## Contents

**Leonard Babby**
The Syntax of Surface Case Marking  
1

**Suzanne Flynn and Barbara Lust**
Acquisition of Relative Clauses: Developmental Changes in their Heads  
33

**Gerald Greenberg**
Nicte and Nicego are both 'Nothing' Subjects  
46

**Wayne Harbert**
In Defense of Tense  
66

**Julia Herschensohn**
Genericness and Intensionality  
93

**Susan Hertz**
Linguistic Rules for Speech Synthesis  
103

**Robert Howell**
On the Syntax of Passives in German  
121

**Cornelius Kubler**
Language Contact in Taiwan  
138

**Rose Maclaran**
On Two Asymmetrical Uses of the Demonstrative Determiners  
153

**Margaret See Gebauer**
Modifiers in Cooperation - Negation, Aspect, Focus and Modality in Chinese  
175

**Elizabeth Ungar**
Generative Phonology versus Akkadian  
196
Copyright, 1980, by the Department of Modern Languages and Linguistics, Cornell University, Ithaca, New York 14853

All rights reserved
THE SYNTAX OF SURFACE CASE MARKING

Leonard H. Babby
Cornell University

"The more outré and grotesque an incident is the more carefully it deserves to be examined, and the very point which appears to complicate a case is, when duly considered and scientifically handled, the one which is most likely to elucidate it." — Sherlock Holmes

Part I

1.0 **Introduction.** Discussions of surface Case usually deal with either the morphological aspects of Case (e.g. the principles determining the distribution of allomorphs) or with its semantic aspects (see Jakobson 1971). But the syntactic aspects of Case have been by and large neglected in the transformational literature. This article is accordingly devoted to the syntax of surface Case, more specifically, to the syntactic constraints on the rules that assign and distribute Case. One of our primary goals is to explain the familiar observation that the direct Cases (i.e. nominative (NOM) and accusative (ACC)) are syntactically different from the oblique ones (i.e. dative (DAT), genitive (GEN), locative (LOC), and instrumental (INST)).

2.0 **The Direct Case Condition.** An indefinite NP in the scope of sentence negation in Russian can be marked with the GEN if and only if it would be in a direct (nonoblique) Case if the sentence were not negated. This means that only subject and direct object NP are normally genitivized under negation (see Babby 1980):

(1) a. Koška est vetčinu.
    cat eats ham
    NOM      ACC
    'The cat eats ham.'
(2) a. V našem lesu rastut griby.
in our forest grow mushrooms.
               3rd pl NOM pl
'There are mushrooms growing in our forest.'

(b) V našem lesu ne rastet gribov.
in our forest NEG grow mushrooms
               3rd sg GEN pl
'There are no mushrooms growing in our forest.'

(3) a. Oni podražajut našim metodam.
they copy our methods
               NOM DAT DAT
'They copy our methods.'

(b) Oni ne podražajut našim metodam.
they NEG copy our methods
               NOM DAT DAT
'They don't copy our methods.'

(c) *Oni ne podražajut naših metodov.
               GEN GEN

The verb podražajut 'copy' in (3) governs an object NP in the DAT
Case and, therefore, this NP cannot be genitivized when the
sentence is negated (see (3c)).

This constraint on the surface distribution of GEN marking
in the scope of negation can be referred to as the Direct Case
Condition. Since many other syntactic processes are also con-
fined to just those NPs that are normally assigned the NOM or
ACC Case, an explicit account of the syntax of Case must con-
tain a principled explanation for the Direct Case Condition.

2.1 There are at least two different ways to interpret the
Direct Case Condition. According to the first (Hypothesis I),
only a NP marked NOM or ACC can be marked GEN when it is in the
scope of sentence negation. This means that the rule of GEN
marking must change or replace a direct Case with the GEN Case.
Hypothesis I appears to reflect the facts most directly and, as
far as I can tell, it has been assumed in all earlier work
on the GEN of negation. But observe that if genitivization replaces NOM and ACC Case marking with GEN, then Hypothesis I does not provide a principled account for why oblique Cases cannot be replaced by the GEN as well.

According to the second hypothesis, only a NP that has no Case marking on it (i.e. a caseless NP) can be marked GEN in the scope of negation (subjects and direct objects are underlyingly caseless). If a caseless NP is not marked with the GEN or some other oblique Case in the course of a syntactic derivation, it is subsequently marked with the appropriate direct Case. Thus, according to Hypothesis II, a NP is marked either with the GEN (in a negated sentence) or a direct Case (in an affirmative sentence); there is no Case changing or replacement involved at all.

Hypothesis II makes a more interesting claim than Hypothesis I (which is the equivalent of a superficial descriptive statement) and this article is devoted to exploring its consequences for a theory of Case marking. It should be immediately obvious that Hypothesis II has one important advantage over Hypothesis I, namely, it provides a principled syntactic explanation for the constraints on GEN marking in negated sentences and for the Direct Case Condition in general: If a NP is already marked with an oblique Case, it cannot receive additional Case marking. Since the NPs that emerge from the syntactic derivation of an affirmative sentence as NOM and ACC are caseless when the rule of GEN marking applies in negated sentences, there is nothing to prevent these NPs from being marked GEN if they meet the conditions (i.e., are indefinite, in the scope of negation, etc.). In other words, Hypothesis II claims that the subject and direct object in (2b) and (1b) can be marked GEN because they are caseless when the rule of GEN marking applies. But the object NP in (3b) is not genitivized because it is already marked DAT when the GEN marking rule operates (recall that podražajt 'copy' governs the DAT).

I will demonstrate below that Hypothesis II predicts other surface Case marking patterns, some of which appear at first glance to be anomalous or idiosyncratic. But before considering this independent supporting evidence, it is necessary to look at Hypothesis II in more detail.

2.2 There are two types of NPs in the underlying representation of Russian sentences. First, NPs that are marked with oblique Cases; they can be referred to as governed NPs since their Case marking is completely determined by a governing word (i.e. prepositions, verbs, adjectives, nouns, and certain quantifiers).
The other type of NP is caseless; it can be referred to as un-
governed since its Case marking is not determined by a governing
lexical category. If a caseless NP is not transformationally
marked with an oblique Case in the course of a syntactic deri-
vation (e.g. by a rule like GEN marking in negated sentences), it
is marked with either the NOM or ACC depending on its syntactic
constituency or configuration. In Russian, a caseless NP is
normally marked ACC if it is a constituent of the VP (e.g. direct
objects and NP adverbials of time (see note 2)); caseless NPs
that are not VP constituents are marked NOM (e.g. subjects and
topics). Note then that surface oblique Case marking can be
acquired by a NP in one of two ways: it can either be governed
by a lexical category (e.g. DAT in (3)) or it can be transforma-
tionally marked on a caseless NP by a specific syntactic rule like
GEN marking.

Given the above account of the difference between direct
(structural) Cases and oblique Cases, it is not difficult to
understand why traditional grammar often characterizes NOM and
ACC as the 'grammatical' or 'syntactic' Cases — they are deter-
mined by strictly syntactic criteria.

3.0 Case in Russian: preliminaries. This section contains
some general observations about surface Case. Its purpose is
to set the stage for a more detailed discussion of Hypothesis II.

3.1 Case is first and foremost the property of noun phrases; nouns
are always marked for Case in Russian because they are always NP
constituents. Case marks a NP's 'external' relation to the rest
of the sentence.

The Case marking on a NP node (which is acquired either by
government or transformation) is distributed down onto the NP's
markable constituents (noun, adjective, determiner, quantifier,
and participle) by means of a transformation which Ross (1967:80-
87) calls Case Marking and which more recently has been referred
to as Case Distribution (Bably 1980) and Case Percolation (Chomsky).
Below I will use the term Case Marking (and Case Assignment)
to refer to the various transformations that mark an NP node with
a particular direct or oblique Case, and the term Case Percolation
to refer to the transformation that distributes the Case marking
of a NP node down onto its constituents. Note that Case Percolation
cannot copy a NP node's Case down into a tensed sentence embedded in the NP.

3.2 NP-Internal and NP-external Case relations. The Case mark-
ing on a NP node in Russian does not necessarily coincide with
the head noun's Case, e.g.:
(4) a. Prišlo [pjat' devušek]_NP
    arrived five girls _NP nom
    NOM GEN
    'Five girls arrived.'

b. *Prišlo [pjat' devuški]_NP
    NOM NOM nom

Devušek in (4a) is marked GEN in the scope of the quantifier pjat' 'five'. But this is an internal Case marking process, i.e., it does not affect the NOM Case on the NP node itself and, therefore, its external relation to the rest of the sentence (its subjecehood remains intact).

This brings us to a rather curious fact about modern Russian. It is possible for the Case of the NP node to differ from the Case of its head only when the NP is itself marked with a direct Case; if the NP is oblique, then all its markable constituents, including both the quantifier and head noun, must also carry this oblique Case, e.g.:

(5) a. On prišel [s [pjat'ju devuškami]_NP inst ]PP
    he came with five girls _NP inst
    INST INST
    'He came with five girls.'

b. *On prišel [s [pjat'ju devušek]_NP inst ]PP
    INST GEN inst

c. On podražaet pjati raznym xudožnikam. (cf. (3))
    he immitates five different artists
    DAT DAT DAT
    'He immitates five different artists.'

It is often observed that NPs containing quantifiers like pjat' involve government when they are in a direct Case (pjat' is said to govern the GEN in (4a)) and involve agreement when they are in an oblique Case (pjat'ju INST is said to agree with devuškami INST in Case in (5a)). I will argue below that this curious government/agreement surface Case pattern provides important independent evidence that Hypothesis II is correct. But before doing this it is necessary to look at Case marking on adjectives.

4.0 Adjectives and Case marking. Nouns in Russian are always marked for Case, whereas verbs, as a rule, are not. A unique property of adjectives, one that sets them off from both nouns
and verbs, is this: adjectives occur freely either with or without Case marking. This is a direct reflection of the fact that adjectives occur freely both in NPs (attributive function), where they are marked for Case, and outside the domination of NPs (predicate function), where they are not marked for Case (i.e. \([V \ AP]_{\bar{VP}}\)). This crucial difference, which is obscured in the morphology of most languages, has a clear morphological realization in Russian: adjectives that are dominated by NP have one set of endings (long forms (LF)) and adjectives that are not NP constituents (i.e. predicate adjectives) have a different set of endings (short forms (SF)); the LF declension expresses Case, while the SF declension does not (see Babby 1973, 1975). Since the two sets of endings are in complementary distribution with respect to NP constituency and Case, we can think of them as 'allodeclensions'.

While Case is a property shared by adjectives and nouns, government is a property shared by adjectives and verbs, i.e., adjectives in Russian have as wide a range of complements as do verbs (subordinate clauses, infinitive phrases, prepositional phrases, and obliquely marked NPs (see (6) below)).

4.1 Let us consider the derivation of a sentence like (6); нужна is a SF adjective that governs the DAT Case. (7) is the structure underlying (6) (the noun and adjective are uninflected stems and the present tense of быть 'be' is represented as Ø since it is not phonetically realized in the present tense).

(6) Kniga нужна студентам.
    book necessary students
    NOM f. sg. f. sg. DAT pl.
    'The-students need the-book.'

(7) \[ S \]
    \[ NP_1 \]
      \[ V \]
        \[ Ø \]
          \[ knig- \]
            \[ f. sg. \]
    \[ AP \]
      \[ A \]
        \[ nuzn- \]
          \[ student- \]
            \[ pl. \]
    \[ NP_2 \]
      \[ DAT \]
The rules that apply in the derivation of (6) from (7) are the following:

**NP₂-cycle:** Case Percolation, which copies the DAT marking from NP₂ onto student-, giving studentam (NP₂ is a governed NP and is therefore Case marked in the underlying representation (see sec. 2.2)).

**S-cycle:** Subject-verb Agreement, which copies the features of feminine and singular from the subject noun onto nužn-.

Case-marking, which marks NP₁, the subject, with the NOM Case since it is a caseless NP not dominated by VP.

Case Percolation, which copies NOM marking from NP₁ onto kniga-. Note that Case Percolation must apply as soon as the NP receives its Case marking, no matter what the source.

Kniga- is realized in the surface structure as kniga (NOM f. sg.) and nužn- is realized as the SF nužna (f. sg.); the adjective stem nužn- is realized as a SF because it is not a constituent of a NP at any point in the derivation and, therefore, never acquired Case marking.

Now let us embed the sentence represented in (7) as a relative clause in the direct object NP of the structure in (9); it has two possible surface realizations, namely:

(8) a. Ja našel [knigu, [kotoraja nužna studentam] S NP acc
    ACC NOM SF DAT
    'I found the book which is necessary to the students.'

    ACC LF ACC DAT
    'I found the book (which is) necessary to the students.'
The following rules apply in the derivation of (8a) from (9):

**Embedded S:** same as derivation of (6) from (7)

**Matrix S:** VP-cycle: \( NP_2 \) is marked ACC since it is a caseless NP dominated by VP. Case Percolation then copies the ACC marking down onto \([\text{knig-}]_3\); the Case marking on \( NP_2 \) cannot be \( NP_3 \) copied into the embedded S.

The other rules that apply on the matrix cycle are: Relative Clause Formation, Subject-verb Agreement, and Case Marking and Percolation (\( NP_1 \) is marked NOM). These rules produce sentence (8a); \( \text{nuzn-} \) is realized as the SF \( \text{nuzna} \) because it never comes under the direct domination of a NP node and, therefore, is never marked for Case.

Sentence (8b) is derived from (9) in the following way: \( NP_4 \), the subject of the relative clause, and \([\emptyset]_7 \) are deleted by Relative Clause Reduction; the embedded S-node, which no longer branches after Relative Clause Reduction, automatically deletes (see Ross 1967; Babby 1975): the result is the intermediate structure in (10).
Now $NP_2$ is marked ACC just as it was in the derivation of (8a), but in this derivation Case Percolation copies the ACC marking not only onto [knig-], but onto nužn- as well. This can happen in the derivation of $NP_3$ (8b) because the relative clause has been reduced and the adjective becomes a constituent of $NP_2$ (i.e., there is no longer an S-node to block Case Percolation from $NP_3$). Thus nužn- in (9) is realized as the LF nužnuju ACC f. sg. in (8b) because it is introduced into the direct domination of $NP_2$ as a result of Relative Clause Reduction, and then Case marked (see Babby 1973, 1975 for details). The surface structure of (8b) is represented in (11) (I presume that the VP node should also be pruned); compare the LF nužnuju in (11) with the SF nužna in (7). 10

4.2 Case and inertness. The derivation of the sentence pair in (8) from the structure in (9) illustrates that adjectives in Russian are underlying caseless uninflected stems whose surface
Case marking (or lack of it) is determined 'configurationally', i.e. in terms of NP constituency. But the derivation of (8b) illustrates another important fact about Case marking in Russian: when nužn- was marked ACC in (10) by means of Case Percolation, its complement student(äm) which was marked DAT on an earlier cycle, was unaffected, i.e., it was not changed to ACC (cf. *Ja našel knigu, nužnuju studentov (ACC=GEN)). This is exactly what we would expect, given the fact that SF are caseless. When Case Percolation copied the ACC Case marking from NP₂ onto its constituents, nužn- had not been previously Case marked, but student(äm) had already been marked DAT on the NP₅ cycle (NP₅ in (9) is governed by nužn- and is therefore Case-marked in the underlying representation). Thus studentäm DAT was not marked ACC when nužn- was because it already had its Case marking at that moment and was therefore impervious to subsequent Case marking and percolation operations. In other words, nouns and adjectives may be said to have a Case 'valence of one'; once Case marked, they become inert with respect to any Case marking operations on higher cycles. Thus when nužnuju in (8b) is marked ACC it is caseless; studentäm is unaffected since it was already marked DAT and was therefore inert. The sequence of Case marking and percolation involved in the derivation of (8b) can be schematically represented in (12) ((a), (b), and (c) are three successive stages):

\[ (12) \]

\[ a. \quad NP \rightarrow b. \quad NP_{\text{acc}} \rightarrow c. \quad NP_{\text{acc}} \]

\[ \begin{array}{c}
A \\
\downarrow \text{AP} \\
\downarrow \text{NP}_{\text{DAT}} \\
\end{array} \quad \begin{array}{c}
A \\
\downarrow \text{AP} \\
\downarrow \text{NP}_{\text{acc}} \\
\end{array} \quad \begin{array}{c}
A \\
\downarrow \text{AP} \\
\downarrow \text{NP}_{\text{acc}} \\
\end{array} \]

4.3 The principle of Case 'inertness' accounts not only for the surface Case pattern in sentences like (8b) -- it also predicts the distribution of the GEN Case in negated sentences like those in (1) to (3) (see sec. 2.0): The DAT NP in (3) (which is governed by the verb) is not marked GEN even though it is in the scope of sentence negation because it is already Case marked (i.e. inert) when the GEN marking rule operates on the VP-cycle. But underlying caseless NPs that have not been Case marked on an earlier cycle can be genitivized in the scope of negation (see (1) and (2)); these caseless NPs would be marked with the appropriate direct Case if the sentence were not negated.
The Case marking pattern in sentences like (8b) represents a problem only in those analyses in which it is claimed that the SP nužna is a NOM Case form rather than a caseless form of the adjective (see Ross 1967). If nužna is NOM, then there is no principled way to explain why Case Percolation changes the NOM marking on nužna to ACC nužnuju, but does not change the DAT marking on studentam to ACC as well. Notice that this is precisely the same problem we encountered earlier in our discussion of the traditional treatment of GEN marking in the scope of negation: if the subject and direct object NP are underlyingly NOM and ACC (rather than caseless, as I am claiming), then we have no principled way to explain why the NOM and ACC marking on NPs in the scope of negation is changed to GEN, but oblique Case marking is not.

We can conclude this discussion with the following general observation: NPs and their constituents (e.g. adjectives and nouns) can be Case marked on a given cycle if and only if they were not Case marked on an earlier cycle. I have found no evidence in Russian that rules of Case marking and percolation can change Case marking.

4.4 If these observations are correct, then they go a long way in explaining the fact that it is precisely the subject and direct object NP that normally take part in syntactic processes that involve a change in grammatical relations, e.g. Passivization. Transformations that do not change grammatical relations are not normally confined to subjects and direct objects, e.g. Relative Clause Formation, which, in Russian, moves a NP leftward but does not change its Case marking. Since the subject and direct object are, according to Hypothesis II, the only two NPs that are invariably caseless, it is only these two NPs that allow different surface Case marking, i.e. either oblique or configurationally defined direct Case. I am of course assuming that Case in Case languages is the primary syntactic device for expressing grammatical relations and, therefore, that a change in grammatical relations in a language like Russian involves a different Case marking on the NP (and not moving it to a new position) (see Babby 1978a). For example, Passivization is a rule that involves a change in the sentence's grammatical relations and, as we might expect, its domain is confined to the underlying subject and direct object in Russian: the NOM subject in the active sentence is INST in the passive, and the ACC active direct object is the passive sentence's NOM subject. We do not change NOM Case marking on the subject to INST when we passivize in Russian; rather, we mark the underlying caseless subject NP INST rather than NOM (and the underlying direct object NP NOM rather than ACC; no Case is changed and no NPs are moved).
Obliquely governed NPs are 'fixed' throughout a given syntactic derivation, i.e., their Case marking cannot be changed and, therefore, their grammatical relations remain unaffected by the operation of transformational Case marking and percolation rules. This ultimately explains why the inventory of surface syntactic structures in Russian is so different from the inventory in a language like English, where grammatical relations are defined by a NP's position in a phrase marker (see Chomsky 1965: chap. II) and a change in grammatical relations therefore involves moving a NP to a new position in the phrase marker. A NP in English can even be moved out of a PP, a governed position in Russian (e.g.: the man (who(m)) he was talking to/with). For example, it is predictable that Russian cannot have a passive construction corresponding to the English Ivan was given a book (*Ivan byl dan knigu). This is because Ivan is the underlying indirect object and, therefore, is marked DAT in the structure underlying the active Russian sentence; making the indirect object the subject under Passivization would involve changing the underlying DAT Case marking on the indirect object to NOM (not moving the NP to a new position as in English). But as I have argued above, rules cannot change Case in Russian. Thus the absence of indirect object passives in Russian is an automatic consequence of the principle of inertness.

