrow \ S \\
\downarrow \ VP \\
is \ \text{tall} \\
\downarrow \ NP_1 \\
the \ boy_j \\
\downarrow \ VP \\
\downarrow \ NP_j \\
the \ girl_j \\
\downarrow \ V \\
\downarrow \ NP_j \\
the \ boy_j
\]
(54) (b)

(55) (a)

(55) (b)
that the head noun-phrase must delete at least one identical noun-phrase in
the relative clause to yield a well-formed relative construction, the sentence
derived from (54b), *the girl (that) the boy she hit is tall, will be correctly
marked as ungrammatical.

On the other hand, if Copying applies to the girl in (55a) to yield (55b),
the required deletion conditions will be satisfied and the resulting sentence
will be correctly characterized as well-formed. Thus the higher instance of
the girl will delete the lower one, and then the resulting non-branching S
will be pruned according to the general convention for tree pruning to yield
(55c):

\[(55)\ (c)\]

```
              S
             /\  
            NP   VP
           /\    
           NP  S1
          /\  
         the boy1 NP
         /    
        V    VP
       /\  
      hit   NP
     /\ 
    the girl the boy1
```

In (55c), the head noun-phrase the boy will then delete the identical con-
stituent in the relative clause to yield the well-formed sentence the boy the
girl hit is tall.

We have shown that, by permitting free copying in relatives, if the copied
constituent is not identical to the head noun-phrase, the general conditions
on deletion and the universal condition on relative well-formedness will
always prevent the derivation of ungrammatical sentences. If the freely
copied constituent is identical to the head noun-phrase, on the other hand,
the appropriate conditions will be satisfied and the resulting derivations will
be correctly characterized as well-formed. This demonstrates that there is
no justification for the postulation of any separate rules of Wh-movement
or relative-raising in grammars, all significant characteristics of relative
clause constructions being adequately accounted for solely by means of the
independently motivated general rules of Copying and Deletion in conjunc-
tion with the universal deletability condition for relative-clause well-formed-
ness and the appropriate independent constraints on all identity deletions.

We have seen thus far that by analyzing relative clause formation into
the general processes of Copying, Deletion, and Pronominalization, we can
account for the parallelism between well-formed simple dislocated sentences
and well-formed relative constructions in those languages which observe the Immediate Dominance Condition, and also account for the parallelism between well-formed simple topicalized sentences and well-formed relativizations in those languages which do not observe this condition. We would like to show finally that the proposed theory of relative clause formation is also consistent with the facts about the occurrence of inflected relative pronouns, or Wh-words, in languages like English, and that it provides a basis for the explanation of a significant additional difference in this respect between such languages and those which observe the Immediate Dominance Condition.

We will assume that in addition to the universal principles of Copying, Deletion, and Pronominalization, the theory of relativization in English also includes two additional principles: a That-Insertion rule (56A), and a WH-attachment rule (56B).17

(56) (a) \textbf{That-Insertion} (optional)
\[
\text{NP}[\text{NP } S] \rightarrow \text{NP}[\text{NP that } S].
\]
\[
\text{where } S \neq s_{\text{NP}}[X \text{ Prep } Y] Z
\]

(b) \textbf{WH-Attachment} (obligatory)
\[
\text{NP}[\text{NP}_1 s_{\text{NP}}[X \text{ NP}_1 Y] Z] \rightarrow
\]
\[
\text{NP}[\text{NP}_1 s_{\text{NP}}[X_{\text{NP}}[\frac{\text{WH}}{\text{NP}_1} \text{ NP}_1] Y] Z].
\]

We will also assume that WH-Attachment applies before Deletion, since if it did not, its structural description could never be satisfied by any possible sentence. It should be noted that since the WH-Attachment rule incorporates the element WH in one of the NP’s which it yields, that NP can never satisfy the identity condition for deletion, and will be ultimately mapped

17 These two rules are only tentatively formulated here. The condition on the That-Insertion rule is intended to prevent \textit{that} from being inserted when a relative clause begins with a prepositional phrase. Thus, ungrammatical sentences like (1) will be excluded by this condition.

(1) *the book that the cover of is green is expensive.

Since we have ordered WH-Attachment after That-Insertion, the initial noun-phrase of a relative clause, or a noun-phrase within the initial noun-phrase will always undergo WH-Attachment, since it can never undergo That-Insertion. Thus, we get (2) or (3) instead of (1):

(2) the book the cover of which is green is expensive.

(3) the book of which the cover is green is expensive.