Russian syntax does not have a rule of Tough Movement (Direct Object Raising), which produces sentences like Ivan is hard to fool, where Ivan is the underlying direct object of the infinitive to fool, but the surface subject of the predicate adjective hard. This sentence is impossible in Russian (cf. (13a)); (13b) is its grammatical equivalent.

(13) a. *Ivan truden provesti. 
   Ivan hard/difficult to fool 
   NOM m. sg. SF m. sg.

     b. Ivana trudno provesti. 
      Ivan hard to fool 
      ACC m. sg. SF n. sg. 
     'Ivan is hard to fool/ It is hard to fool Ivan.'

Russian cannot have a syntactic structure like (13a) for the following reason: Ivan is marked ACC as the direct object of provesti 'to fool' on the embedded VP-cycle and, according to our principle of inertness, this ACC marking cannot be changed on higher cycles. In other words, (13a) is ungrammatical in Russian because its derivation would involve changing the Case marking on Ivan from ACC to NOM; this is a violation of the
inertness principle and naturally results in an ungrammatical sentence. Only (13b) is possible in Russian: Ivana (ACC) remains the direct object of the infinitive and the sentence is subjectless (the neuter marking on the predicate adjective trudno signals that there is no subject NP for it to agree with in gender and number).12 Thus, although Case marking rules are the Russian analogue of movement transformations in English, the two syntactic operations have different constraints on them (i.e., there is no inertness principle in English); this simple fact results in radically different surface syntactic structures in the two languages.

5.0 The government/agreement Case pattern in a quantified NP. In this section I will demonstrate that Hypothesis II (i.e., subject and direct object NP are underlingly caseless (see sec. 2.1 and sec. 2.2)) plus the principle of inertness proposed above (i.e., a NP can be Case-marked only once in a syntactic derivation) combine to predict the seemingly idiosyncratic government/agreement Case marking pattern mentioned above in section 3.2 (see the examples in (4) and (5)).

The government/agreement pattern can be schematically represented as follows (what is said here about INST holds for all the oblique Cases).

(14) a. \[
\begin{array}{c}
\text{NP} \\
\text{nom/acc} \\
\text{pjat'ju} \\
\text{five} \\
\text{knigi} \\
\text{books} \\
\text{NOM/ACC} \\
\text{government} \\
\end{array}
\]

b. \[
\begin{array}{c}
\text{NP} \\
\text{inst} \\
\text{pjat'ju} \\
\text{five} \\
\text{knigi} \\
\text{books} \\
\text{INST} \\
\end{array}
\]

(14a) involves government (the quantifier pjat' governs the GEN marking on knigi) and (14b) involves agreement, i.e., both pjat'ju and knigi are in the same Case and neither can be said to govern the other.

The crucial question that must be asked here is: Why should a quantifier impose GEN marking on a noun in its scope only when the superordinate NP is marked with a direct Case? It turns out that the answer to this question is quite straightforward, provided that our grammar incorporates Hypothesis II. Consider the derivation of the PP s pjat'ju knigami 'with five books' (cf. s pjat'ju knigi); its underlying representation is (15) (Q stands for quantifier and pjat'- and knig- are uninflected stems).
NP is a governed noun phrase, i.e., its INST Case is determined by the preposition \textit{with}. The only rule to apply to (15) is Case Percolation, which copies the INST marking from NP\textsubscript{1} down onto \textit{pjet}'- and \textit{knig}-, giving \textit{pjet'ju} INST and \textit{knigami} INST. The rule of GEN marking in the scope of quantifiers cannot mark \textit{knigami} GEN because it was already marked INST, i.e., \textit{knigami} is inert at the moment that GEN marking can apply (see discussion of sentences in (3)). Note that \textit{pjet'ju} and \textit{knigami} appear to agree in Case in (14b) because they both receive their Case marking from the same source at the same time.

Now let us consider the derivation of \textit{pjet' knig} in the sentence 	extit{Ja kupil \textit{pjet' knig}} (see (14a)) 'I bought five books'. (16) is the underlying representation of the VP (irrelevant details are omitted); NP\textsubscript{1} is the direct object.

Notice first of all that NP\textsubscript{1} is the direct object of \textit{kupil} 'bought' and, according to Hypothesis II, it has no Case marking in the underlying representation (16). The first rule to apply is GEN marking in the scope of \textit{pjet'}- (on the NP\textsubscript{1}-cycle), which assigns the GEN Case to \textit{knig}-'. GEN marking can apply in this derivation because NP\textsubscript{1} is caseless (ungoverned) and \textit{knig}-' has therefore not yet been assigned a Case (it is not inert). GEN marking derives (17) from (16).
The next rule to apply (on the VP-cycle) is Case Marking: \( NP_1 \) is assigned the ACC Case since it is a caseless noun phrase dominated by the VP node (see sec. 2.2):

Case Marking is followed immediately by Case Percolation (see note 13). \( \text{pjet}'- \) 'five', which was not previously Case marked, is marked ACC; but \( \text{knig} \) GEN pl. 'books' is unaffected by Case Percolation in this derivation because it has already been marked GEN on the \( NP_1 \)-cycle in the scope of \( \text{pjet}'- \), and is therefore inert with respect to Case Marking and Percolation on the VP-cycle. Case Percolation derives (19) from (18):

These are precisely the same principles that account for the surface Case pattern in sentence (8b) (\( \text{Ja našel knigu, nužnuju studentam} \)): \( \text{studentam} \) 'students' is not marked ACC by Case Percolation when \( \text{knigu} \) and \( \text{nužnuju} \) are because it already received DAT Case marking on the earlier NP-cycle and is therefore
inert when Case Percolation operates to produce (11) (see the schematic diagram in (12)).

Case Percolation in the derivations of (8b) and (14a) are schematically represented in (20):

Both derivations illustrate that a NP in Russian can be Case marked only once in a given derivation.

Given the derivations of (14a) and (14b) proposed above, *s pjat'ju knig and *p'nat' knigi NP nom/acc are automatically excluded: in the case of (14b) (s pjat'ju knigami), knig- is marked INST before GEN Marking can mark it GEN, while in (14a) (p'nat' knig), GEN Marking applies before Case Percolation can mark it ACC. It is obvious from comparing the derivations of (14a) and (14b) that the order of application of Case Percolation vis-à-vis GEN Marking is crucial (the former precedes the latter in (14b) while the latter precedes the former in (14a)). But notice that we have not imposed this ordering relation in order to 'make it all come out right in the end': the ordering is intrinsic, i.e., it is completely determined by whether the superordinate NP is governed (Case marked) or ungoverned (caseless) on a given cycle.

In summary, the various surface Case patterns discussed so far in this paper are all automatic consequences of our assumption that the subject and direct object NP are caseless in the underlying structure while the other NPs are not, and that nouns and adjectives may be Case marked only once in a given derivation.

Part II

6.0 Hypothesis II in languages other than Russian. In Part I it was demonstrated that Hypothesis II enables us to relate a number of seemingly unrelated surface Case patterns in Russian, and to show that they are in fact entirely regular (i.e., given Hypothesis II, the facts could not be otherwise). In Part II I
will briefly discuss the consequences of assuming that the subject and direct object are underlying caseless NPs in most if not all natural languages. Needless to say, my proposal at this point is meant only to suggest an interesting direction for investigating linguistic universals.

My main point is that NP₁ (subject of a transitive sentence), NP₂ (direct object), and NP₃ (subject of an intransitive sentence) in (21) are always caseless, and that natural languages normally select one of four different basic 'configurational' syntactic strategies for assigning them surface Case.

(21) a.  
```
    S  
   / \  
  S1  VP  
  /   \  
 NP1  V   NP2  
        / \    
        NP3   V
```  
b.  
```
    S  
   / \  
  S1  VP  
  /   \  
 NP1  V   NP2  
        / \    
        NP3   V
```

In other words, subject and direct object NP are invariably marked in terms of their syntactic position (configuration). The picture is often complicated by the fact that languages sometimes use more than one strategy (e.g. 'mixed' ergative/accusative languages) or use a typologically uncommon strategy in certain constructions (e.g., direct object NPs in certain subjectless sentences are marked NOM rather than ACC in North Russian (see Timberlake 1974)).

There is a relatively small finite number of possible strategies for assigning Case based on the configurations in (21). As far as I have been able to determine, there is no language whose surface Case marking on subjects and direct objects does not represent one of these strategies or a combination of them, a fact which provides empirical support for the theory of Case that I am proposing in this paper.

6.1 Strategy I: Accusative languages. The Case marking strategy outlined above for Russian is called the ACC strategy, and Russian is classified as an ACC language. Caseless NPs that are constituents of VP are marked ACC, and caseless NPs that are not VP constituents are marked NOM. This kind of configurational marking can be represented as follows:

(22) a.  
```
    S  
   / \  
  S1  VP  
  /   \  
 NP1  V   NP2  
        / \    
        NP1 nom   V   NP2 acc
```

6.2 **Strategy II: Ergative languages.** Ergative/absolute Case marking is an alternative syntactic strategy for Case marking the same three caseless NP in (21). According to Comrie (1973:252), the absolute Case is marked on the NP closest to the verb ('closeness' is measured in terms of phrase marker domination). Thus the direct object NP in transitive sentences (NP in (21)) and the subject NP in intransitive sentences (NP) are closest to the verb in (21a) and (21b) respectively, and they are accordingly marked with the absolute Case; the 'other' NP, i.e. NP, the subject of the transitive sentence, is marked with the ergative Case:

\[(23) \quad \begin{array}{c}
\begin{array}{c}
\text{S} \\
\text{VP}
\end{array} \\
\begin{array}{c}
\text{NP} \\
\text{V}
\end{array} \\
\begin{array}{c}
\text{NP} \\
\text{V}
\end{array}
\end{array} \Rightarrow \begin{array}{c}
\begin{array}{c}
\text{S} \\
\text{VP}
\end{array} \\
\begin{array}{c}
\text{NP} \\
\text{erg}
\end{array} \\
\begin{array}{c}
\text{NP} \\
\text{absol}
\end{array}
\end{array} \]

The ergative/absolute strategy treats the subject NP of transitive and intransitive sentences differently because they happen to be different with respect to their relative 'closeness' to the verb.\(^{14}\)

6.2.1 The existence of 'mixed' ergative languages, i.e. languages that use both NOM/ACC and ERG/ABSOL strategies, supports our hypothesis that Case marking on the subject and direct object NP
is a relatively superficial syntactic process for Case marking caseless NPs. In these languages, the choice of NOM/ACC vs. ERG/ABSOL strategy is determined by a particular grammatical distinction. For example, in Georgian the NOM/ACC pattern is used in certain tenses while the ERG/ABSOL strategy is used in the other tenses (see Comrie 1973:245). The choice of strategy may also depend on whether the subject NP is a full noun or a pronoun (e.g. Dyirbal); Xrakovskij (1974:35) points out that in Khanty, a Ugric language, the choice of ERG/ABSOL vs. NOM/ACC depends on whether or not the subject NP is emphasized in a given sentence.

In these 'mixed' languages, NOM marking is not changed to ERG or ABSOL (or vice versa) when, say, the tense is changed (cf. Georgian). Rather, the caseless subject NP is marked either NOM or EGR/ABSOL depending on the factor (e.g. tense) determining the strategy being used.

6.2.2 Ergative marking and direct object incorporation. There is one more important fact about ERG languages that supports our claim that ERG/ABSOL Case assignment is a superficial syntactic operation. According to Comrie (1973:243), in certain ERG languages the direct object can be optionally incorporated into the verb, i.e.:

\[(24)\]

```
S
   VP
   NP
   V
   NP
```

Direct Object Incorporation results in an intransitive sentence in the surface structure. Our hypothesis correctly predicts that a transitive sentence without incorporation will make its subject NP ERG (since the direct object is 'closer' to the V), but the same sentence with direct object incorporation will mark its subject NP ABSOL since it is the surface equivalent of (21b), not (21a). If Case marking on the subject and direct object were not a superficial phenomenon dependent on the surface syntactic configuration, these facts could not be accounted for in a natural way.

6.3 Strategy III. The third strategy for marking the three NP configurations in (21) is quite simple: each of the NPs receives
different Case marking (let us call them Cases X, Y, and Z).

(25) a. 
```
  S               S
  |               |    ===⇒    |
 NP1 VP NP2 V    NP1 X V NP2 Y
```

b. 
```
  S               S
  |               |    ===⇒    |
 NP3 VP V         NP3 Z V
```

While this strategy is attested (see Anderson's (1976:5) discussion of Motu), it appears to be relatively rare among the world's languages.

6.4 Strategy IV. This strategy is in one sense the simplest of the four and its existence strongly supports the distinction between underlying caseless (ungoverned) vs. oblique (governed) NPs on which our theory of Case is based. Languages using strategy IV simply do not Case mark the three NPs in (21), i.e., the subject NP (in both transitive and intransitive sentences) and the direct object NP are identical to the noun's underlying uninflected stem and are identified by the absence of Case morphology. Turkish can serve as an example of a Case language in which strategy IV is the predominant strategy. It should be pointed out that Case languages using other strategies commonly leave subject and direct object NP 'unmarked' for Case in some declensions (thus what is often called the NOM or ABSOL Case ending is in reality the noun's bare stem).

Since the subject NP of both transitive and intransitive sentences in languages employing strategy IV have identical marking (the absence of Case marking is normally viewed as a type of Case marking within a paradigm, i.e. 'zero' allomorphs), languages using strategy IV are normally grouped typologically together with NOM/ACC languages and not singled out as a separate type. Note finally that Hypothesis II enables us to demonstrate that it is not a coincidence that Case languages tend to employ 'zero' Case allomorphs almost exclusively for subject and direct object NPs.
7.0 Surface Case complexity. If the world's languages do in fact normally limit themselves to just these four strategies for assigning Case to caseless NPs, how can we account for the bewildering complexity that we invariably encounter when analysing subject and direct object Case marking in individual languages? This complexity can be accounted for, at least partially, as follows: (i) A language can employ more than one strategy to mark the same configuration (e.g. Georgian). Although all the combinations of these four basic strategies are not attested, it is easy to see how the possibility of combining strategies contributes to the number of Case patterns actually found. (ii) In 'mixed' languages like Georgian, the strategies used are in complementary distribution, i.e., although they are used to mark the same syntactic configurations (see (21)), they are each determined by different tenses, and can therefore not cooccur in otherwise identical sentences. But there are languages in which two different Case marking strategies compete in identical sentences. These competing Case patterns normally belong to different stylistic registers, and most often represent a diachronic change in progress (the more colloquial one replacing the other). (iii) Finally, it often happens that a language can employ an 'exotic' Case marking strategy in a restricted number of constructions (e.g. the NOM direct object in North Russian). What is significant about these 'minor' strategies is that they are confined to just the three caseless NPs in (21), just as the four 'major' ones are. In the following sections, I will briefly discuss (ii) and (iii) ((i) was discussed in section 6.2.1).

7.1 Minor strategies. As mentioned above, in North Russian dialects the direct object NP in certain transitive subjectless sentences is marked NOM rather than ACC (see Timberlake 1974; Anderson 1976:20):

\[
(26) \quad S \quad \overset{\text{VP}}{\longrightarrow} \quad S \\
\quad V \quad NP \quad \overset{\text{VP}}{\longrightarrow} \quad V \quad NP_{\text{nom}} \\
infin \quad \overset{\text{NP}}{\longrightarrow} \quad \overset{\text{infin}}{\text{VP}}
\]

Note that marking the direct object NP with the same Case used to mark the subject NP is not really an 'exotic' strategy: it is precisely what happens in ERG/ABSOL languages.

This special strategy is confined to a very restricted
subsystem of the grammar in North Russian. In 'mixed'
HWG languages, the domain of the alternative strategies is far
greater. But what is important is that the principle in both
situations is the same: Case languages tend to develop alternative
or competing Case marking strategies in certain well-defined sub-
parts of the grammar. The reason that these different strategies
manifest themselves on subject and direct object NPs (see (21))
is that these are the only NPs that are always caseless and, there-
fore, the only NPs that allow 'Case competition' (see section 4.4).

7.1.1 Serbo-Croatian provides a particularly good example of a
'nonstandard' Case marking strategy (the data is from Wayles
Brown). As we saw above in section 5.0, Case marking in Russian
NPs containing quantifier words like pet 'five' is extremely
complex. Serbo-Croatian has greatly simplified the NP-internal
Case relations in quantified NPs:

(27) a. Pet devojaka je došlo
five girls AUX came
NOM/ACC GEN pl. n. sg.
'Five girls came.'

b. s pet devojaka
with five girls
NOM/ACC GEN pl.
'With five girls.'

c. sa stotinu devojaka
with hundred girls
ACC GEN pl.
'with a hundred girls.'

The preposition s/sa governs the INST Case in Serbo-Croatian.

The internal structure of the subject NP in (27a) looks
superficially like Russian (pet' devušek 'five girls'): devojaka
is marked GEN in the scope of the quantifier pet. Pet is the
form used for both NOM and ACC; it is natural to suppose then
that pet is NOM since pet devojaka is the subject of (27a)
(pet' is NOM in (4a)). But consider (27b): the preposition s
governs the INST Case, but it is clear that the INST marking has
not been percolated down onto either of the NP constituents (cf.
Russian s pet'ju (INST) devuščami (INST) 'with five girls' in (5a)).
Devojaka in (27b) is GEN and, as (27c) unambiguously demonstrates,
pet must be ACC, not NOM, in (27a) and (27b). Stotina in (27c)
is unambiguously the ACC because stotina is the NOM (cf. Masu
(ACC) devojaka (GEN) je došlo 'A lot of girls came').
What appears to have happened in Serbo-Croatian is this: The following constraint on Case marking in a NP containing a quantifier was introduced into the grammar: the Case on a NP containing a quantifier word like pet cannot be percolated down onto the NP's markable constituents. The NP-internal Case marking is determined as follows: the noun in the scope of the quantifier is marked GEN (as in Russian). In Russian the caseless quantifier's stem receives its Case marking from its NF node (see (4a)); this does not happen in Serbo-Croatian, where the following simple strategy has developed: a quantifier word is marked ACC. This strategy is a maximally 'local' NP-internal process, i.e., the superordinate NF node's own Case marking and grammatical relations play absolutely no role whatsoever in determining the ACC marking on the quantifier. As a result of this local strategy, quantified subject NPs have ACC quantifiers. Local Case marking strategies like the one just illustrated help make a Case language seem quite complex.

7.2 Competing strategies. It was mentioned in section 7.0 (ii) that two strategies may compete in identical environments. Russian provides a particularly striking example of this (see Borras and Christian 1971:391):

(28) a. Ja sosčital četyrex soldat.
   I counted four soldiers
   GEN GEN pl.
   'I counted four soldiers.'

b. Ja sosčital četyre soldata.
   I counted ACC GEN sg.
   'I counted four soldiers.'

(28b) is colloquial.

The derivation of (28b) is, for all practical purposes, the same as the derivation of Ja kupil pjat' (ACC) knig (GEN)
'I bought five books' in section 5.0 (see (15) - (18)): soldat-
is marked with -a (the GEN sg. m./n, ending) in the scope of the quantifier četyr- 'four',15 and then četyr- is itself marked ACC on the VP-cycle.

In Russian animate direct objects have special marking: the GEN is used instead of the ACC; this fact is ignored in the derivation of (28b), but not in the derivation of (28a). What appears to have happened in (28a) is this: the superordinate direct object NP is somehow marked with the animate GEN marking
of **soldat-**; it is percolated down from there onto **šetyr-**, which results in the 'agreement' pattern in (28a) rather than the 'government' pattern in (28b). The GEN pl. marking on **soldat** makes it inert, and **šetyr-** cannot impose the -a ending on it.16

8.0 Conclusions. I have argued in this paper that the underlying representation of a Case language must contain at least two kinds of noun phrases: One kind is marked with Case as a result of government by a lexical category (e.g. verbs, prepositions etc.) and the other is caseless. Subjects and direct objects are always underlingly caseless, but other NPs may also have no Case assigned to them (e.g. predicate nominals, topic NP, etc.). A caseless NP is assigned its surface Case in one of two ways (in some languages it may remain caseless in the surface structure (see section 6.4)): It may be marked with an oblique Case by a transformation (like GEN marking in the scope of negation); if it is not marked with an oblique Case, it is marked with a 'structural' Case like NOM/ACC, ERG/ABSOL etc., depending on its syntactic configuration and the structural Case strategy employed. A NP can be marked for Case only once.

8.1 The theory of Case proposed in this paper clearly has explanatory value for Russian since it allows us to demonstrate that certain Case patterns which seem anomalous at first glance turn out to be entirely regular and predictable (see (14)). The next question that we must ask is whether this theory can account for surface Case patterns in other languages; the data presented in Part II above is certainly encouraging. But the 'universal' validity of this theory of Case marking is a strictly empirical question and, therefore, cannot be settled at this time.

8.2 In conclusion I will present some Japanese data.17 I think that it is typical of the kind of Case patterning that should show up in one form or another in most languages with morphological Case if Hypothesis II is correct: the Case marking on the subject and direct object NP behave differently than Case marking on NPs with other functions with respect to various syntactic operations. (In the following sentences **wa** marks topic, **ga** subject, **o** direct object, and **de** locative.)

(29) a. Watasi+ga hon+o yonda.
   I book read
   'I read the book.'
b. Watasi+wa hon+o yonda.
   I (=topic) 
   'I (=topic) read the book.'

c. Hon+wa watasi+ga yonda.
   book I 
   'I read the book (=topic).' 

d. *Watasi+ga+wa hon+o yonda.

e. *Hon+o+wa watasi+ga yonda.

(30) a. Watasi+ga niwa+de hon+o yonda.
   I garden+in book read 
   'I read the book in the garden.'

b. Niva+de+wa watasi+ga hon+o yonda.
   garden (=topic) I book read 
   'I read the book in the garden (=topic).' 

If we assume that subject and direct object NP in Japanese are caseless in the underlying structure and, like Russian, are configurationally marked (for ga and o), the surface Case patterns presented in (29) and (30) turn out to be entirely predictable: Topicalization in Japanese is a syntactic rule that both moves a NP out of its clause and marks it with the topic marker wa. If we assume that structural Case marking on subject and direct object NPs is last cyclic in Japanese as it is in Russian (i.e., it is the last transformation to operate on the S and VP cycles), then the derivations of the sentences in (29) and (30) become transparent: Topicalization moves the caseless subject and direct object NP and marks them with wa before they can be marked with ga and o; there is no need to claim that ga and o are changed to or replaced by wa (see (29)). But oblique Cases like locative de in (30) are, according to our theory, present in the underlying structure. This means that the oblique locative marking must be present on the NP when it is topicalized, and, therefore, wa is simply added to niwa+de to give niwa+de+wa in (30b).

If subject and direct object NP are in fact underlingly caseless, Case patterns like those in (29) and (30) are exactly what we would expect to find in Case languages. According to the theory of Case proposed above, these patterns should be the rule, not the exception.
FOOTNOTES

1 It was pointed out to me by W. Harbert after I completed the research on which this article is based (see Babby 1978b. 1980) that N. Chomsky has recently proposed a theory of Case which is, in many respects, identical to the one I propose below. This fact is significant because the linguistic data on which our respective theories are based are totally different. I will refer to these parallels wherever appropriate.

I would like to thank the following people who contributed in a variety of ways to this article: John Bowers, Richard Brecht, Wayles Browne, Stephen Franks, Gerald Greenberg, Wayne Harbert, Carol Rosen, Claudia Ross, and Peter Zimmermann. I should single out John Bowers, whose ideas have so influenced my own in the course of the last nine years that it is often difficult for me to sort out what originated with whom.

2 Note that certain NP adverbials of time, which are marked ACC in affirmative sentences, can also be marked GEN under negation:

(i) Ja s takoj baboj dnja ne stal by zit'
I with such woman day NEG begin particle to-live
GEN
'I wouldn't live with a woman like that for (even) a day.'

NP complements of the copula byt! 'be' are marked NOM in affirmative sentences, but are never marked GEN when the sentence is negated. Perhaps this is because 'predicate nominals' are never in the scope of sentence negation. (In the following example, byt! is not phonetically realized because it is in the present tense.)

(ii) Ivan – moj brat
Ivan my brother
'Ivan is my brother.'

Ivan ne moj brat vs. *Ivan ne moego brata
Ivan NEG my brother GEN GEN
NOM NOM
'Ivan is not my brother.'
3 Do not confuse a caseless NP with an NP that is marked with the NOM Case, which is often referred to as the 'unmarked' Case. 'Unmarked' in this sense is a strictly semantic concept.

4 I am using the term 'government' in its traditional sense, namely, to describe a situation in which a lexical category determines Case marking (see (3)). Chomsky uses it in a more technical sense, namely to describe a particular type of phrase marker dominance (e.g. α governs β iff α minimally c-commands β). But he does relate the two senses: 'Case assignment is a special case of governance: you can Case assign when the governing category happens to be a Case assigner' (N. Chomsky, transcript of Pisa lecture I, pp. 6-7).

Chomsky also notes that a lexical category inherits its governance from its strict subcategorization feature. Verbs therefore assign Case through subcategorization, i.e., it is the subcategorization feature that assigns Case, not the verb, which only appears to assign Case because they have subcategorization features. Thus it is the subcategorization features that have Case, it is part of their meaning. Sometimes they may have Case inherently [=government in my sense, LHB]. Sometimes they may just gain Case by virtue of the fact that a structural Case is assigned in the position that they control [=configurational marking of caseless NP with direct Case, LHB] (paraphrased from N. Chomsky, transcript of Pisa lecture II, p. 47).

5 Chomsky's account of direct Case marking is almost the same as the one that I propose here (see Chomsky, On Binding, 32-33 and Pisa lecture II, 45), but, once again, the terminology is different: What I call 'direct Cases' Chomsky calls 'structural Cases', and what I call 'governed Cases' he calls 'inherent Cases' (personal communication).

Note that approximately ten years ago Ken Hale proposed that Case in Australian accusative languages is 'strictly a function of the domination of noun phrases. Thus, a noun phrase immediately dominated by the sentence node (S) is assigned nominative Case; a noun phrase immediately dominated by the verb phrase node (VP) is assigned objective case ...' (Hale, 8-9).

6 It appears that the ACC Case can be governed by certain prepositions (i.e. CP NP acc PP). These NPs behave syntactically like governed oblique NPs with respect to GEN marking in the scope of
negation, namely, they are never marked GEN, e.g.:

i. Naši druz'ja ne opozdali ni na sekundu / *sekundy.
   our friends NEG were-late not for second second
   ACC GEN
   'Our friends were right on time.'

But an ACC NP governed by a preposition does not behave like a governed oblique NP if it contains a quantifier (see section 5.0 for details), e.g.:

ii. Naši druz'ja opozdali na pjat' časov / *časy.
    our friends were-late for five hours hours
    ACC GEN ACC
    'Our friends were five hours late.'

(compare to: s  pjat'ju časami / *časov)
    with five hours hours
    INST INST GEN

If we want to demonstrate that the Case marking in (i) and (ii) above is in line with the theory of Case being proposed in this paper, it is necessary to claim that prepositions do not in fact govern ACC marking on NP. Rather, we have to assume that ACC NPs which appear to be governed by prepositions are in fact underlyingly caseless, i.e., prepositions like na in (i) and (ii) do not impose any Case at all on their objects. We must also assume that PP are islands that do not allow Case marking transformations like GEN marking in the scope of negation to penetrate them. Given these assumptions, sekundu is marked ACC in (i) by the configurational Case marking rule that marks direct objects etc. ACC (i.e. caseless NP in VP are marked ACC). In (ii), pjat' governs the GEN (a NP-internal relation) and then pjat' is itself marked ACC by the same rule that marks sekundu in (i) ACC. If these proposals are correct, then it seems that prepositions and verbs have the same kinds of government, i.e., both can either govern oblique objects or have caseless objects.

7 Active participles in Russian, which are not used in the spoken language, are adjectival forms of the verb and are accordingly marked for Case in the same environments that 'primary' adjectives are (see Babby 1974).

8 I am assuming that in other Case languages the NOM form of adjectives has a dual function: it marks the NOM Case on adjectives in a NOM NP, and is used on predicate adjectives to indicate that
they are caseless.

See Babby 1976 for a discussion of how rules might relate syntactic features to inflectional morphology.

The following sentence pair illustrates the same surface Case distribution of the underlying caseless adjective stem nužn– as in (8a) and (8b), but here the LF is NOM since the superordinate NP (i.e. NP$_2$ in [NP$_1$ S NP$_2$]) is the subject.

i. [[[kniga [kotoraja nužna studentam]$_S$ NP$_S$ nom lost
    book which necessary students nom SF
    NOM SF

'The book which is necessary to the students has been lost.'

ii. [[[kniga [nužnaja studentam]$_{AP}$ NP$_{AP}$ nom lost
    NOM LF NOM DAT nom SF

'The book [which is] necessary to the students has been lost.'

Note that in Russian animate direct objects are marked with the GEN Case form rather than the ACC.

The problem of explaining the different Case marking on the adjective and its complement before and after Relative Clause Reduction was raised by Ross (1967) in his discussion of Case in Latin. The Russian analysis that I propose here seems to be valid for the Latin as well. Thus it turns out, on closer inspection, that there is in fact no problem.

Note that the word order in (13b) has no relevance for the sentence's grammatical relations; the following sentences all have the same grammatical relations: Provesti Ivana trudno, Ivana provesti trudno, Trudno provesti Ivana, etc. Word order in Russian is determined for the most part by the preceding discourse, i.e. by distinctions like theme/rheme and and old/new information (see Babby 1980: chap. V).

Sentence (13b) is much closer in structure to the English It is hard to fool Ivan than to Ivan is hard to fool.
Case Percolation must apply as soon as a NP receives its Case assignment. In the case of governed NP, this means that percolation is the first transformation to apply on the NP-cycle (see section 4.1).

Note that the Case relations in (14b) depend only on governed oblique marking on the superordinate NP, not on the presence of a preposition, e.g.:

Oni podržajut pjeti metodam / *metodov.
they imitate five methods methods
DAT DAT GEN
'They are imitating five methods.'

The verb prodražajut governs the DAT Case (see (3)).

Anderson (1976:19-20) proposes different configurational strategies to account for ERG/ABSOL and NOM/ACC Case marking. It is not crucial for us here which approach is correct; what is, however, significant is the fact both suggestions depend on the subject and direct object NP's surface syntactic configuration.

Dva/dve 'two', tri 'three', and četyre 'four' require a noun in their scope to be marked with the ending -a GEN m/n sg. or -i GEN f. sg. This fact has a diachronic explanation.

I am unsatisfied with the analysis of (28a) that I have proposed here. Yet the sentence pair nevertheless provides an excellent example of Case completion. It is clear that the key to understanding the sentences in (28) is soldat's animacy: it is ignored in (28b) and responsible for the GEN pl. soldat in (28a). The real problem is to discover how četyrex gets marked GEN -- it seems to be acting like an adjective (which historically it is) in (28a), but not in (28b).

Note finally that the 'agreement' and 'government' Case patterns compete in (28), whereas they are in complementary distribution in (14).

The Japanese data were provided by Claudia Ross.

If we assume that wa is a Case ending, we must add that Japanese, unlike Russian, does not have a principle of inertness. But if wa is not considered a Case, no special statement about forms like niwa+dèwa in (30b) is required since we are not dealing with an instance of Case agglutination.
REFERENCES


___________. MIT ms. On Binding. (First draft, January 1978).

___________. Pisa Lectures (Transcript of recording).
Hale, Ken. MIT ms. The passive and ergative in language change: the Australian case.


Acquisition of Relative Clauses:
Developmental Changes in Their Heads

Suzanne Flynn
Barbara Lust

In this paper we present experimental data which confirm that children at early stages of first language acquisition distinguish relative clause types according to whether they are free or lexically headed. We present data which show that so-called free relatives, as in 1 (sometimes called "Headless relatives"), provide the developmental basis for lexically headed relatives, as in 2.

1. I want what Joan has bought.

2. I want the books which Joan has bought.

Free relatives are more productive (i.e., more frequent) than lexically headed relatives at early periods of language development. We argue on the basis of the experimental data that the developmental import of the free relatives, such as 1 (that is, the reason they may be useful to further development) concerns their grammatical structure. We argue that it does not concern the property of semantic indeterminacy of their reference.

To test the hypothesis that free relatives, such as 1, might be basic to the acquisition of lexically headed relatives, such as 2, we tested children's production and comprehension of three types of relative clauses, such as exemplified in 3.

3. Relative Types

Lexically Headed Relatives

I. Determinate Head

Big Bird pushes the balloon which bumps Ernie

II. Non-determinate Head

Ernie pushes the thing which touches Big Bird

Nonlexically Headed

III. Free Relative ("what")

Cookie Monster hits what pushes Big Bird

Types I and II were lexically headed relatives. Type III was a free relative. Type II shared the property of semantic indeterminacy of reference with the Type III free relative. This differs from the
semantic determinacy which the Type I relative has. However, Type II has the same syntactic structure of the Type I lexically headed relative. That is, both Type I and II have a lexically specified noun head and an adjoining wh-word in comp position. The Type III free relative, on the other hand, has a "wh-word" ("what") but whether or not this is in head or comp position is debated, and in any case it has no lexically-specified noun head. (See Hirschbuhler, 1978; Van Riemsdijk and Groos, 1979; Bresnan and Grimshaw, 1978; Harbert, 1979).

To test children's production of these 3 relative clause types, we used an elicited imitation task with sentences like those shown in 3. To test comprehension, we used an act-out task with a similar set of sentences and a set of Sesame Street and Muppet dolls. In this initial paper we focus mainly on the results of the imitation task.

We tested a sample of 96 children between the ages of 3 years 6 months and 7 years 7 months, who were divided into 8 6-month age groups as shown in 4. Both imitation and comprehension tasks were given in counterbalanced order to

4. Age Groups tested: (overall mean age 5.5)

<table>
<thead>
<tr>
<th>Range (years, mos.)</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>I 3.6-3.11</td>
<td>3.7</td>
</tr>
<tr>
<td>II 4.0-4.5</td>
<td>4.2</td>
</tr>
<tr>
<td>III 4.6-4.11</td>
<td>4.7</td>
</tr>
<tr>
<td>IV 5.0-5.5</td>
<td>5.1</td>
</tr>
<tr>
<td>V 5.6-5.11</td>
<td>5.7</td>
</tr>
<tr>
<td>VI 6.0-6.5</td>
<td>6.2</td>
</tr>
<tr>
<td>VII 6.6-6.11</td>
<td>6.8</td>
</tr>
<tr>
<td>VIII 7.0-7.7</td>
<td>7.2</td>
</tr>
</tbody>
</table>

all children. The actual sentences administered for imitation are shown in Table I. In both the comprehension and imitation tasks, all sentences were equalized precisely in syllable length and roughly in word length. As can be seen from the table, only object relatives were tested, and the grammatical function of the relativized noun phrase in the subordinate clause varied as to whether it was subject or object.

We hypothesized that children would not imitate all relative types equivalently. They would find it significantly easier to imitate free relatives (such as Type III) than lexically headed relatives (such as either Type I or II on the table). This would indicate that the free relatives were more basic in children's competence than the lexically headed relatives. In particular, we hypothesized that Type I and II relatives would not differ sig-
nificantly in imitation success. This pattern of results would show that children's preference for free relatives over lexically headed relatives was based on syntactic structure differences between these and not merely on a preference for the semantic indeterminacy of the free relative. On the other hand, if we found that children imitate both Type II and Type III relatives equivalently (and both of these were superior to Type I) this would suggest that an apparent developmental precedence of free relatives (such as III) over lexically headed relatives such as Type I was due in fact not to syntactic structure differences between I and III but to the property of semantic indeterminacy in the free relative. There is some indication in the developmental psycholinguistic literature that children's notions of semantic determinacy are only gradually developed (e.g., Tanz, 1976).

Results

Results of the imitation task showed (according to Analysis of Variance on amount of correct imitation) that children do distinguish among various head types. In this analysis, Relative Type had a significant effect on the success of children's imitation (F(2,176) = 7.49, p < .001)).

As can be seen from Figure 1, free relatives (Type III) were significantly easier for children to imitate than the determinate headed relatives (Type I). Means overall correct were .90 and .68 for the Type III and I relatives, respectively (F(1,88)= 11.01, p < .001). Notably, free relatives were also significantly easier for children to imitate than the nondeterminate headed relatives (Mean correct for the nondeterminate was .70) (F(1,88) = 8.43, p < .01). Critically, there was no significant difference in imitation between determinate and nondeterminate headed relatives (Types I and II).

There was no significant main effect due to the grammatical function of the relativized NP in the subordinate clause, showing that the critical structural factor in these sentences was relative head type and not grammatical function of the relativized noun.

In general, although age was not significant, these effects of relative type were generally constant over development (since there was no significant interaction between Age and Head Type). At one of the last age groups, the 7th (mean age 6.8), the types begin to equalize, as would be expected.

Syntax vs. Semantics

These data generally confirm our thesis that children distinguish
the various relative clause types and, further, that free relatives have a kind of developmental primacy over the early ages (up until about 6-1/2). Since as we hypothesized, children's imitation did not distinguish the two types of lexically headed relatives which shared the same syntactic structure, although they differed in semantic determinacy, these data also confirmed that children's distinction of the relative types and their preference for the free relative were based on structural differences across these types and not on these semantic differences.

Our thesis was further confirmed by the results of the act-out comprehension task (these results are sketched in Figure 2). Here it was found that although Head Type also significantly determines children's successful interpretation of sentences with relatives ($F(2,176) = p < .001$), there was no significant difference between children's interpretation of the (Type III) free relative and the (Type II) nondeterminate headed relative (means .58 and .66) and both of these were significantly more difficult for children to interpret than the Type I Determinate headed relatives (mean .84) ($F(1,88) = 9.61, p < .01$, and $F(1,88) = 20.01, p < .001$, respectively).

This documents that children are sensitive to the semantic factor of referential determinacy. This finding was remarkable given that we saw above that this semantic factor does not determine children's success at relative clause production in the imitation task. Since this finding in the comprehension task makes it clear that the semantic determinacy distinction was available to the children, it strengthens the conclusion that children's differentiation of the relatives and the developmental primacy of the free relatives in the production task is based on their structure, independently of this aspect of their semantics.

The question then becomes: What aspect of the structure of the relative types are children sensitive to? And, accordingly, what aspect of this structure explains the developmental primacy of the headless relative?

Results (error)

Analysis of children's imitation errors showed that the largest proportion of structural errors across all relative types involved the head or comp, signifying that head type is a significant variable in acquisition of relatives. Errors which changed grammatical relations across clauses occurred far less often, as can be seen in Table 2.

The structural preference for headless relatives was supported in error analysis by the high amount of conversion of the relative pronoun "which" in either the Type I determinate-headed or Type II non-determinate headed relatives to the pronoun, "what," which had
been used in the headless relative. About 80 to 90% of subord-
inate errors or about 25% of Type I and II items shifted from
"which" to "what," e.g., 5.6

5. E. Ernie touches the balloon which Big Bird throws.
S. Ernie touches the thing what Big Bird throws. (5,1)

Further, all the head type conversions for type II non-
determinate headed relatives, and half the conversions of Type I
determinate-headed relatives were conversions to free relatives.
[Conversions of the free relative head type, on the other hand,
were most all (93%) conversions to "thing" headed Type II rela-
tives and the highest proportion of these occurred in the oldest
age group. The fact that these Type II relatives were synonymous
with the Type III free relative confirms our finding in the
comprehension data that children were sensitive to the semantic
determinacy factor; although this was found to be independent of
the structural factors which determined imitation success.]