It will be seen shortly that we can in fact assume that WH-Attachment is a universal rather than language-restricted rule, and that the fact that languages like Chinese do not have WH-words is due simply to the Immediate Dominance Condition. As for That-Insertion, this might also be interpreted as a universal Relative-Marker-Insertion rule, although it may be governed by rather different conditions in different languages.
into the appropriate member of the phonological set *who, whom, which*, etc.

After the optional application of Copying and That-Insertion and the obligatory application of WH-Attachment, a relative construction with an identical subject will have one of the four possible structures illustrated in (57)\(^{18}\):

(57) (a)  
```
NP       S
  NP     S
    that
  the boy

NP       VP
  NP
    hit the girl
  the boy
```

(57) (b)  
```
NP       S
  NP     S
    that
  the boy

NP       S
  NP     S
    the boy
  NP
    hit the girl
  the boy
```

\(^{18}\) If unrestricted reapplications of Copying are permitted, there will actually be an infinite number of structures like (57b) and 57d of the form

```
NP
  NP
    S
  NP
    S
  NP
    S
  NP
    S
```

However, since Deletion is obligatory, all structures which undergo multiple copying will be reduced to exactly the same surface structure, which will be identical to that which is derived by only one application of Copying. There is thus no reason to impose any restrictions on the reapplication of this rule.
(57c) is the result of applying That-Insertion; (57b) is the result of applying both Copying and That-Insertion; (57c) is the result of applying WH-Attachment; and (57d) is the result of applying both Copying and WH-Attachment. These four structures all satisfy the structural description of the universal Deletion transformation, which will apply to them cyclically from more deeply embedded clauses to less deeply embedded ones. Since Deletion is obligatory within clauses included in a noun phrase, both (57a) and (57b) will yield the same product, (58a), and both (57c) and (57d) will yield (58b). The ungrammatical reduction (58c) will, of course, be underrivable from any of these structures.

(58) (a) the boy that hit the girl.
    (b) the boy who hit the girl.
    (c) *the boy hit the girl.

In the case of a relative construction with an identical object, there will also be four possible structures to which Deletion will apply. They are illustrated in (59).

(59a) is the result of applying That-Insertion; (59b) is the result of applying Copying and That-Insertion; (59c) is the result of applying no optional rules at all; and (59d) is the result of applying both Copying and WH-Attachment.
IMMEDIATE DOMINANCE AND IDENTITY DELETION

(59) (a)

```
NP
   NP    S
      that  NP
        S    VP
           the girl    NP
               V    hit    the boy
```

(59) (b)

```
NP
   NP    S
      that  S
        the boy    S
            the boy    NP
                V    VP
                   hit    the boy
```

(59) (c)

```
NP
   S
      the boy    NP
          S    VP
             the girl    V
                hit    the boy
```

(59) (d)

```
NP
   S
      the boy
          NP    S
             NP    NP    VP
                the boy    the boy    the girl
                   V    hit    the boy
```
Deletion will apply to (59a) and (59b) to yield (60a), to (59d) to yield (60b), and to (59c) to yield (60c).

(60) (a) the boy that the girl hit.
(b) the boy whom the girl hit.
(c) the boy the girl hit.

If we compare the relative structures with identical subjects (57) to those with identical objects (59), we find that if That-Insertion has not applied, an identical object can undergo WH-Attachment only if it has been copied and raised, while WH-Attachment will apply to an identical subject whether it is raised or not, since in either case the subject will immediately follow the head noun-phrase and thus satisfy the structural description of the obligatory WH-Attachment rule. The theory of relativization proposed here thus explains why in English a relative clause with identical subject must always begin with either that or a WH-word, while a clause with identical object may begin not only with that or a WH-word, but also with no connective marker at all. This theory similarly explains why, for relative clauses in which the identical constituent is an object of a preposition, the clause may also contain either THAT, a WH-word, or no connective marker at all if, as in (61), no phrase including the preposition has been copied; while if such a phrase has been copied, as in (62), the clause must always include a WH-word.

(61) (a) the man that I was standing near.
(b) the man who(m) I was standing near.
(c) the man I was standing near.

(62) (a) *the man \{near that\} I was standing.
(b) the man near whom I was standing.
(c) *the man near I was standing.