Errors such as exemplified in 6 and 7 confirm children's
general difficulty with differentiation and ordering of the head
NP and comp in relatives.

6. E. Fozzie kisses the thing which Kermit Frog hits.
S. Fozzie Bear kisses which the thing the thing that
Kermit Frog hits. (age 3,9)

7. E. Cookie Monster eats the thing which Ernie kicks.
S. Cookie Monster eats the thing that about Ernie kicks.
(ince 4,3)

With regard to the issue of why headless relatives should be
structurally simpler for children to acquire than the lexically
headed relatives, we evaluated children's imitation errors in terms
of 2 possible structural descriptions of the headless relative
sketched in 8. (1) One SD (8i) leaves the wh-word "what" in

8. Possible phrase structures for the headless relative
(adapted from Groos and Van Riemsdijk, p.8)

The COMP Hypothesis
(i)

The Head hypothesis
(ii)
comp position as it is in other relatives and leaves the NP head empty (Groos and Van Riemsdijk) (2) The other SD position positions the wh-word in head position and leaves comp empty (Hirschbuhler; Bresnan and Grimshaw). Errors such as 9 might provide evidence in favor of the first alternative (i.e., "what" is in comp). (Here it can be seen that children appear to have provided a head and have then placed "what" in the comp position.) However, this evidence is ambiguous, since both of these sentences

9. E. Ernie touches the balloon which Big Bird throws
   S. Ø throws that what Big Bird throws (age 3,7)
   E. Ernie touches the balloon which Big Bird throws
   S. Ernie touches the thing what Big Bird throws (age 5,1)

may involve a nominalization of the "what clause" and a juxtaposition of this nominal, similarly to the juxtaposition in a sentence like 10.

10. John likes him, the president.

Other errors such as 11 might provide evidence in favor of the 2nd (8ii) possible structure for headless relatives, viz. that the "wh" word, "what" is in head position. (Here in fact it can be seen that children have even furnished a determiner for the "wh" word, i.e., "the what".) These errors are not definitive either, however, since, for example, the second of these also would allow a juxtaposed nominal analysis.

11. E. Ernie pushes the thing which touches Big Bird.
   S. Ernie pushes the what Ernie pushes. (age 4,2)
   E. Cookie Monster eats the thing which Ernie kicks.
   S. Cookie Monster eats the what the thing that Ernie kicks. (age 5,0)

What the errors suggest more generally, in fact, is that the relative clause is nominalized by the child in early forms of child language (that is, dominated directly by an NP node), and that it may be positioned in juxtaposition to a separate nominal in the matrix. The errors in 12 appear to support this analysis. We have seen this was a possible analysis for most of 9 and 11.

12. E. Fozzie Bear hugs what Kermit the Frog kisses
   S. Kermit the Frog hugs it what he kisses (age 3,9)
   E. Ernie touches the balloon which Big Bird throws
12. S. Ernie kissed it what Big Bird throw (age 4,1)
   E. Cookie Monster eats the thing which Ernie kicks
   S. Cookie Monster touches the thing that which Ernie kicks
   (age 3,9)
   E. Cookie Monster hits what pushes the Big Bird
   S. Ernie pushes the thing that which pushes Big Bird (age 4,2)

This would suggest in general that neither of the SD in 8 above
describe headless relatives in early child language. Rather, children's
early relatives, in particular headless relatives, may involve a
simple direct nominalization of the relativized sentence as in 13.
Only later in development is a separate NP head and comp differentiated
from this S within the phrase structure of the NP. (This lack of
differentiation of head and comp in the headless relative of child
language is actually consistent with certain current analyses of
headless relatives for adult grammar (Harbert, 1978; Bowers, pc)).

13. Development: Differentiation from the left structure to
   the right

   NP
   (S')
   (Comp) S
   (Head) ...gap...

   NP
   S'
   Comp S
   ...gap...

   Headless relative
   Headed relative

In conclusion, headless relatives may be easier for children
because they allow an easy nominalization of an S without a separate
NP head and this nominalization can be immediately embedded as an
NP in the matrix clause without differentiation of head and comp within
the NP.

In this case, ostensibly headed relatives for younger children
may reflect a flat juxtaposition structure (like 10) and not a truly
subordinative structure, where the matrix NP must function both as
matrix NP and as the head which binds a gap in a subordinate rela-
tive clause which is embedded via a comp node in a complex NP.

General Conclusions

If these analyses are valid, children do not have the full
structural differentiation for recursive sentence embedding under NP until at least about the age of 6 1/2. The language competence of the child below this age is not identical to that of the adult. In particular, complex sentence formation in the young child involves structural hypotheses much more general than true recursive complex NP embedding which requires full head and comp differentiation in a relative clause.
Footnotes

1. Paper presented at the biannual meeting of the Linguistic Society of America, Los Angeles, Winter, 1979. This is an initial version of a full report which is in preparation.

We thank James Gair, Wayne Harbert, John Bowers, Jack Carroll and Renate Born for helpful discussions. We owe special thanks to Margaret Bergman for her assistance throughout all stages of data analysis and data collection.

This paper was partially supported by a graduate research supplement from the Department of Modern Languages and Linguistics, by a small seed grant from the College of Human Ecology and by an NSF grant BNS-7825115.

2. That is, although the reference of "the thing" head specified by the relative clause, e.g., "the thing which touches Big Bird," is specific, viz., one of the 3 dolls or props available, still this lexical head does not determine which reference of this available set of referents is to be chosen. A similar indeterminacy characterizes the free relative.

3. "Which" was chosen as the relative pronoun for the lexically headed relatives instead of the more familiar "that" because of the comparability of the pronouns "which" and "what" as relative pronouns. In addition, the status of "that" as a relative pronoun is ambiguous. For a more detailed discussion see Stahlke, 1976.

4. There was a significant interaction between head type and grammatical function, although we will not discuss this here.

5. In general, comprehension tasks seem to tap syntactic competence much less directly than production tasks (e.g., Lust, Loveland and Kornet, Linguistic Analysis, to appear).

6. This can be compared to the lower amount of conversion of the free relative pronoun "what" in Type III to "which" or "that", either of which would have been grammatical for a lexically headed relative. (For the headed relatives, Type I and II, the conversion of the pronoun "which" to "that" was not considered an error. In fact, 30% of the Type I relatives and 33% of the Type II relatives converted the pronoun "which" to "that".)

7. Notably, other research has shown that children (age 3 years) do have both sentences and phrasal coordination (Lust, 1977). Children as young as older 3-year-olds and 4-year-olds do seem to demonstrate competence for sentence to sentence subordination (e.g., adverbial "when" clauses (Lust, to appear)).
Bibliography


26 a. das Buch, das ich glaubte [PRO t_i lesen
the book which I believed to-read
zu können]
to be-able
'the book which I believed I was able to read'

b. das Buch, das sie mir befahl [PRO t_i
the book which she me ordered
von ihm zu kaufen]
from him to buy
'the book which she ordered me to buy from him'

Both of these constructions are well-formed. I have argued in
note (12) that the bracketed constructions in these examples do,
in fact, have PRO subjects, and are therefore minimally of the
form _S[ ]. Consequently, whether they are actually of the form
_S[COMP[ ] S[ ]] or not, they still defeat the S/S subjacency
analysis. Given either assumption, if we continue to claim that
(25a) and (25b) are out because relative pronoun fronting in German
is subject to an S/S version of subjacency, we end up with the
wrong prediction about the permissibility of relative pronoun
fronting in (26a) and (26b).

Let us assume first that the bracketed constructions in
(26) consist just of S, not S contained in S. If that is the case,
then the relative pronoun must be moved directly from its position
is the lower S to the higher COMP position, across two S-nodes,
as in (27a).

27 a. das Buch S[COMP[ das_i ] S[sie mir befahl S[PRO t_i
the book which she me ordered
von ihm zu kaufen]]]
from him to buy

Such movement would be in violation of subjacency if S is a
bounding node, and the S/S subjacency analysis would therefore
incorrectly predict that the results are ungrammatical.

Next, let us assume that the bracketed constructions in (26)
are of the form _S[COMP[ ] S[ ]]. In that case, the relative
pronoun could first be moved into the lower clause COMP. From
there, however, it would have to be moved into the higher COMP
across both an S and an S boundary, as in (27b).
Thus, the grammaticality of the examples in (26) is inconsistent with the claim that both S and Š are bounding nodes for subjacency in German. We must therefore find an alternative way of blocking extraction of the type found in the ill-formed constructions in (25), which does not also block extraction of the type found in the well-formed constructions in (26). A comparison of the two yields two obvious differences to which such an alternative condition could conceivably refer: it could distinguish between extraction from clauses with lexical subjects and extraction from clauses with PRO subjects, or it could be sensitive to the presence or absence of tense. However, we have reason to doubt the relevance of the first of these differences. We have seen that reflexive binding and DR in German are restricted by the SSC in constructions with PRO subjects, so there is no evidence elsewhere in the grammar for constraints triggered by the presence of lexical subjects but not PRO subjects. The second difference, on the other hand, is quite likely to be the crucial one, since we have already established that tensed and untensed clauses behave differently with respect to constraints on at least one other process in German.

Of course, these obvious differences do not exhaust the possibilities which exist a priori for characterizing the asymmetry between (25) and (26). If we adopt (27a), rather than (27b), as the correct analysis of the latter, then we can claim that this asymmetry reflects a difference in extractability from S and Š. Š-boundaries can be claimed not to be barriers for movement in German. Therefore, relativization is permitted in (26). Š-boundaries, on the other hand, can be claimed to block movement, thus preventing relativization in (25). (As observed in note (14), Chomsky has recently proposed that Š might universally constitute an absolute barrier for movement.) The major difficulty with the proposal just outlined is a complete lack of evidence that (25) and (26) differ structurally in the required way. There is no independent motivation for favoring analysis (27a) over (27b) as the correct characterization of extraction from infinitive complements. In fact, according to Chomsky's most recent model
(27a) isn't even a possible analysis of such constructions, since PRO subjects crucially require the presence of 3.

Thus, we are led by a process of elimination to conclude that the most likely relevant difference between (25) and (26) is that of tense. It appears that relative pronoun movement in German is free to extract from untensed clauses, but not from tensed ones.

If we attempt to refine this rough formulation, however, we find that the constraint is not collapsible with the PIC as normally stated. That is, it does not appear to be formulateable in terms of a c-command relationship between tense and the affected position. Consider example (25a). In that example, the relative pronoun has been moved twice. (Of course, I am assuming successive-cyclic WH-movement). First, it has been moved from a position c-commanded by tense into the lower COMP. As illustrated by (24), such movement is a perfectly normal operation. The second movement, from the lower COMP to the higher one, is the one to be prevented. It cannot be prohibited by the usual formulation of the PIC, however, since the lower COMP is not within the domain of tense. Clearly, a system of constraints which contains both the standard PIC and some other restriction on accessibility of positions in tensed clauses is unsatisfying. Thus, while it is somewhat risky to draw far-reaching conclusions from an isolated instance, the German relativization facts have potentially interesting consequences for one or more major claims about grammatical organization, including the successive cyclic hypothesis of movement and the significance of the c-command relationship in defining constraints on grammars.
Acknowledgments

A highly abbreviated version of this paper was presented at
the 1979 LSA winter meeting.

I would like to thank Jim Gair, Julie Herschensohn, Herb Kufner,
Bob Ladd, Sally McConnell-Ginet and Larry Solan for their helpful
comments and suggestions. All remaining errors are the sole
responsibility of the author.

Notes

1 Specified subjects are defined for the purpose of this
condition as subjects not controlled by Y and not containing X.
The notion of specified subject becomes unnecessary in the version
of the SSC advanced in Chomsky (1978).

2 According to the analysis of Chomsky (1979), the complement
in (3b) consists of 5, while the one in (3a) consists solely of
S. I will ignore this proposed difference, since it is irrelevant
for the arguments presented here.

3 Citations from the Gothic Bible are taken from the edition
of Streitberg (1971). I have also used the version of the Greek
model for translation compiled by Streitberg, which is the result
of painstaking comparison of texts, and which is widely accepted
as essentially correct. The Gothic translation is generally
acknowledged to be extremely faithful to the Greek original,
although the degree to which this fidelity affects its trustworthi-
ness as a syntactic corpus is a matter of dispute. This controversy
has no bearing on the nativeness of the Gothic data discussed here,
however, since the translator systematically diverged from the
Greek text with respect to the distribution of reflexive and
nonreflexive forms.

4 For a more detailed account of the differences in the
distribution of reflexive pronouns in Greek and Gothic, see Harbert
(in preparation).

5 It appears to be normal crosslinguistically for DR and
reflexive binding to be parallel phenomena; i.e., usually, the only
positions in which a pronoun is subject to an obligatory DR inter-
pretation with respect to a preceding NP are those in which a
reflexive form may be understood as coreferring with that NP.
Chomsky (1978) accounted for this parallelism by means of rather elaborate indexing and index-erasing mechanisms. In Chomsky (1979) it results from complementary restrictions on pronouns and anaphors. The former must be free within their minimal governing categories, while the latter must be bound within their minimal governing categories.

6 The validity of the claim that the examples in (12) exemplify violations of the SSC could possibly be challenged on two points. First, it could be claimed that Gothic reflexives are not 'true' anaphors. Second, it could be claimed that these examples do not in fact involve nonfinite clauses.

The first of these objections is without basis, given a reasonable definition of anaphors. As noted, Gothic reflexive forms never occur without a subject antecedent. They are obligatory in simple clauses when coreference with the subject is intended, and they are blocked from occurring free in at least some opaque domains (i.e., in subject and nonsubject position in tensed clauses).

The second objection could arise with respect to at least those constructions which I have analyzed as having PRO subjects. Since PRO has no overt realization, it might be claimed a priori that it is simply not present in these examples. The constructions in question could be analyzed as subjectless VPs, rather than as clauses with PRO subjects, in which case no violation of the SSC would be involved. Chomsky (1978:11) rules out this alternative type of analysis in principle, since it leads to a complication of the rules for the base. However, the Gothic data themselves provide an argument against the VP analysis. As observed, Gothic reflexive forms require subject antecedents. Example (i), however, illustrates that they can occur in infinitive complements in the absence of an appropriate lexical subject controller.

i).  anabiuda qenai₁ [...] PRO₁ du abin seinamma₁
     I-command woman-Dat to husband self's
     (+REFL) aťra gagawairpjan]
     later to-reconcile
     'I command a woman...later to be reconciled with her husband.' (I Cor 7:10-11)

Unless we posit a PRO subject in such constructions, we cannot explain the appearance of the reflexive. qenai cannot serve as its antecedent, since it is a nonsubject.
Similar arguments will be presented against the VP analysis in analogous cases in the other languages to be discussed.

It should be pointed out that there are some rare examples in the Gothic Bible in which a nonreflexive pronoun in a nonfinite clause is not interpreted as disjointly referent with the subject of the higher clause. Compare, for example, (ii):

\[
\text{ii). ei } [\text{is}_i] \text{ gebi unsis}_j [\text{PRO}_j \text{ unagein that he might-give us fearlessly us handau fijande unsaraize galausidaim out-of hands of-enemies our delivered skalkinon imma}_i (-\text{REFL})] \text{ to-serve him}
\]

'that he might grant us, fearlessly delivered out of the hands of our enemies, to serve him'

(Luk 1:73-74)

The normal distribution of pronouns in Gothic leads us to expect a reflexive in the underlined position. These cases are generally highly complex, with a great deal of material intervening between the higher clause subject and the pronoun; they might therefore be explained as the results of simple lapses. However, I argue elsewhere (Harbert, in preparation) that they might also be regarded as evidence of an incipient change in the direction of a grammar which is less marked with respect to universal conditions on binding.

7 Reflexives in finite clauses in Icelandic can have higher clause subjects as their antecedents under some highly restricted, discourse-conditioned circumstances. This is illustrated by (i), from Thráinsson (1976a):

\[
\text{i). Jón}_i \text{ sagði } [\text{að}_i \text{ hann}_i \text{ væri gæður John said that he would-be glad }
\]

\[
[\text{ef } \text{ María}_j \text{ kyssti } \text{ sig}_i (+\text{REFL})/\text{hann}_i (-\text{REFL})] \text{ if María kissed self /him}
\]

'John said that he would be glad if Mary kissed him.'

In order for the reflexive to be possible in such constructions, the verb of the lower clause must be subjunctive. (ii) shows, however, that this condition is not sufficient; rather, the antecedent must also be the subject of a verb of a specific semantic type, e.g. a verb of reporting like \text{segja} 'say.'
ii). Jón varð glad if Mary kissed him /

*sig*

The restrictions on this use of the reflexive in Icelandic are discussed in detail by Thráinsson (1976a), who observes that the contrast between (i) and (ii) makes it unlikely that the conditions on the occurrence of such reflexives are to be stated syntactically. The possibility of the reflexive in (i) is clearly not the type of phenomenon one would wish to account for in terms of core-grammar conditions; rather, it appears to be more appropriately handled by the type of discourse-level linking suggested by Koster (1978) for analogous uses of the reflexive in English. (Compare Clements (1978) for an interesting discussion of similar cases in other languages). Incidentally, note that the underlined nonreflexive pronoun in (i) is not subject to an obligatory DR interpretation with respect to the higher-clause subject.

8 For extensive arguments that sentences like (15a) involve infinitival clauses with PRO subjects, rather than subjectless VPs, see Andrews (1976).

9 The facts presented here have also been observed by Verma (1972), Gupta (1974) and Kachru and Bhatia (1977).

10 The claim that (16c) involves an untensed clause with a PRO subject, rather than a subjectless VP, is supported by the fact that the reflexive can also be understood as coreferring with Winod. Since, in general, reflexives in Hindi can be controlled only by subjects, we must posit a PRO subject, controlled by Winod, to which the reflexive can be properly bound.

11 According to the PIC model, the occurrence of the anaphor in English example (8) is marked, while the blocking of the anaphor in Hindi example (17b) is normal. The NIC model of Chomsky (1978), on the other hand, characterizes (8) as normal and (17b) as atypical. At first glance it appears that the choice between the two models with respect to these examples is simply a matter of characterizing one construction or the other as the crosslinguistic norm. In fact, however, the NIC model only makes a partially correct prediction about (8), since, as illustrated by (i), the position in question remains opaque with respect to DR:

i). They said that NP[pictures of them] would be sold]
According to Chomsky's latest model of binding, both the use of each other in English and appnas in Hindi as possessives would be crosslinguistically marked in any case, since that model predicts that anaphors should not be able to appear free within minimal governing categories, including NPs. This claim has some interesting ramifications. Some languages, e.g., English, use nonreflexive pronominal forms to indicate possession both in instances involving coreference with the subject and in instances involving disjoint reference with the subject, as in (ii).

\[ \text{ii). } \text{He}_i \text{ sold } \text{NP}[\text{his}_i, \text{ car}] \]

In such languages, the usual reflexive pronoun cannot be used to indicate possession by the subject:

\[ \text{iii). } *\text{He}_i \text{ sold } \text{NP}[\text{himself's}_i, \text{ car}] \]

Other languages, e.g., Hindi, Gothic, Icelandic and Latin, distinguish systematically between reflexive and nonreflexive possessives. According to Chomsky (1979), languages like English represent the unmarked case, while languages like these represent the marked case. In Harbert (in preparation) I discuss data which give interesting support to this claim; throughout their history, the Germanic languages have tended to abandon the reflexive/nonreflexive possessive distinction. This tendency is readily interpretable as a tendency to conform to crosslinguistically unmarked principles of binding. Significantly, the same tendency is in evidence in Romance, where the Latin suus/eius distinction has been universally abandoned in the later dialects.

Once again, however, certain asymmetries appear which are troublesome for Chomsky's latest binding proposals. The existence of reflexive possessives may be crosslinguistically infrequent (I have no actual statistics). Nonetheless, they are found in several languages. On the other hand, I know of no case in which anaphors can appear free in nominative subject position; yet both of these possibilities are blocked in Chomsky's model by a single, general condition on anaphors, and therefore should not be expected to vary independently.

12 There are at least two sets of facts which argue that complements like the one in (20b) consist of untensed clauses with PRO subjects, rather than subjectless VPs. The first of these involves sentences like (21), in which DR and reflexive binding fail to operate down into such a complement. Within the framework assumed here, only the SSC can prevent them from operating in this
way, and the SSC can be triggered only if a PRO subject is present.

The second argument is based on an observation by Sweetser (1976) on the syntax of the adverbs selbst/selber (= '(by) oneself' in the emphatic sense.) Selbst and selber can usually be construed either with subject NPs or nonsubject NPs, provided that they are adjacent to those NPs. This is illustrated by (i) and (ii).

i). Den Professor selber habe ich gefragt  
   the professor i  self i  aux I asked  
   'I asked the professor himself.'

ii). Ich selber habe den Professor gefragt  
    I  self i  aux the professor asked  
    'I myself asked the professor.'

Selbst and selber can also 'float away' from the NPs with which they are connected, but only if those NPs are subjects. Compare (iii) and (iv).

iii). Den Professor habe ich selber gefragt  
      the professor i  aux I  self j / *self i  asked 
      'I asked the professor myself/*himself'

iv). Ich habe den Professor selber gefragt  
    I  aux the professor j  self i / self j  asked  
    'I asked the professor myself/himself'

Now, consider (v):

v). Sie bat mich [das selber zu machen]  
   She i asked me j that self j / *self i to do  
   'She asked me to do that myself.'

Selber in this example can be construed only with mich. This fact has several consequences. First, if the bracketed construction in (v) is a subjectless VP, the failure of selber to be construed with sie cannot be accounted for in a principled way. On the other hand, if the bracketed construction is an S (or S) with a PRO subject, such floating will be blocked automatically by the SSC. (The same holds true, mutatis mutandis, for an analysis which holds that there is no selber-floating, but an interpretive rule associating selber with NPs.)

Even granting the possibility that this restriction is explain-
able in terms of some independently motivatable extra constraint on selber-floating, the VP analysis is still faced with a problem. Selber must have floated from (or alternatively, must be construed with) some NP in (v). In the VP analysis, the only candidate is the matrix object mich. However, as shown in (vi), the putative pre-floating source for (v) is ungrammatical.

\[ \text{vi.} \quad *\text{Sie bat mich \_ selber \_ das zu machen} \]

she asked me self that to do

For some reason, selber in (vi) can refer only to sie. If (vi) is taken to the source for (v), therefore, it must be specified that selber-floating is obligatory in constructions of this type. However, such a specification is inconsistent with the general behavior of selber-floating; not only is it optional elsewhere, as illustrated by the alternation between (ii) and (iv), but, as illustrated by (iii), it is generally prohibited from removing selber from a nonsubject NP.

On the other hand, if we claim that selber in (v) is associated with a PRO subject controlled by mich, we need make no such ad hoc exceptions to the general conditions on selber-floating.

Chomsky (1979) suggests with respect to another phenomenon the possibility that a condition on binding which is not stated independently because it is derivable as a theorem from a yet more general condition may be put into effect through some manner of "analogic process" just in case the more general condition is relaxed. In the present instance, an analysis of this sort might have the following form: the PIC does not need to be stated in the grammar to prevent anaphors from appearing free in nonsubject position in tensed clauses, because they are already prevented from doing so by a more general condition—the SSC. Just in case the latter is relaxed, however, the former acquires an independent existence to handle a subset of its responsibilities.

It seems to me that proposals of this sort amount to begging the question of the nature of core-grammar constraints. Moreover, we are still faced with the problem of explaining why all of the languages we have considered should choose to institute just this particular theorem of the relaxed SSC.

Chomsky (1979) proposes that S is universally a boundary for movement, and that the so-called bridge predicates in English are verbs which govern S-pruning.
References


Harbert, Wayne (in preparation). Germanic reflexives and conditions on binding.


GENERICNESS AND INTENSIONALITY

Julia Herschensohn
Cornell University

The distinction made by Frege (1892) between Sinn, 'sense', and Bedeutung 'reference', to account for the nonsubstitutability of coreferring terms in opaque contexts has proved a point of study for philosophers and linguists throughout the twentieth century. Thus while both 'the Morning Star' and 'the Evening Star' ('Phosphorus' and 'Hesperus') refer to the planet Venus, they are not interchangeable in (1c).

(1) a. Jane believes the Morning Star is a planet.
   b. The Morning Star is the Evening Star.
   c. Jane believes the Evening Star is a planet.

One must distinguish between the reference or extension (i.e. the object Venus, second planet from the Sun) and the sense or intension (the 'concept' of the referring expression) in order to account for the possible falsity of (1c), in the case that Jane had concluded that Phosphorus was a planet, but had made no such inference regarding Hesperus. Opaque or intensional contexts allow either a specific (de re) or a nonspecific (de dicto) interpretation of the NP within the scope of the opacity inducing element. A more complete understanding of 'intension' is that an intension is a function from possible worlds to extensions, that is, it provides a formula for determining the proper extension of an expression in any given world (cf. Carnap (1956), Lewis (1972)). An intension specifies the necessary properties of a given NP in all possible worlds.

Because the intensional context induces an interpretation of the NP as having an extension in worlds other than the present, the nonspecific de dicto reading ignores accidental properties that might be associated with a specific referent (e.g. that the 'Evening Star' is the second planet from the Sun, surrounded by thick clouds, etc.) and rather regards only necessary properties of the intension of the NP.
in question, that is what is necessarily characteristic of that NP in all possible worlds (cf. Kripke (1972)). Intension is then seen as central to 'meaning', although it is not the sole constituent. Both opaque contexts and generic sentences provide intensional environments, as both engender nonspecific NP's and therefore focus on the intension of the NP, on its necessary properties in all possible worlds. I shall call this focus on intension intensionality.

The term generic is used to describe either a nonspecific definite NP in any syntactic position (2), a nonspecific subject NP (3), or a sentence whose subject NP is nonspecific and whose verb is habitual (4).

(2)  a. The beaver builds dams.
     b. Dams are built by the beaver.
     c. John is writing an article on the beaver.
     d. The beaver is becoming extinct.

(3)  a. The beaver builds dams.
     b. A beaver builds dams.

(4)  a. The whale is a mammal.
     b. The elephant eats peanuts.

The nonspecificity of the NP is thus crucial to the description of the generic, particularly as the NP is the focus of genericness. Because specificity is determined by several linguistic and nonlinguistic factors, every generic sentence is ambiguous between a generic and nongeneric interpretation.

In its referential use a given NP is associated with a specific referent or extension; in its generic use there is no necessary extension of the NP in the universe of discourse. The referential is the extensional use of the article while the generic is the intensional use of the article. The generic function focuses on the intension of the article and of the noun, and thus accounts for the difference in syntax and interpretation between definite and indefinite and between count and mass in (5)-(8).

(5)  a. The whale is numerous on the Pacific Coast.
     b. Whales are numerous on the Pacific Coast.
     c. *A whale is numerous on the Pacific Coast.
(6)  a. The whale disperses itself quickly when threatened.
   b. Whales disperse themselves quickly when threatened.
   c. *A whale disperses itself quickly when threatened.

(7)  a. The whale is almost extinct.
   b. Whales are almost extinct.
   c. *A whale is almost extinct.

(8)  a. *The governor of California is numerous on the Pacific Coast.
   b. *(The) Milk is numerous in Wisconsin.

The intension of the noun phrase is then partially a function of the intension of the article.

The verb of a generic sentence is always habitual, yet the generic habitual is different from the referential habitual in that the nonspecific subject forces a reading which is not fixed with respect to time and space. While the generic habitual shares all morphological and syntactic characteristics of the referential, it is not semantically identical from this perspective. The difference however precisely parallels that noted between referential and generic NP's, the focus is on intension, not extension. It is thus intensionality, the focus on intension, which is the notion unifying genericness in both NP's and sentences.

The notion of intensionality is not limited to NP's and generics, but is rather one of the key properties of language. A number of phenomena from quite divergent aspects of language show the pervasiveness of this phenomenon.

Opaque contexts engender ambiguity between an intensional (de dicto) and extensional (de re) reading of the NP therein.

(9)  a. Oedipus said that his mother was beautiful.
   b. Oedipus said: 'My mother is beautiful.' (de dicto)
   c. Oedipus said: 'Jocasta is beautiful.' (de re)

The indirect speech of (9a) may report the intension of the definite description ('my mother, whoever she is'), that is
the literal report (b), or its extension, the speaker's reinterpre-
tation of what Oedipus said with respect to a specific referent (c).

(10) a. Jane believes the Morning Star is a planet.
    b. The Morning Star is the Evening Star.
    c. Jane believes the Evening Star is a planet.

Jane's belief in (10a) may be about the extension of the Morning Star (i.e. Venus, second planet from the Sun, etc.) in which case (10c) is true, or her belief may concern the intension of the Morning Star, in which case (10c) may or may not be true.

(11) a. Jane wants to marry a Swede.
    b. Jane wants to marry a Swede, but she can't find one.
    c. Jane wants to marry a Swede, and frankly, I don't like him.

(11a) is ambiguous between the reading in (11c) where Jane has a specific extension in mind and (11b) where Jane is interested in the intension, which has a number of potential extensions. Generic sentences are likewise ambiguous with referential ones, the former being intensional, the latter extensional.

Intensionality is also manifested lexically, as items may be weighted either to the referential or the abstract. Shifters and most uses of deictics are obligatorily extensional. On the other hand, generic one (French on, German Mann) is necessarily intensional, as it is the nonspecific agent by definition. Lexical items may show a predilection toward the referential or the generic, sometimes by their meaning alone (concrete nouns are used referentially whereas abstract nouns can often be only generic), but sometimes in an arbitrary way. Child may be used referentially or generically, but kid cannot be used with the definite singular generic (the nonspecific, nonreferential par excellence).

(12) In this, the Year of the Child, it is well to remember that the child needs love as well as sustenance. (specific or generic)

(13) In this, the Year of the Child, it is well to remember that the kid needs love as well as sustenance. (specific only)
Nouns then may favor intensionality (e.g. *courage*) or extensionality (e.g. *kid*).

Carlson notes two readings of certain verb constructions, the 'event' reading and the 'generic or characteristic' reading. He argues that the ambiguity is not related to tense, as tenseless verbs (14) show the ambiguity.

(14) The couple considered *attending church*.

'The object of consideration may either be a particular happening (attending church on one particular day), or characteristically (being one who habitually attends church).’ (Carlson (1977b):119) The event reading is extensional while the characteristic reading is intensional.

Carlson points out that Milsark (1976) notices a similar phenomenon with predicates, those that are state-descriptive (15) and those that are properties (16).\(^2\)

(15) a. A man was nude.
   b. A man was drunk (in a bar).
   c. Some women were alert.

(16) a. A man was intelligent.
   b. A man was boring (*in a bar*).
   c. Some women were beautiful.

He makes the classification on the basis of which predicates may be used in existential sentences. Thus the state-description predicates are extensional while the properties are intensional. This is in keeping with the observation that the predicates in (16) tend to refer to necessary rather than accidental properties.

Anaphora also show the ability to distinguish intension from extension, as identity of sense corresponds to the former (17a), while identity of reference to the latter (17b).

(17) a. I read a book and John read one too.
   b. I read a book and John read it too.

Type pronominalization (17a) chooses the intension as antecedent; token pronominalization (17b) chooses the extension as antecedent. Another syntactic construction which shows anaphoric relations sensitive to intensionality is the relative clause.
Kuno (1970) notes that with a nonspecific antecedent a which relative is used (18a), where usually who appears (18b).

(18) a. John is a doctor, which I could never be.
    b. John is a doctor, whom you can really trust.

When the relative relates to the intension of its antecedent which is used; when it relates to the extension, who is used.

Certain syntactic constructions favor one mode or the other. The existential sentence (19) is extensional par excellence, whereas the middle voice se construction in French (20) is usually generic and therefore intensional.

(19) There is a man standing on the table.

(20) Le pain se mange à tous les repas en France.
    the bread self eats at all the meals in France
    'Bread is eaten with all meals in France.'

The subjunctive mood focuses on the intension of the verb, on its necessary properties and potential realizations. The contrast between the intensional subjective (21) and the extensional indicative (22) can be seen in Rivero's examples.

(21) Quiero que vengan los niños que eran culpables.
    'I want the children who were guilty (indic.)
    to come.'

(22) Quiero que vengan los niños que fueran culpables.
    'I want the children who may have turned out to be
    guilty (subjunct.) to come.'

The specificity of the noun is correlated with the extensionality of the verb: +Specific with indicative, -Specific with subjunctive.

It is the ability to refer abstractly, nonspecifically, intensionally that renders language such a complex system of communication capable of expressing the potential as well as the actual. From one perspective intensionality represents the idealized system of language's necessary properties while extensionality represents its mise en action, but it is impossible to isolate the two phenomena, as language functions by employing both modes.
FOOTNOTES

1 Because the interpretation of the article is a function of the noun it modifies, it is possible to predict the 'class generic' reading as an attribute only of count nouns. For a noun to be countable, it must not be amorphous and must have more than one possible referent in a given world. The plurality interpretation therefore does not obtain when a noun has but a single referent (8a) or when it is a mass noun (8b).

The anomaly of (8a) may or may not hold for (i) depending on whether the class yeti has a single member.

(i) The yeti is numerous in the Himalayas.

2 'Properties are those facts about entities which are assumed to be, even if they are not in fact, permanent, unalterable, and in some sense possessed by the entity, while states are conditions which are, at least in principle, transitory, not possessed by the entity of which they are predicated, and the removal of which causes no change in the essential qualities of the entity.' (Milsark:129)

3 Frege noted this fact about subjunctives: 'These cases are distinguished linguistically by the mood of the verb. With the subjunctive, we have a dependent question and indirect reference of the words, so that a proper name cannot in general be replaced by another name of the same object.' (Frege 1892/1964:68). By 'indirect reference' Frege means intensional reference.
REFERENCES


. 1979. On two asymmetrical uses of the demonstrative determiners. This volume.


LINGUISTIC RULES FOR SPEECH SYNTHESIS

Susan R. Hertz

Abstract

This paper describes a highly interactive and flexible speech synthesis system called SRS (Speech Research System). SRS allows linguists with no knowledge of computing to develop text-to-speech rules for any natural language. The system uses three kinds of rules to express the conversion from text to speech: letter rules, feature rules, and parameter rules. First, letter rules convert a text string into a matrix of distinctive features. Next, feature rules modify the feature matrix. Finally, parameter rules generate a set of synthesizer parameter values on the basis of the features in the matrix. The rule notation is novel and powerful, yet of a general format familiar to linguists.

Introduction

Recently, linguists and psycho-linguists have begun to recognize the advantages of using a computer to test their hypotheses about the nature of speech. With the appropriate programs, for example, rule sets that produce speech in any natural language could be developed and verified, and stimuli for carefully controlled perceptual experiments could be generated. More generally, such experience would enable linguists to learn firsthand the fundamental principles of acoustic phonetics and speech synthesis. However, speech synthesis systems oriented toward such experimentation have been largely unavailable. It is goal of SRS (Speech Research System), an interactive system specifically designed for the linguist or psycho-linguist, to fill this important need.

SRS has two special characteristics. The first is minimal theoretical constraints: the system provides the user with a general framework within which to test hypotheses about the nature of speech, but does not dictate what those hypotheses must be or lay down a particular synthesis strategy.

The second special characteristic is powerful interactive facilities. The system provides a way for the linguist sitting at the keyboard to define distinctive features, phonetic symbols, and rules, to store and edit them, to test the rules by applying them, and to edit the resulting acoustic parameter file. A large number of alternative feature, symbol, and rule sets may be defined and stored, yet using the system requires almost no knowledge of computing technology.

SRS runs on a small computer that is coupled to a terminal analog speech synthesizer. The synthesizer accepts digital input from the computer and produces continuous waveforms. The synthesizer is designed to
accept values for various speech parameters, such as formant frequencies, amplitudes, and fundamental frequency. The parameter values are transmitted to the synthesizer by the computer, which takes new values from the acoustic parameter file at specified time intervals to update the values for the synthesizer.

The acoustic parameter file represents an utterance. It is the result of a set of phonological rules that have been applied to a text utterance or to a phonetic transcription of an utterance.

The computer constructs the acoustic parameter file from commands, rule definitions, and utterances the user gives it via a computer terminal, as illustrated in Figure 1.

![Figure 1. User Interaction with the System](image)

The three kinds of rules used by the system are described in the various sections of this paper. The first section presents an overview of the rule application process. The second describes the rules in more detail, showing the range of linguistic statements that users may make with the rules. It also describes the other kind of information that users must specify before they can write and apply rules. This information includes phonetic symbols, distinctive features, and the like. The last section discusses why all three kinds of rules are needed to express the conversion from text to speech in a linguistically meaningful way.

I. The Rule Application Process

Figure 2 shows the sequential operation of the three kinds of rules supported by the system. First, letter rules convert an orthographic representation of an utterance into a string of user-defined symbols, each
associated with a set of distinctive features. Next, feature rules modify the feature composition of the utterance, by supplying redundant or context-dependent features. Finally, parameter rules produce a file of synthesizer parameter values on the basis of the features present in the utterance.

![Diagram of conversion from text to speech]

Figure 2. Conversion from Text to Speech

Figure 3 contains some sample rules that produce values for the nasal amplitude on the synthesizer, shown as a user might type them in. The letter rules state that the combination of letters 'ai' is pronounced [e] and that the letter 'm' is pronounced [m]. The diagram shows the phonetic transcription produced by these rules for the word aim, and below it some of the features defined by the user for the phonetic symbols involved.

The feature rule states that a segment with the feature [+voc] acquires the feature [+nas] when it precedes a nasal. Thus, it adds to the [e] of aim the feature 'nasal', a feature used by the subsequent parameter rules.

The first parameter rule, for example, assigns to a nasal vowel a target for the nasal amplitude halfway through the segment with a value of 2 decibels and a linear transition (represented by an underscore) to a target in the following segment. The second rule sets the nasal amplitude to 10 decibels throughout the entire duration of a nasal consonant. The diagram shows the pattern these rules produce for the nasal amplitude.

II. Features, Symbols, and Rules

To begin, each user creates his own linguistic framework by typing in features and symbols to represent rules and utterances relevant to his
LETTER RULES:
\[ ai \rightarrow [e] \]
\[ m \rightarrow [m] \]

\[ \text{aim} \]
\[ \downarrow \]
\[ \text{e} \rightarrow [m] \]
\[ \text{[+voc]} \rightarrow \text{[+nas]} \]
\[ \text{...} \]
\[ \text{[+nas]} \]

FEATURE RULE:
\[ [+\text{voc}] \rightarrow [+\text{nas}] / _{\text{[+nas]}} \]

\[ \text{[+voc]} \rightarrow \text{[+nas]} \]
\[ \text{[+nas]} \]
\[ \text{...} \]

PARAMETER RULES:
\[ [+\text{voc} \text{[+nas]}] \text{AN} \rightarrow (.5,2) \]
\[ [+\text{con} \text{[+nas]}] \text{AN} \rightarrow (.0,10) \rightarrow (.99,10) \]

\[ \text{0.5} \]
\[ \text{.0} \]
\[ \text{.99} \]
\[ \text{time} \]

\[ \text{Figure 3. Sample Rules and an Example} \]

problem. Then he defines the rules that convert the utterance into the file of parameter values that drive the synthesizer.