Thus the relative clauses of (61a-b-c), in which either the man or nothing has been copied, are derived in precisely the same manner as the corresponding verbal-object clauses of (60a-b-c). In (62), on the other hand, where Copying has applied to the entire prepositional phrase near the man, That-Insertion is incapable of applying (accounting for the ungrammaticality of (62a)), and the conditions for the obligatory rule of WH-Attachment will always be satisfied (accounting for the grammaticality of (62b) and the contrasting ungrammaticality of (62c), which could be derived only by failing to apply this applicable obligatory rule).

Since our rule of WH-Attachment is formulated in such a way that the identical noun-phrase of the relative clause comes to be adjoined to a sister
which is identical to it except for the additional feature WH, where both sisters are dominated by NP, none of the noun phrases resulting from the application of WH-Attachment will ever be both identical to the head noun-phrase and immediately dominated by the relative clause. Given the condition that no relative clause can be well-formed unless its head NP can delete at least one identical NP in the clause, it would follow that any language which observes the Immediate Dominance Condition could never have a well-formed relative clause that includes a WH-word. Our theory thus predicts that there are no natural languages which have both WH-words and the Immediate Dominance Condition. All available evidence thus far indicates that this prediction is correct.

The proposed theory similarly predicts that there is no language which has both WH-words\(^{19}\) and pronominal reflexes of the identical noun-phrase in relative clauses. In other words, it claims that sentences like (63)

\[
(63) \quad \text{*the boy whom the girl hit him is my brother.}
\]

are ungrammatical in all possible languages. This prediction too is consistent with all language data known to us.

4. CONCLUSION

By assuming the existence of a non-universal Immediate Dominance Condition on identity deletion, it has been possible to provide a systematic general explanation of a number of superficially disparate facts about natural languages. These include facts about the occurrence and co-occurrence of various types of coordinations, topicalizations, dislocations, and relative clause constructions in languages, and about the observed limits on typological variation within this broad spectrum of grammar. Thus, by assuming that this condition holds for languages like Chinese but not for those like English, it has been possible to account for a wide range of facts about both groups of languages by means of a single theory whose other fundamental principles are all universal rules of grammar.

It will have been observed that the notion of immediate dominance has been extended in several different ways during the course of the preceding investigations. Thus, the deletability requirement of immediate dominance has been generalized from the initial case of immediate dominance by a conjunct of a sentential coordination first to the case of immediate dominance by any conjunct of any coordination, then to the case of immediate dominance.

\(^{19}\) By 'WH-words' we mean relative pronouns inflected not only for case but also for at least one of the characteristically pronominal distinctions of gender, number, person, animateness, or humanness.
dominance by the subordinate $S$ of a construction of the form $_S[\text{NP}_S[X]]$ or its mirror-image, and finally to the case of immediate dominance by the subordinate $S$ of a relative construction of the form $_{NP}[\text{NP}_S[X]]$ or its mirror-image. The permissible deletability configurations that have been subsumed under the Immediate Dominance Condition are thus represented by the following four generalized mirror-image tree structures, with identities indicated by identical subscripts and with the properly deletable constituents encircled:

\[(64)\]

\begin{center}
(a) \quad \raisebox{-0.5em}{
\begin{tikzpicture}
  \node (S) {S};
  \node (NP) at (S.south) [below] {NP} edge from parent node [left] {NP};
  \node (A) at (S.south) [below] {A} edge from parent node [left] {A};
  \node (C) at (S.south) [below] {C} edge from parent node [left] {C};
\end{tikzpicture}
}\quad \quad (b) \quad \raisebox{-0.5em}{
\begin{tikzpicture}
  \node (S) {S};
  \node (NP) at (S.south) [below] {NP} edge from parent node [left] {NP};
  \node (A) at (S.south) [below] {A} edge from parent node [left] {A};
  \node (C) at (S.south) [below] {C} edge from parent node [left] {C};
\end{tikzpicture}
}
\end{center}

\begin{center}
(c) \quad \raisebox{-0.5em}{
\begin{tikzpicture}
  \node (S) {S};
  \node (NP) at (S.south) [below] {NP} edge from parent node [left] {NP};
  \node (A) at (S.south) [below] {A} edge from parent node [left] {A};
  \node (C) at (S.south) [below] {C} edge from parent node [left] {C};
\end{tikzpicture}
}\quad \quad (d) \quad \raisebox{-0.5em}{
\begin{tikzpicture}
  \node (S) {S};
  \node (NP) at (S.south) [below] {NP} edge from parent node [left] {NP};
  \node (A) at (S.south) [below] {A} edge from parent node [left] {A};
  \node (C) at (S.south) [below] {C} edge from parent node [left] {C};
\end{tikzpicture}
}
\end{center}

Now it can be readily seen that each of these structures shares certain properties and relations with each of the others. Thus, since (64a) is obviously only a special case of (64b), the former configuration can be eliminated in favor of the latter. It is also clear that (64c) and (64d) are both special cases of the more general structure (65).

\[(65)\]

\begin{center}
\begin{tikzpicture}
  \node (A) at (0,0) {A};
  \node (NP) at (A.south) [below] {NP} edge from parent node [left] {NP};
  \node (S) at (NP.south) [below] {S} edge from parent node [left] {S};
\end{tikzpicture}
\end{center}

It will be observed that in (64b) and (65), the properly deletable constituent is an immediate constituent of a conjunct or of a subordinate clause. Thus, it is possible to reduce all of these special cases to a single generalization to the effect that a properly deletable constituent is always an immediate constituent of a construction which is an immediate constituent of a construction which immediately includes either its identical deleting constituent or a construction which immediately includes its deleting constituent. By claiming the existence and non-universal distribution of the Immediate Dominance Condition we are thus claiming that this single generalization
can be inferred from some but not all bodies of linguistic data in conjunction with the universal principles of human language acquisition.

We have dealt here with only certain aspects of some of the more basic derivational processes involving identity deletion. However, since the Immediate Dominance Condition is assumed to be independent of any of the peculiarities of particular rules or constructions, the empirical consequences of its observance or non-observance could be expected to extend into other areas of grammar as well, where additional systematic differences between immediate-dominance and non-immediate-dominance languages should be found. This expectation has been borne out thus far by evidence from preliminary investigations of certain other types of constructions involving identity deletion, such as comparatives and coordinations with *respectively*. Further research is required, however, to fully determine the validity of the Immediate Dominance Condition with respect to these and other types of constructions involving identity deletion.

Further research is also required, of course, to determine the full range of implications of the general theories of coordination, topialization, and relativization that have been suggested here, and to test the predictions of these theories against additional facts about additional languages. To the extent that these predictions continue to be consistent with the available data, all of the principles of these theories will continue to stand as well-confirmed explanatory principles of grammar. Thus, pending evidence to the contrary, it is appropriate to maintain not only the Immediate Dominance Condition, but also the universal principles of Copying, Identity Deletion,

---

20 Thus, for example, *respectively*-coordinations have been found to occur thus far only in languages which do not observe the Immediate Dominance Condition. The non-existence of *respectively*-coordinations such as

(1) John and Bill hit the boy and the girl, respectively.

in immediate-dominance languages such as Chinese can be readily explained if it is assumed that such constructions are derived by optional regrouping and *respectively*-introduction from structures underlying such paraphrases as

(2) John hit the boy, and Bill the girl.

since the latter structures are derivable only by violating the Immediate Dominance Condition. This obviously does not suffice, however, to account for the non-occurrence in immediate-dominance languages of *respectively*-constructions like (3a), whose presumed derivational sources are unreduced sentence coordinations like (3b) which are available to all languages independently of their respective conditions on deletion:

(3) (a) John and Bill hit the boy and kicked the girl, respectively.

(b) John hit the boy, and Bill kicked the girl.

Further research is required, therefore, to determine the precise nature of the relationship between deletion and regrouping, both in languages like Chinese, where regrouping appears to be dependent upon deletion, and in languages like English, where the two processes appear to be independent with respect to coordination. (See Tai (1969) for further discussion.)
and Pronominalization, and the proposed system of derivational relations between these universal principles and the proposed non-universal principle of Immediate Dominance.

The demonstrated explanatory value of these principles also provides support for a number of more tentative but much more general claims about the nature of grammar. Thus, the facts considered here provide support for the hypothesis that languages differ in syntax chiefly as a result of differences in rule-independent derivational constraints and not as a result of the presence or absence of particular rules, the basic non-lexical syntactic processes of natural language being largely if not wholly universal. Similar support is provided for the hypothesis that most if not all derivational changes in constituent structure are the result of a conjunction of the independent processes of identity adjunction, or copying, and identity deletion, and that most if not all restrictions on constituent-structure alternation are the result of general constraints on the latter process and not on the former. Regardless of their ultimate truth or falsity, these and other hypotheses suggested by the principle of Immediate Dominance clearly serve to open up a number of interesting new areas of productive research in linguistics. By contributing to the generation of such hypotheses, the notion of Immediate Dominance can thus serve as a useful stimulus for significant research in an area far wider than its own original domain of explanation.

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