The following sections illustrate the kinds of features, symbols, and rules the user may type in to synthesize speech. Many of the examples are taken from actual data supplied with the synthesis system to familiarize a new user with its operation.

A. Features

Initially, the user must type in distinctive features. The features may be binary or n-ary. Binary features are represented by a name. N-ary features are represented by a name followed by a dot and the number of values the feature may assume. The following names, for example, are part of the system-supplied feature set:¹

binary features: stop voc voic tens vel ...

n-ary features: vb.3 vh.3 st.3 ...

The names [vb.3] and [vh.3] represent vowel backness and vowel height as three-valued features and the name [st.3] represents three degrees of word stress. Once a feature has been introduced, the user can make reference to it in letter, feature, and parameter rules and in defining utterance symbols, as shown in the following sections.

B. Utterance Symbols

An utterance to be synthesized may be expressed by the user in one of three ways: as a text utterance (in terms of ordinary spelling), as a

¹ The system implementation makes it desirable to restrict feature names to four characters.
symbolic utterance (in terms of phonetic symbols), or as a combination of ordinary spelling and phonetic symbols. Any portions of an utterance entered as text must be converted into a string of phonetic symbols by a set of letter rules.

1. Symbolic Utterances

There are three types of symbols that may be defined to represent symbolic utterances. The first, segment symbols, represent bundles of features that make up utterance segments. The following segment symbols, for example, might be used to synthesize the word Cornell. They are displayed in a form in which a user could type them in:

```
  k = +stop +vel
  0 = vb.3 vh.1 +voc
  r = +ret
  n = +alv +nas
  E = vb.1 vh.2 +voc
  l = +lat
```

No negative binary features such as [-voic] need be specified, because all unspecified binary features are assumed to be negative. The symbol 'k', for example, is assumed to have the feature [-voic] since it was not specified as [+voic]. Note that only the minimum number of features necessary to distinguish each segment from all others is assigned in each symbol definition. For the sake of achieving greatest linguistic generality, those features that are predictable from other features present in a segment may be assigned to the segment with a feature rule, rather than with a symbol definition. For example, rather than repeat the feature [+voic] in every definition of a vowel, a single rule could assign the feature [+voic] to all vowels.

The utterance may have two other kinds of symbols interspersed among the segment symbols. First, it may have prosody symbols. Such symbols, like segment symbols, are defined in terms of features. Rather than comprising segments of the utterance, however, their features are added to those of a preceding or following segment when the utterance is converted to its appropriate feature representation. Prosody symbols usually assign features to a segment that are not inherent to it, but depend on unpredictable aspects of the context in which the segment is embedded. Consider, for example, the following symbol definitions:

```
  '1 = (FOLLOW) st.1
  '2 = (FOLLOW) st.2
  '3 = (FOLLOW) st.3
  / = (PRECEDE) +peak
```
The prosody symbols '1', '2', and '3' represent three degrees of stress. When used in an utterance, they add the features [st.1], [st.2], and [st.3] to following segments. The symbol '/' represents an intonation peak. It adds the intonation feature [+peak] to a preceding segment.

The other kind of non-segmental symbols, boundary symbols, have neither features of their own nor direct influence on the features of their neighbors. They are most often used to represent such aspects of the utterance as the boundaries between syntactic units, but can represent anything else needed by subsequent rules, including word classes, pauses, and the like. In the system-supplied data set, a crosshatch (#) represents word boundaries and two vertical bars (||) a pause. Since many phonological processes take place in word-initial or word-final position, or at a pause, these boundary symbols often serve as a part of rule environments, as will become clear in the sections on feature and parameter rules.

Once the appropriate symbols have been defined, an utterance to be synthesized can be typed in as a string of those symbols. The following diagram shows the word Cornell in its symbolic input form and beneath it the features to which it is converted by the system on the basis of the above definitions:

```
# k O r n '3 E 1 #
# +stop vb.3 +rel +alv | vb.1 +lat #
+vel vh.1 +nas | vh.2
+voc +voc
```

Note how the feature [st.3] (highest degree of stress), associated with the prosody symbol '3', is added to the features for the stressed vowel that follows, symbolized by 'E'.

2. Text Utterances

A text utterance is converted to a symbolic utterance by a set of letter rules. Unlike the segment symbols of symbolic utterances, which can only be referred to by the rules in terms of features, text characters may be referred to directly. A user can, however, assign features to text characters so that his rules can also make reference to groups of characters, such as all letters that represent vowels or all those that represent consonants. The following symbol definition, for example, could be used to assign to the letter 'c' the feature [+con]:

```
c = (LETTER) +con
```

Subsequent sections illustrate the use of the feature [+con] in writing letter rules.

Like segment symbols of symbolic utterances, text characters are assumed to have negative values for any features for which they are not given a positive value. For example, if only the letters of the alphabet are assigned the feature [+seg], all non-letters, whether assigned other
features or not defined at all, are assumed to have the feature [-seg]. Thus, in the system-supplied data set, the feature [-seg] can be used in letter rules, among other things, to refer to word boundaries, since it matches commas, blanks, periods, and other word delimiters.

3. Text and Symbols

The previous sections have described how users can express utterances in terms of ordinary spelling or in terms of phonetic symbols. In addition, the system allows users to type in utterances that consist of both ordinary spelling and phonetic symbols. Consider, for example, the following utterance:

I [r E d] all day.

Since the letter rules in the system-supplied rule set generate the pronunciation [r i d] for the word read in the sentence I read all day, a user desiring the past tense pronunciation [r E d] has to type it phonetically. Note, however, that the remainder of the words of the sentence can be expressed in orthographic form, since they are handled correctly by the letter rules.

C. Rules

After naming his features and defining his symbols, a user may type in letter, feature, and parameter rules. The rules conform as closely as possible to conventional rule syntax familiar to linguists. However, since linguists' rules generally produce as their final output a discrete feature matrix, rather than a continuous waveform, the parameter rules include a new and powerful notation for describing the speech wave in a linguistically meaningful way.

1. Letter Rules

Letter rules convert an utterance expressed in ordinary spelling into a set of user-defined phonetic symbols. Consider, for example, the following letter rules, shown as a user might type them in:

\[
\begin{align*}
\text{ice} & \rightarrow [i \ s] / \{\text{apr} | \text{ol}\}_- \\
\text{ice} & \rightarrow [\& \ s] / -<\# \{([+\text{con}]) \text{ent} | \text{d(e)v} | \ldots\} \\
i & \rightarrow [\text{ay}] / _- [+\text{con}] \ e
\end{align*}
\]

where $[\&] = [\text{e}]$. The first rule states that the sequence of letters 'ice' is pronounced [i s] when it follows either the sequence 'apr' or 'ol', as in caprice and police. The second states that 'ice' is pronounced [\& s], as in novice, when it follows anything but a word boundary in turn followed by either up to two consonants or the sequence 'ent', or when it follows the sequence 'dv' or 'dev', etc. Thus, this rule assigns the correct pronunciation to the endings of words such as apprentice, crevice, and malice. The last more general rule states that the letter 'i' is pronounced [ay] when it precedes a consonant followed by 'e'. It assigns the correct pronunciation to the 'i' of words such as entice, device, advice, wide, and alike.
Note that braces and parentheses are used in much the same way as in generative notation. Braces surround alternatives, one of which must be present for the rule to apply, whereas parentheses surround optional elements, which may or may not be present for the rule to apply. The rule format differs only slightly from standard notation, in that for typing convenience alternatives follow each other on a line and are separated by a vertical bar, rather than being expressed vertically, one above the other:

\{apr | 'ol} rather than \{apr
ol\}

Angled brackets preceded by a minus sign, a device not familiar to linguists, enclose sequences of elements which must not be present if the rule is to apply. Note how the angled brackets are used in the above rule to exclude from application of the rule certain words that are handled by a later rule.

The following rule illustrates in more detail how the angled bracket notation, the most novel of the notational devices for expressing letter rules, is treated when rule environments are being tested for possible application:

\( a \rightarrow [e] / _{-<x>}[+\text{con}]e \)

Assume this rule is being tested for its applicability to the 'a' of taped. First, the letter following 'a', namely 'p', is tested to make sure it is not the letter 'x'. Since it is not, the same letter is tested to see if it has the feature [+con]. Since it does, the next letter is tested to make sure it is an 'e'. Note that once it has been determined that the element in angled brackets is not present in the appropriate place in the utterance, the testing process continues as though the element had never been included in the rule. If the rule environment in this example had been tested against the word taxed, it would have failed to match, since the letter following 'a' is 'x'.

The various notational devices described in this section are often combined to define environments more complex than those illustrated, particularly in rules that affect vowels. One such rule, which generates the unstressed ending of words such as hottest, and harvest, is described in Hertz (1979a).

---

2 On first glance, it might be argued that the rule 'a -> [e] / -<x> [+con]e' obscures the generalization that the letter 'a' is not pronounced [e] before the letters 'xe' because 'x', unlike most letters in the same environment is realized phonetically as a sequence of two consonants [ks]. However, in words such as badge, the letter 'a' precedes a sequence of letters that is realized by what many consider a single unit ['j'], but in which the 'a' is nevertheless pronounced [ae]. It would not help, as some have suggested, to first convert taped into an underlying form 't a k s e d' for purposes of writing a general rule, because there are other words, such as example, in which a conversion from 'x' to 'ks' would have adverse consequences.
2. Feature Rules

Feature rules are phonological rules of the type familiar to most linguists. They modify the feature composition of an utterance, and look like generative rules, but are not restricted to that theory. They are most often used to supply a segment with features used by subsequent parameter rules. The rules conform to conventional rule syntax except that the features of a feature list, like the alternatives in braces, are listed horizontally, with one feature following the next on a line, rather than vertically, with one feature below the other:

\[ +\text{vel} +\text{stop}\] rather than \[ +\text{vel} \\
+\text{stop} \]

Feature rules often assign features to a segment that depend on the segment's context. For example, the following rule, illustrated earlier, adds the feature \(+\text{nas}\) to a vowel that precedes a nasal:

\[ +\text{voc} \rightarrow +\text{nas} / - [+\text{nas}] \]

The angled bracket notation, described earlier in the section on letter rules, is most often used in feature lists to prevent a rule from applying across word boundaries. The following rule, for example, adds the feature \(+\text{asp}\) to a voiceless stop that precedes a stressed syllable within the same word:

\[ -\text{voic} +\text{stop} \rightarrow [+\text{asp}] / _{-<\#>[(+\text{con})-<\#>]+[+\text{voc} -\text{st.1}] \]

More specifically, this rule states that a segment with the features \(-\text{voic}\) and \(+\text{stop}\) acquires the feature \(+\text{asp}\) when it precedes a consonant followed by either a consonant and a vowel that does not have the feature \([\text{st.1}]\) (i.e. it has either \([\text{st.2}]\) or \([\text{st.3}]\)), or only a stressed vowel. The crosshatches enclosed in the angled brackets insure that no word boundaries are present before the consonant and vowel if the rule applies. A subsequent parameter rule refers to the feature \(+\text{asp}\) to control the aspiration amplitude on the synthesizer.

Feature rules often apply to the output of the letter rules to generate the correct pronunciation of a word. Consider, for example, the following rule:

\[ +\text{voc} \rightarrow [\text{st.1} \text{ vb.2} \text{ vh.2}] / \\
-<\#>([(+\text{con})-<\#>]+[(+\text{con})-<\#>])([+\text{voc} +\text{glid}])^3 \]

This rule reduces a vowel when it precedes up to three consonants followed by a diphthong, all in the same word. It affects the vowels of the syllables preceding those with the diphthongs in words such as deploy, synthesize, and arouse. Section III discusses in more detail why both letter rules and feature rules are needed to generate the correct pronunciation.

---

^3 Diphthongs are defined in the system-supplied data set as having both the features \(+\text{voc}\) and \(+\text{glid}\).
for many words.

In addition to supplying context-dependent features, feature rules may also fill in redundant features needed by subsequent parameter rules. The following rule, for example, assigns the feature [+voic] to any segment that is either a vowel, resonant, or nasal:

\[ [+\text{voc} \mid +\text{res} \mid +\text{nas}] \rightarrow [+\text{voic}] \]

3. Parameter Rules

Linguistically speaking, the most novel rules used by SRS are the parameter rules. They describe how to get the synthesizer values into the acoustic parameter file. The parameter rules look like standard phonological rules, except that in place of feature changes they specify segment durations or contour-and-target patterns, all in natural units of measurement rather than in specific parameter settings internal to the synthesizer. Consider, for example, the following duration rules:

1. \([+\text{stop}] \text{ DU} \rightarrow 100 \) / # _
2. \([+\text{son}] \text{ DU} \rightarrow 50 \)
3. \([\text{voc vh.1}] \text{ DU} \rightarrow 100 \)

Rule 1 assigns a word-initial stop a duration (DU) of 100 milliseconds. Rule 2 assigns all sonorants a duration of 50 milliseconds, and rule 3 overwrites this duration with one of 100 milliseconds when the sonorant is a low vowel. Figure 4 shows the durations assigned by these rules to the first three segments of Cornell.

The second type of parameter rule assigns contour-and-target patterns. Parameter targets are specified by a position relative to a segment, together with a value, expressed in a natural unit of measurement. Up to two targets may be assigned to a segment. Contours link targets within or
across segment boundaries. The simplest contour is a linear interpolation, which may be represented by an underscore (but see the section on parameter rule interactions for a more precise account of the use of the underscore).

The following example of a parameter rule describes the voicing amplitude (AV) pattern for voiced segments:

\[ [+\text{voic}] \text{AV} \rightarrow _{(0.20,20)} (0.80,18) _\]

This rule specifies two targets. The first is positioned 20% of the way through a voiced segment and has a value of 20 decibels, the second 80% of the way through the segment with a value of 18 decibels. Linear transitions ('_') link the targets to each other and to targets in preceding and following segments. This rule shows the maximum number of contours and targets that may be assigned to a segment.

The following rule has only one contour, but two targets:

\[ [-\text{voic}] \text{AV} \rightarrow (0.0,0) _{(0.99,0)} \]

This rule assigns to voiceless segments a voicing amplitude of zero decibels during the entire segment. Other rules might assign a single target, a single contour, one of each, or any of a number of other patterns.

Figure 5 shows the pattern produced by the two voicing rules just given for the voicing amplitude of the syllable [k 0 r].

\[ \text{Figure 5. Voicing Amplitude of Syllable [k 0 r]} \]

In addition to linear transitions, contours may be represented by names associated with user-defined shapes. The following rule for the aspiration amplitude (AH) refers to a curve with the shape shown below it (actually defined as a sequence of nine numbers).

\[ [+\text{asp}] \text{AH} \rightarrow (0.0,0) \text{ aspc} \]

\[ \text{aspc} = \_\_\_ \]

This rule assigns to aspirated segments a target for the aspiration amplitude at the beginning of the segment with an amplitude of zero decibels and
a following aspiration curve called \textit{asp}. In the system-supplied rule set, another rule assigns to unaspirated segments a target for the aspiration amplitude at the beginning of the segment with amplitude zero, so that the pattern produced for the aspiration amplitude of the sample syllable \textit{cor} is as shown in Figure 6.

![Figure 6. Aspiration Amplitude of Syllable \([k \ 0 \ r]\)](image)

In general, the parameter rules may associate any part of the pattern \(T\_T\_\) with a particular segment, where \('\) represents a contour and \(T\) represents a target. When conflicts arise between neighboring segments, such as two contours that have no intervening target, the rule application routines automatically insert missing targets or contours according to certain default assumptions, and ignore extra targets and contours.

(a) Parameter Rule Interactions

Two or more parameter rules that apply to the same segment may interact in linguistically meaningful ways to produce the final duration or contour-and-target pattern for the segment.

An example of the first type of interaction is the use of a duration rule that modifies a portion of the duration set by an earlier rule, as illustrated below:

\[ [+\text{voc}] \text{DU} \rightarrow (.20) 170\% (.80) / \_ \text{([- [+\text{con}][+\text{con}])} \| \]

This rule lengthens by 170\% the portion of a pre-pausal vowel that stretches from a point twenty percent of the way through the segment to a point eighty percent of the way through the segment. Note that it will not lengthen any transitions that may be present between the previous sound and the point at which the duration begins to be modified. Modifying the duration of transitions between the targets of neighboring segments could affect the perception of the sounds in question.

After a duration modification rule has applied to a segment, a later rule may make further alterations to the segment's duration.

It is not only duration rules, however, that can interact with each
other; rules that specify targets and contours may interact as well. For instance, a rule may modify by a certain percentage a target value that was set by an earlier rule. Such a rule contains a relatively specified target value, as illustrated by the following rule:

\[ [+\text{voc}] \text{F3} \rightarrow (\$,75\%) \]  

This rule lowers the third formant of a vowel that precedes a retroflexed consonant to 75% of its previously assigned value. The dollar sign functions as a placeholder for the target position already assigned, which remains unchanged.

To increase generality, dollar signs are used for either target positions or values that are set by some other rule. Consider, for example, the following rules:

1. \([+\text{st.1 voc}] \text{F2} \rightarrow _{._.5,$} _\)  
2. \([+\text{tens vh.3 vb.1 } +\text{voc}] \text{F2} \rightarrow (\$,2000) \)

Rule 1 assigns to all unstressed vowels a second formant target position of .5, but leaves the second formant target value unspecified, since it, unlike the target position, depends on the particular vowel. The second rule fills in a segment-specific second formant value. It assigns to a tense high front vowel, that is, to [i], a second formant value of 2000 hertz. The result of applying both of these rules to an unstressed [i] is the following contour-and-target pattern:

\[ _{._.5,2000} _\]

Now consider a case in which rule 2, which assigns a second formant value to [i], interacts with a rule that assigns two target positions, rather than one:

3. \([-\text{st.1 } +\text{tens } +\text{voc}] \text{F2} \rightarrow _{._.3,$} _{._.7,$} _\)

This rule sets the second formant target positions of all stressed tense vowels to .3 and .7, but leaves the target values unspecified. The result of applying rules 2 and 3 to a stressed [i] is the following:

\[ _{._.3,2000} _{._.7,$} _\]

If, after all the rules apply, a target still has no value, it is automatically assigned the last value used for the parameter in question. In this case, both targets will be assigned the value 2000 hertz. Note that rule 2, which assigns a second formant value to the first target of [i], interacts correctly with both rule 1, which assigns a single target to unstressed vowels, and with rule 3, which assigns two targets to stressed vowels. Had it explicitly filled in values for two targets, however, it would not have interacted correctly with rule 1, since it would have added a second target. The automatic propagation of target values, then, can be used to advantage to express certain linguistic generalizations.

In the last example, target positions were assigned to tense vowels
for the second formant only. Often, however, all formants are assigned the same target positions in a certain environment, and it would obscure a linguistic generalization to write three separate formant rules in such a case. The three rules may be collapsed into one via a parameter cover symbol (defined by the user along with utterance transcription symbols). A parameter cover symbol is a symbol that represents a group of related synthesizer parameters. In the system-supplied data set, for example, the symbol 'F' represents the first three formant parameters. It was defined as follows:

F = (PARAM) F1 F2 F3

The following rule uses this symbol to assign all formants of all tense vowels the same timing and contour configuration:

[+tens +voc] F -> _ (.3,$) _ (.7,$) _

If after all rules have been tested, any target position or value has not been explicitly specified, but left as a dollar sign, it is assigned a reasonable default value.

Parallel to the use of dollar signs for targets is the use of underscores for contours. Like dollar signs, underscores represent portions of a contour-and-target pattern that is to be left unchanged if specified by a preceding rule, or which may be specified by a later rule. Only if no previous or later rule specifies the contour by name is the default of a linear contour for the portion specified with the underscore assumed.

Unlike dollar signs, however, which are most often used as placeholders, underscores are most often used to represent their default, a linear transition, as illustrated in previous examples. The following rules, not taken from the system-supplied data set, illustrate the less common, but nevertheless linguistically meaningful, use of the underscore as a placeholder:

[+tens +voc] F -> (.3,$) curv (.7,$)

[+voc +tens vb.1 vh.2] F1 -> ($,500) _ ($,400)

The first rule assigns to the three formants of all tense vowels a target in the beginning of the segment followed by a curved transition to a target at the end of the segment. The second rule fills in the target values for the first formant of the tense vowel [e]. Since the preceding rule has named a specific contour spanning the two targets, the underscore in the second rule functions as a placeholder, not as a linear transition. Thus, the final contour-and-target pattern for the tense vowel [e] after both rules apply is the following:

(.3,500) curv (.7,400)

The examples so far have shown how one rule can interact with another one by modifying a previously assigned value or by filling in unspecified information. Parameter rules may interact in other ways as well. In particular, a rule may overwrite information supplied by an earlier rule or
add contours and targets to a pattern assigned by an earlier rule. Consider, for example, the following rules:

1. \([\text{+tens } \text{+voc}] F \rightarrow \_ (.3,\$) \_ (.7,\$) \_

2. \([\text{+voc}] F \rightarrow (.0,\$) / || _

Rule 1, discussed earlier, assigns a particular contour-and-target pattern to tense vowels. Rule 2 overwrites the first target position assigned by rule 1 with a position of .0 when the vowel follows a pause. The contour specification resulting from the application of both of these rules follows:

(0,\$) \_ (.7,\$)

The second rule does not completely overwrite the contour specification produced by the first; it simply modifies the first target position for phrase-initial segments. Note that rule 2 will overwrite the first target position of any vowel, tense or non-tense, assigned a position by a preceding rule. In general, a rule that applies to the same parameter for a segment as an earlier rule modifies only the corresponding portion of the contour specification, in this case the first target.

Sometimes, however, it is desirable to state explicitly where a contour-and-target pattern should begin or end, regardless of the pattern produced by previous rules. This can be accomplished by using the special arrow and crosshatch notation, as exemplified by the following rules:

1. \([\text{+tens } \text{+voc}] F \rightarrow \_ (.3,\$) \_ (.7,\$) \_

2. \([\text{+tens vh.3 vb.3 } \text{+voc}] F2 \rightarrow \$ (,1100) \_ (,900)\)

3. \([\text{+tens vh.3 vb.3 } \text{+voc}] F2 \rightarrow (,\$) \_ \# (,\$) / [\text{+pal}] \_

Rule 1, discussed earlier, assigns a contour-and-target pattern for all of the formants of all tense vowels. Rule 2 assigns to a tense high back vowel, that is, to \([u]\), second formant target values of 1100 and 900 hertz. It interacts with rule 1 to produce the following contour-and-target pattern:

\_ (.3,1100) \_ (.7,900) \_

Rule 3 interacts with both rules 1 and 2. It uses a crosshatch preceded by a left arrow to state that any contour or target preceding the second target that may have been assigned by previous rules should be deleted when \([u]\) follows a segment with the feature \([\text{+pal}]\). The result of applying rules 1, 2, and 3 to a post-palatal \([u]\) is the following pattern for the second formant:

(.7,900)

Thus, the second formant will glide down gradually from the high value characteristic of palatals to the low value characteristic of the vowel \([u]\).
In addition to overwriting or deleting targets and contours assigned by preceding rules, parameter rules can add targets and contours to previously assigned patterns. Many of the devices presented above can also be combined in other ways not illustrated here. More details about the possible interactions among parameter rules are presented in Hertz (1979b). Hertz (1979b) also discusses how such conflicts as an illegal sequence of target positions, or a relatively specified value that has no previously assigned value to modify, are handled.

III. Interactions between Letter, Feature, and Parameter Rules

It is clear that letter rules and some kind of parameter rules that generate output for the synthesizer are needed in converting from text to speech. The justification for an intermediate set of feature rules is less apparent. Our rule writing experience, however, has shown that feature rules are a much-needed link between letter rules and parameter rules.

Consider, for example, the feature rule of Figure 2, which assigned the feature [+nas] to vowels occurring before nasals. On first glance, it might seem desirable to bypass the feature rule altogether by including the environment for vowel nasalization in the parameter rule as follows:

\[ [+voc] \text{AN} \rightarrow (.5,2)_- / _- [+nas] \]

However, not only the nasal amplitude, but other parameters as well (e.g. formants and bandwidths) may be different for nasalized vowels and their non-nasalized counterparts. Hence, without feature rules, numerous parameter rules would require the same environment, some of them very complex.

It is not only parameter rules, however, that can be simplified through feature rules. Letter rules can be simplified as well. Consider, for example, the following rules:

\[
\begin{align*}
\text{ai} & \rightarrow [e] \\
\text{a} & \rightarrow [e] / _- [+con] e
\end{align*}
\]

The first rule was discussed earlier. The second produces the same phonetic output as the first for the letter 'a' when it precedes a consonant followed by the letter 'e'. Neither of these rules, however, produces the correct phonetic output before 'r' for the dialect we are working with, in words such as air and care. In these cases, both spellings are pronounced more like the vowel of pet, a sound distinguished from [e] in our feature set by its negative value for the feature [tens], and symbolized as [E].

The information about the pronunciation of the vowel before [r] could be embodied either in letter rules alone or in combination with a feature rule:

\[
\begin{align*}
\text{ai} & \rightarrow [E] / _- r & \text{vs.} & \text{ai} & \rightarrow [e] \\
\text{ai} & \rightarrow [e] & \text{a} & \rightarrow [e] / _- [+con] e \\
\text{a} & \rightarrow [E] / _- re & [+tens] & \rightarrow [-tens] / _- [+ret +con] \\
\text{a} & \rightarrow [e] / _- [+con] e
\end{align*}
\]
The strategy on the right, which employs one feature rule, leads to a significant reduction in the number of rules, since it is not only [e], but other tense vowels as well, [i], [u], and [o], that are realized by their non-tense counterparts before [r]. Whereas a single feature rule handles all these cases, without it additional letter rules would be needed before every rule that would otherwise yield a tense vowel before [r].

The next example in support of feature rules considers the case of the reduction of a sequence of two identical consonants into one in English, a phenomenon which can be expressed by the following feature rule:

\[ [+\text{con} = \text{lab} = \text{alv} = \text{vel} = \text{fric} = \text{stop}] \rightarrow [] \]

\[ / \_ [+\text{con} = \text{lab} = \text{alv} = \text{vel} = \text{fric} = \text{stop}] \]

where '=' means that the corresponding features in each list must have the same value (positive or negative) if the rule is to apply, like the alpha notation of Chomsky and Halle. This rule deletes the first of two identical consonants. If instead this geminate reduction were handled by letter rules, a great many rules would be required, some with very complex environments, since different sequences of letters can produce the same phonetic output, for example the 'c' and 'qu' as well as the 's' and second 'c' of acquiescence.

Concluding Remarks

This paper has introduced an interactive speech synthesis system called SRS. It has focussed on the letter, feature, and parameter rules of the system, and has shown how the three kinds of rules can interact in meaningful ways to produce speech. At Cornell University, the system has proven its usefulness as a tool for instruction about acoustic phonetics, a tool for generating stimuli for perceptual experiments, and more generally, a tool for research into the nature of speech. SRS has been used with success to develop a comprehensive set of text-to-speech rules for English. It is now being used for a larger project, in which rules are being developed for a number of other languages, including Spanish, German, Dutch, and Japanese. The use of the system to develop rules for a large variety of languages should help define universal principles of speech perception that will shed light on the nature of sound changes and sound processes in general (see Hertz 1979b).

Linguistically speaking, the most novel rules used by SRS are the parameter rules. They provide a flexible notation for investigating many of the continuous aspects of the speech wave. Since precise methods for describing the continuous aspects of the speech wave in linguistically meaningful ways are a relatively new endeavor, with necessary constraints not yet known, the rule notation has been designed to be as powerful as possible. Extensive experimentation with the parameter rules should bring to light any necessary constraints.

For certain purposes, however, the parameter rule notation is not powerful enough. In their present form, for example, parameter rules are not ideally suited to describing long-term effects, such as intonation, pitch drift, and instances of progressive or regressive nasalization or
retroflexion, which extend over large portions of the utterance. For that reason, we are presently engaged in designing a new kind of rule, which will allow for the description of prosodic phenomena in a flexible and linguistically-motivated way.

My long commitment to SRS, then, stems from my desire to provide linguists like myself, who have not been able to carry out certain types of phonological research due to lack of facilities, with a tool which presupposes no knowledge other than linguistics on their part, and which restricts them as little as possible to any particular hypotheses about speech or to any particular natural language. I hope that through writing rules with the system, linguists will succeed in gaining new insights into the nature of speech and will discover aspects of the speech wave worthy of incorporating into a universal system of phonology.

References


On the Syntax of Passives in German

Robert B. Howell

Cornell University

The formation of passive sentences has long been the source of some of the most persistent objections to Standard Transformational Theory as proposed and subsequently expanded by Chomsky in Syntactic Structures (1957) and Aspects of the Theory of Syntax (1965). At least part of the uncertainty surrounding passivization seems to be due to the fact that a large percentage of the investigators dealing with the problems base their arguments on the evidence provided by English. In addition, many researchers who deal with languages other than English received their initial training in syntactic theory in the United States, and are thus heavily influenced by work done in English syntax. Unfortunately, English is a poor example on which to base any universal statements about passive sentences. The range of possible passive predicates in English is quite limited relative even to closely related languages like German and Dutch. This limited range of 'passivizable' predicates in English coupled with a deceptively simple passive morphology has led to a far too narrow characterization of the passive. This characterization (i.e. Chomsky's), while problematic in English, is wholly inadequate for a language such as German.

Through analysis of the relatively more complex nature of passive sentences in German it is possible to shed light on the shortcomings of Standard Transformational interpretations of the passive. Furthermore, a reanalysis of the German passive in the theoretical framework proposed by Bowers (forthcoming) can provide valuable insight into the formation of passive sentences in language in general. Of particular interest will be the German 'impersonal passives' of the type *ihm wurde geholfen* 'him was helped' and the 'intransitive passives' such as *hier wird getanzt* 'here is danced'.

1. Standard Theory. In early transformational theory both active sentences and their passive counterparts were derived from a single underlying structure. Such an analysis seemed justified in view of the facts presented by English. In English each passive sentence seemed to have an active counterpart whose truth conditions were equivalent to those of the passive form. In short, passive sentences appeared to be merely surface variants of active sentences which were derived by means of an optional transformation:
The structural description of the passive transformation could apply only to transitive sentences (cf. Chomsky, 1957, pp. 73-4):

\[ \text{SD: } \text{NP - AUX - V - NP} \]
\[ 1 \quad 2 \quad 3 \quad 4 \]
\[ \text{SC: } 4 - 2 \text{ be} + \text{en} - 3 - \text{by} + 1 \]

An analysis of this sort poses immediate problems for German. It was noticed by American linguists (Chomsky among them) that the transformational introduction of the agent preposition 'by' actually creates new structure (a PP), a process which is beyond the power of a transformational rule as formulated in Syntactic Structures. A similar ad hoc structure-creating process would be present in the analogous German transformation:

**Der Polizist sah meinen Freund.** 'the policeman saw my friend'

\[ \text{SD: } \text{NP + K}_0 - \text{AUX - V - NP + K}_1 \]
\[ 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \]
\[ \text{where: } K_0 = \text{nominative} \]
\[ K_1 = \text{accusative} \]
\[ \text{SC: } 5 \quad 2 \quad 3 \text{ werden} + \text{en} \quad 4 \quad \text{ von } 1 + K_2 \]
\[ K_2 = \text{dative} \]

**Der Polizist sah meinen Freund**

\[ \text{T-passive} \]
\[ \text{Mein Freund wurde vom Polizisten gesehen} \]

' my friend was seen by the policeman'

Still worse, a difficulty arises in German which is not immediately apparent in English. In English the so-called 'statal passive' and the 'actional passive' have identical formal representations:

The window is broken. (statal)

The window is (got) broken. (actional)

There is no apparent difficulty in introducing the passive auxiliary be in a transformation. In German, however, the actional and statal passives have different formal representations and the introduction of two different passive auxiliaries in a single transformation is problematic:
1) *Das Fenster wurde zerbrochen.*
   'The window got broken' (actional)

2) *Das Fenster ist zerbrochen.*
   'The window is broken' (statal)

Two solutions to this problem are possible. In one analysis the sentences can simply be assigned different underlying structures, with the actional form representing the true passive while the statal passive is only a coincidentally similar surface form. Thus 2) would be derived from an active sentence of the sort:

\[
NP + K_0 - AUX - VP - NP + K_1 \rightarrow NP + K_0 - AUX - VP
\]

*Man zerbrach das Fenster.* \(\rightarrow\) *Das Fenster wurde zerbrochen.*

'One broke the window.'

The statal passive on the other hand would be analysed as a 'noun - copulative - predicate adjective' construction:

\[
NP + K_0 - AUX - V - AP
\]

*Das Fenster ist zerbrochen.*

This analysis is suspect for various reasons. The most obvious objection is based on the fact that sentences 1) and 2), so very similar in meaning, are also quite similar formally - i.e. they both seem to consist of a noun phrase, a verb, and a past participle complement. Assignment of two widely divergent underlying structures to two such similar sentences (particularly the analysis of *zerbrochen* as a VP in 1) and an AP in 2)) seems unwarranted and undesirable. An important and easily explained generalization about the relationship between the two passive forms is missed.

A second possible analysis of the passive in German first proposed by Bierwisch (1965) preserves the structural relationship between the statal and actional passives by generating the passive verbal morphology directly in the PS rules. The passive auxiliaries *sein* 'to be' and *werden* 'to become' are introduced directly in the underlying structure rather than by means of a transformation. They are simply subcategorized in the *lexicon* to take past participle verb complements (see Bierwisch, p.77):

*sein*: \([NP \underline{___} + \text{en} \ VP]\)

*werden*: \([NP \underline{___} + \text{en} \ VP]\)

The passive transformation itself then merely involves movement of noun phrases (i.e. elevation of direct object to subject position, demotion of agent phrase). It is an obligatory transfor-
mation triggered by passive verb forms in the underlying structure.

The result of generating passive auxiliaries in the underlying structure of passive sentences does have the effect of destroying any identity of structure between passive and active sentences at any level:

```
Underlying

Active

S

NP    AUX    VP

man    past    zerbrechen das

Passive

NP    AUX    VP

V     NP

Fenster    man    past werden zerbrechen das

Fenster
```

Thus 'there is no syntactic rule which explicitly expresses the active-passive relation in the syntactic component (Freiden, 1975),' nor is this relationship expressed in the deep structure.

In his reformulation of the passive in *Aspects*, Chomsky also seems to abandon the attempt to relate active and passive sentences directly. Instead, active and passive sentences are given quite different underlying structures and different derivations (see Chomsky, 1965 pp. 103-6):

```
Underlying

Active

S

NP    AUX    VP

V     NP

Passive

S

NP    AUX    VP

V     NP    ADV.manner

by
```

The passive transformation is triggered by the presence of the by phrase—the one element distinguishing the two underlying structures. For our purposes the problems with Chomsky's *Aspects* model are not central. What is important, however, is that both Chomsky and Bierwisch found it impossible to assign identical structures at any level to active and passive sentences. This non-equivalence of active and passive is an important insight, although linguists like
Bierwisch seemed to fail to grasp its significance.

One common characteristic of all transformational derivations of passive in German and English involves the elevation of the deep structure direct object from the verb phrase to subject position and the simultaneous (or previous) demotion (and optional deletion) of the underlying subject to an agent PP in the verb phrase. Given this analysis, two types of German passive sentences are particularly difficult for Standard Theory to explain. The first type involves passivized predicates which seem to possess neither an overt subject nor a direct object (so-called 'impersonal passives'):

3) **Ihm wurde geholfen.**
   'Him(dat.) was helped.' i.e. 'He was helped.'

In sentences of this type neither NP necessary to fit the structural description of the passive transformation is present on the surface. A second problematic passive form is the widespread 'intransitive passive' found in German (also in Dutch) which passivizes verbs that take no direct object:

4) **Hier wird getanzt.**
   'Here is danced.' i.e. 'People dance here.'

5) **Im Sommer wird geschwommen.**
   'In summer is swum.' i.e. 'One swims in the summer.'

In sentences like 3), Standard Theory is forced to make several questionable assumptions. Given the total lack of overt surface agents in the various sentences of this type, an underlying indefinite subject **man 'ong** must be created in deep structure and then obligatorily deleted:

Such an analysis seems ad hoc and unmotivated since the underlying subject and the subsequently derived agent phrase never appear in surface sentences. Clearly the indefinite subject is created in a derivation of this sort solely to make sentences like 3) fit the SD of the passive transformation.
A further difficulty arises in this sort of derivation when
the dative object (i.e. ihm in 3) is elevated to subject position.
In a 'normal' passive, where an accusative object is raised to sub-
ject position, the object assumes nominative morphological represen-
tation and governs the person and number of the verb. When a dative
object is raised, however, it retains its dative morphology and un-
der no circumstances does it govern the person or number of the
finite verb (see Duden 4, 1973, pp.92-3):

'normal passive' 6) Die Kinder wurden gesehen.
   'The children (nom.pl.) were (pl.) seen.'
   but
7) Den Kindern wurde geholfen.
   'The children (dat.pl.) was (sing.) helped.'
i.e. 'The children were helped.'
8) Die Kinder wurden geholfen.

Perlmutter tries to explain the phenomenon above with what
he calls the 'Kinky Case Marking' convention (see Brekenridge,
Harvard honors thesis for discussion). According to this proposal
verbs which mark their objects with a case other than accusative
(i.e. German helfen, glauben, antworten + dative object) do so
idiosyncratically. Surface dative objects are in fact function-
ally accusative (direct objects) which have been shielded from a
general case marking rule by the 'Kinky Case Marking' convention:
'Kinky Case Marking takes precedence over the general case marking
rule (which marks subjects nominative, objects accusative, and
indirect objects dative) ...(Breckenridge, p.41).'' In this way
the apparent dative subject of 7) is supposedly explained.

There is, however, a more logical analysis of the 'dative
subject' in 7). It should be noted that the only overt similarity
between the subject of 6) and the 'subject' of 7) is their clause-
initial positioning. Other than that, the dative den Kindern in
no way resembles a grammatical subject (i.e. its formal represen-
tation is dative rather than nominative) nor does it function as
a subject (i.e. it does not govern the person or the number of
the verb). A likely and far better motivated explanation for
the dative form in 7) would be, therefore, that it simply is not
the subject of the sentence. Although Standard Theory would find
this fact difficult to state formally, it finds logical explana-
tion in the theoretical framework proposed by Bowers.

A second major stumbling block for Standard Theory in Ger-
man is represented by the intransitive passives of the type er
wird hier getanzt. In sentences of this sort neither a subject
nor an object is present. In addition, the passivized verb(tan-
zen) and others like it ('gehen' 'to go', 'schwimmen' 'to swim') never take any sort of an object in their surface forms. Nevertheless Perlmutter (working in a relational framework) contends that passivization in general involves the elevation of a direct object to subject position and that intransitive passives 'universally involve a dummy which advances from 2 (d.o.) to 1 (sub.)'. This generalization implies that a derivation of *es wird hier getanzt* in Standard Theory would entail positing both a dummy direct object and a dummy subject:

```
Es wird hier getanzt.
```

Once again the addition of dummy NP's is ad hoc. The underlying transitivity of an otherwise intransitive verb is totally absurd and a dummy subject which is always deleted is equally unmotivated. Nevertheless, the two NP's necessary to fit the SD of the passive transformation must be inserted in the deep structure of the intransitive passives if one clings to the analysis of passivization presented in standard theory.

II. A Possible Solution. At this point an informal reinterpretation of the nature of passive sentences based on the examples provided by German is in order. In general, passivization seems to be a focusing on the content of the predicate and the simultaneous deemphasis (or even total omission) of the agent. In Standard Theory (and in Relational Theory as expressed by Perlmutter) this emphasis on the predicate is universally characterized by the elevation of the direct object of the passivized predicate to subject position and the demotion of the agent (i.e. the subject of an active sentence) to an agent phrase dominated by the passivized VP. This characterization is roughly adequate for a language such as English. In German, however, a number of predicates can be passivized which simply do not govern a direct object. Standard Theory (i.e. Bierwisch) attempts to inject ad
hoc underlying direct objects into such sentences in order to fit the facts of the language into the existing theoretical framework. A much simpler and more justifiable solution seems to lie in a somewhat broadened definition of the passive.

Informally stated, one could characterize the passive in German as follows: 'The direct object of the passive predicate is elevated to subject position if a direct object is present on the surface. The agent is demoted to an agent phrase dominated by the passive predicate if an agent is present. Lack of either a direct object or an agent does not necessarily prevent passivization.'

Obviously, this definition of the passive must be expressed in a framework which is strictly bound to surface structure. For this reason the framework proposed by Bowers in Theory of Grammatical Relations will be employed. As summarized by Épée (1974), this theory assumes the following: 'There is a set of Phrase-Structure rules which characterize an infinite set of sentences. These rules generate nodes which are "empty", i.e. they dominate the null symbol 0. The structure thus generated defines grammatical relations such as Subject-of, Object-of, and so forth. The only requirement needed in order for a particular phrase of that type (NP, PP, etc.) is that it be found at that position in the surface structure... All empty nodes generated by the PS rules must be filled either by lexical insertion rules or by movement rules... Movement rules (i.e. syntactic rules) and lexical insertion rules are interspersed, in other words, there is no extrinsic ordering between syntactic and lexical insertion rules, hence no level of deep structure in the sense of Chomsky 1965.(introduction)' It must be added that in this framework transformations state structural relationships between surface forms. An obvious advantage of a theory of this sort is that all derivations are necessarily bound to surface structure and are thus inherently well-motivated.

We can begin our analysis by considering some basic passive sentences containing transitive verbs:

1) Ich wurde gesehen. 'I was seen.'
2) Ich wurde von der Frau gesehen. 'I was seen by the woman.'
3) Das Fenster ist zerbrochen. 'The window is broken.'
4) Das Fenster ist vom Stein zerbrochen.

The following PS rules will be assumed:

\[
S \rightarrow NP_0 \ VP \\
VP \rightarrow V \ (NP_2) \ (NP_1) \ (VP) \\
\]

where: 0= nominative
    1= accusative
    2= dative
As well as the following lexical subcategorizations:

wenden: \([VP(VP...([von+NP_2:\emptyset])...V+en])]\)

sein: \([VP(VP...V+en])]\)

sehen: \([VP...NP_1\emptyset]\)

erbrechen: \([VP...NP_1\emptyset]\)

Given these basic assumptions, derivation of sentences 1)-3) can proceed as follows:

1) \textit{Ich wurde gesehen}.

\[
\begin{align*}
T_1 \text{ Accusative Object Preposing: } & [S\, NP: y[V[P x...V:z+en]]] \\
y = \text{ werden} & \rightarrow [S\, NP: x[V[P y...V:z+en]]]
\end{align*}
\]

A rule of Accusative Object Preposing can apply which transfers nominative morphological features onto the accusative object and the derivation is complete. Note that no mention of an agent need be made since no agent is present on the surface. The verb \textit{wenden} is subcategorized to take a verb complement in which the agent phrase is only optional. Thus no unmotivated underlying agent (i.e. \textit{jemand} 'somebody') needs to be posited. Similarly sentences 2) and 3) can be easily derived:

2) \textit{Ich wurde von der Frau gesehen}.

\[
\begin{align*}
T_2 \text{ Agent Postposing: } & [S\, NP: x[V[P y...[ppP: von+NP_2:\emptyset]V:z+en]]] \\
& \rightarrow [S\, NP: y[V[P x...[ppP: von+NP_2:x]V:z+en]]]
\end{align*}
\]
3) Das Fenster ist zerbrochen. (statal)

The ungrammatical sentence 4) is blocked by the subcategorization of sein which excludes the possibility of an agent phrase in its verb complement.

Whereas in Standard Theory the active and statal passives must be analyzed as having quite different structures, the analysis proposed above illustrates quite nicely the structural similarities (compare 1) and 3)) shared by these two passive forms.

Within this same framework, the so-called 'impersonal' and 'intransitive' passive forms which were so problematic in Standard Theory can be quite easily explained. Consider the following sentences:

5) Es wurde hier getanzt. 'It was danced here.'

6) Hier wurde getanzt. 'Here was danced.'

7) Es wurde ihnen geholfen. 'It was them (dat.) helped.'
8) **Ihnen wurde geholfen.** 'Them (dat.) was (sing.) helped.'

In Standard Theory the intransitive verb 'tänzen' must be assigned an underlying dummy object in order to be passivized. Within the framework employed here no such ad hoc machinations are necessary. The verb *tänzen* is merely subcategorized not to take an object:

\[
\text{tänzen: [VP---...]}\]

Likewise the verb *werden* is not restricted (as is, for example *to be* in English) to taking only transitive verb complements. The derivation of an intransitive passive is therefore a relatively simple matter: 6

9) **Es wurde hier getanzt.**

\[
\begin{array}{c}
\text{S} \\
\text{NP} \\
\text{V} \\
\text{VP} \\
\text{wurde} \\
\text{ADV} \\
\text{hier} \\
\text{VP} \\
\text{getanzt}
\end{array}
\]

'\text{es}' Insertion($T_3$)

Note that the SD's for Accusative Object Preposing and Agent Postposing are not met, so these two rules simply do not apply. A final rule of 'es' Insertion must apply in order to obtain the desired sentence by filling the subject NP. This 'es'(it) Insertion satisfies an absolute requirement of German, namely that the finite verb be the second constituent of all matrix clauses. This *es* is essentially a semantically empty dummy subject which appears only in clause-initial position to fulfill the verb-second requirement. 'Es' Insertion is a language-wide rule as is illustrated by the dummy *es* in the following active sentences:

10) **Es kommen viele Studenten.** 'It(nom.) come(pl.) many students (nom.):'

11) **Es regnet.** 'It's raining'

12) **Es schreien zwei Frauen.** 'It(nom.) scream(pl.) two women (nom.):'
Passive sentences with dative objects of the type 7) Es wurde ihnen geholfen can be derived in a similar manner. Since the dative object of helfen does not fit the SD of Accusative Object Preposing, the rule never applies. 'Es' Insertion once again supplies a dummy subject to maintain the verb-second rule. Obviously helfen must be subcategorized to take only a dative object:

helfen: \[
[ VP \ldots NP_2 \ldots ]
\]

\[
\text{Sentences like 6) and 8) pose the greatest problems for Standard Theory. In the sentence Ihnen wurde geholfen an attempt is made to posit the dative ihnen as an underlying direct object which is then elevated to subject position. This analysis is difficult to justify in view of the fact that ihnen never assumes the expected nominative form (i.e. sie 'they') nor does it govern the number (i.e. it does not add the feature +plural) of the verb. It therefore seems safe to assume that it does not act like a subject because it is not one. But what is it? It can be shown that sentence-initial dative forms as in 8) are the result of an entirely different process than Accusative Object Preposing. Consider the following pairs of active sentences:

13) a. Es friert mich. 'It freeze me' (=I'm cold.)

14) a. Er fährt nach Berlin. 'He's driving to Berlin.'
    b. Nach Berlin fährt er. 'He's driving to Berlin.'

15) a. Er glaubt mir. 'He believes me.'
    b. Mir glaubt er. 'Me he believes.'

16) a. Ich komme morgen. 'I'm coming tomorrow.'
    b. Morgen komme ich. 'Tomorrow I'm coming.'

In each of the sentences from 13)b-12)b an element of the matrix VP (i.e. NP_1, NP_2, ADV, PP) is moved to clause-initial position
by a process of topicalization. Notice that in each instance the element of the VP is moved into what is superficially subject position in most normal surface forms. The movement of an element of the VP to clause-initial position does not, however, make it the subject of the sentence. Unlike normal subjects the clause-initial elements in 13)b - 16)b can undergo neither question formation nor relativization:

13) b. *Friert mich?
14) b. *Fährt nach Berlin er?
15) b. *Glaubt mir er?
16) b. *Komme morgen ich?

The verb appears to the left of the actual subject in 13)b - 16)b because of the absolute inviolability of the verb-second convention in German. Thus although constituents other than NP appear in what is superficially subject position, the 'subjectlessness' of these elements is an illusion created by the verb-second constraint. A slight modification of the PS rules can account for these facts:

\[
S \rightarrow \begin{cases} 
(NP, V, \text{ADV}) \\
PP 
\end{cases} \quad \text{VP} 
\]

A sentence like 15)b can be derived as follows:

\[ T_4 \text{ Verb 2nd Constraint: } [S \text{NP}_2:x \text{ V:Ø} \text{ NP}_0:y_{\text{VP}}:z:] \rightarrow [S \text{NP}_2:x \text{ V:Ø} \text{ NP}_0:y_{\text{VP}}:Ø:] \]
T₅ Topicalization: \[
  [S \begin{cases}
    \text{ADV} \\
    \text{NP}_1 \\
    \text{PP}_2
  \end{cases}
  : \emptyset \quad V:w \quad \text{NP}_0:x[\quad \text{VP}\quad \text{y}
  \begin{cases}
    \text{ADV} \\
    \text{NP}_1 \\
    \text{PP}_2
  \end{cases}
  : \emptyset]
\]

\[
  [S \begin{cases}
    \text{ADV} \\
    \text{NP}_1 \\
    \text{PP}_2
  \end{cases}
  : z \quad V:w \quad \text{NP}_0:x[\quad \text{VP}\quad \text{y}
  \begin{cases}
    \text{ADV} \\
    \text{NP}_1 \\
    \text{PP}_2
  \end{cases}
  : \emptyset]
\]

Note that rule ordering is not important. Once again this derivation is well motivated because it conforms exactly to existing surface forms. No abstract forms are ever posited.

It stands to reason that if a topicalization process of this sort occurs in active sentences, it can also apply to passives. This is indeed the case. Consider once again sentences 5) - 8):

5) *Es wurde hier getanzt.*
6) *Hier wurde getanzt.*
7) *Es wurde ihnen geholfen.*
8) *Ihnen wurde geholfen.*

If topicalization is assumed for 6) and 8), facts which were so difficult to account for in Standard Theory find rather simple explanation:

Hier wurde getanzt.

1. 'Es' Insertion
2. Topicalization
3. Verb Second Constraint
4. 'Es' Deletion

'Es' Insertion and 'Es' Deletion are both motivated by surface forms (Hier wurde getanzt, Es wurde hier getanzt) and are not limited to passives (Mich friert, Es friert mich). It seems logical that a dummy subject inserted to maintain the verb-second condition but otherwise semantically empty would be deleted when verb second is already provided by the topicalization rule. The 'Es' Deletion rule would seem ad hoc if it were obligatory, but the deleted *es* can also appear on the surface (Hier wurde *es*
The dative form 'ihnen' never behaves like a sentence subject because it never occupies subject position.

The problems posed by the passive in German cannot be adequately explained in Standard Theory, however an analysis of the German passive in the theoretical framework proposed by Bowers is capable of accounting for the entire range of 'intransitive passives' and 'impersonal passives' in a straightforward and easily justifiable manner. At no stage of the derivation does any element occur which is not present on the surface. The evidence provided by German indicates that the most important characteristic of the passive is not the elevation of a direct object to subject position. Rather the passive nature (i.e. with unstressed or deleted agent) of the VP itself seems to be of primary importance. This concept should be considered central to all analyses of the passive in any language. In this way the shortcomings of the traditional analysis of passivation can be avoided.
Notes

1 For a discussion of the relationship of the statal passive to the active passive in English, see Bowers (forthcoming), chapter 3.

2 For this type of analysis see Bierwisch (1965), pp. 90-4.

3 Thus sentences of the following type are ungrammatical:
   *ihn wurde von man geholfen.
   *ihn wurde von einem geholfen.

4 For a more general discussion of this approach to passivization, see Perlmutter and Postal (unpublished)

5 Note that the concept of AUX has been dropped. In this framework all verbs are potentially main verbs, some of which are subcategorized as taking VP complements. The reasons for this analysis are well motivated and are discussed at length in Bowers (forthcoming).

6 Independent motivation for this type of rule is discussed in Bowers (forthcoming) in section 2.4.

7 For independent motivation for this analysis of topicalization, see Bowers (forthcoming), chapter 6, and Bowers (1976).

8 In impersonal passives with topicalized dative objects the 'Es' Deletion rule is obligatory. Exactly why these particular construction require 'Es' Deletion remains a question.
References


________. Forthcoming. The Theory of Grammatical Relations.


LANGUAGE CONTACT IN TAIWAN

Cornelius C. Kubler

Three Chinese dialects—Southern Min, Hakka, and Mandarin—plus several Malay–Polynesian languages and Japanese are spoken side by side in Taiwan. What influences have these languages had upon each other? That is the question this paper attempts to answer.

The introduction discusses the general linguistic situation of Taiwan. In the next few sections, the sociolinguistic setting and language contact situation of each of the languages—with emphasis on Mandarin—are treated. The conclusions are that due to language contact all of the languages in Taiwan have changed to some degree; that Japanese is rapidly declining in importance and Southern Min, Hakka, and the Malay–Polynesian languages are slowly becoming more limited in function; but that the position of Mandarin is becoming ever stronger, even if at the price of a few concessions to outside influence.

1. INTRODUCTION. Taiwan is a large island in the Pacific Ocean about 100 miles off the southeast coast of the China mainland. Together with several smaller neighboring islands, it has a total area of 13,892 square miles and a population of over 17,000,000. The population of Taiwan is composed of four distinct ethnic groups, each of which has its own language: the Southern Min people, who immigrated to Taiwan from southern Fujian several centuries ago and speak the Southern Min dialect of Chinese; the mainland Chinese, who fled to Taiwan from various provinces in China after the Communist victory of 1949 and speak mostly Mandarin; and the aborigines, who have been in Taiwan for several thousand years and speak about a dozen different Malay–Polynesian languages. Population figures for the four groups are as follows:

<table>
<thead>
<tr>
<th>Group</th>
<th>Population</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern Min</td>
<td>12,408,597</td>
<td>(71% of the population)</td>
</tr>
<tr>
<td>Mainlander</td>
<td>2,547,480</td>
<td>(15% of the population)</td>
</tr>
<tr>
<td>Hakka</td>
<td>2,108,937</td>
<td>(12% of the population)</td>
</tr>
<tr>
<td>Aborigines</td>
<td>331,661</td>
<td>(2% of the population)</td>
</tr>
</tbody>
</table>

From 1895 until 1945, Japan ruled Taiwan and promoted the Japanese language among the people. As a result, many of the native Taiwanese (i.e. Southern Min, Hakka, and aboriginal peoples) above the age of 50 or so speak Japanese as a second language. Since 1945, when Taiwan was recovered by China, Mandarin has been taught widely in the schools with the result that most of those under 50 now know that language. A majority of the population is bilingual and there are many trilin-
gual and even quadrilingual speakers.

In a situation such as that of Taiwan, where several groups of speakers of different languages live closely together and, to a greater or lesser extent, interact with each other, language contact is bound to occur. The purpose of this paper is to report on a preliminary investigation of the influences the various languages spoken in Taiwan have had upon each other. In the sections below, the sociolinguistic setting and language contact situation of Southern Min, Mandarin, Hakka, the Malayo-Polynesian languages, and Japanese in Taiwan will be discussed separately before returning to a more general discussion in the conclusion.

2. SOUTHERN MIN. The Southern Min dialect of Chinese, also known as Hokkien, Amoy, or "Taiwanese," is the native language of the majority (71%) of the people of Taiwan. Traditionally, there are considered to be two subdialects spoken in Taiwan, Zhangzhou and Quanzhou, the names of the two districts of Fujian province from which most of the Southern Min people emigrated. With the recent increased mobility of the population and the advent of mass communication, however, distinctions between the subdialects are rapidly becoming blurred. All types of Southern Min spoken in Taiwan and its adjacent islands are mutually intelligible.

As the language of government and education has for over eighty years now been a foreign one (1895-1945: Japanese, 1945 to present: Mandarin), the Southern Min spoken in Taiwan has been strongly influenced by other languages. This is true especially in lexicon but also to some extent in grammar.

2.1. Examples of Mandarin influence on Southern Min syntax, while probably not very numerous, do exist. For instance, in Mandarin the verb of verbal constructions containing both an adverb and an object is often repeated: Mì shuō Yingwén shuōde hén hai." You speak English very well." The repetition of the verb does not usually occur in Southern Min, which has Lì lêng gú kóng cín ho³ 'You English speak very well.' But under the influence of Mandarin, some Southern Min speakers now repeat the verb and say Lì kóng lêng gú kóng cín ho³.

2.2. Another example of syntactical influence is in 'both...and' and 'neither...nor' sentences, where Mandarin often uses the structure yě...yě, as in Tá yě bùshì Meiguórén yě bùshì Jiānádáirén 'He's neither American nor Canadian.' Southern Min would normally use only one adverb: Tí mì Bīkōnláng iá mì Kǎntáilâng 'He's not American, also is not Canadian.' Under the influence of the Mandarin pattern, some Southern Min speakers now say Tí jì mì Bīkōnláng iá mì Kǎntáilâng.

2.3. Since there is a native literary tradition of pronouncing Chinese characters in taifîn 'Taiwan pronunciation,' Japanese and Mandarin words can be borrowed into Southern Min in two different ways: through the ear, in which case the foreign sounds are adapted directly into the phonological system of Southern Min; or through the eye, in which case the Japanese and Mandarin characters are read off in South-
ern Min pronunciation and later take root in speech. Some examples of direct borrowings from spoken Japanese:

- khîmôchiq (＜J kimoti 'feeling'; often reduced to khîmoq)
- lâjîq (＜J ra'ziq＜E radio)
- nînjîn (＜J nînzi'n 'carrot')
- siaûq (＜J sya'wa＜E shower)
- thômâtoq (＜J to'mato＜E tomato)

2.4. Examples of borrowings which entered through written Japanese:

- bûnliânpît (＜J 万年筆 ma'nne'nhitu 'fountain pen')
- cûûtongchîâ (＜J 自動車 zi'do'osya 'automobile')
- chiâtchîù (＜J 切手 kitte 'stamp')
- hûsîâ (＜J 会社 kaisya 'company')
- iûpiânsîîk (＜J 郵便局 yû'ubi'nkyoku 'post office')

2.5. Some examples of borrowings in Southern Min from spoken Mandarin:

- caîcîân (＜M zaljiàn 'good-bye')
- ciaûa (＜M ja'ga'o, originally 'proud--haughty' but which has gained through written English the meaning 'proud--taking pride in' as in 'I'm proud of you')
- iûmoq (＜M yûmô＜E humor)
- mâmâhûhû (＜M mâmahûhû 'casual, so-so')
- tîtîq (＜M dûdi 'younger brother')

2.6. And a few borrowings which entered Southern Min through written Mandarin:

- biûngsîînphî (＜M 明信片 míngxînphîn 'postcard')
- hûsî (＜M 護士 hûshî 'nurse')
- iûphîoiu (＜M 郵票 yûpia'o 'stamp')
- ôksîngphôsîp (＜M 惡性補習 èxīngbûxî 'unhealthy cramming for examinations')
- siûûmîk (＜M 收音機 shûyûnigi 'radio')

Many of the Japanese and Mandarin lexical borrowings in Southern Min are terms for objects and concepts that did not previously exist in Taiwanese society. With the thing came the word. It is interesting to note that in the cases of many such borrowings there is a pair of words, one Japanese, the other Mandarin. Recently, however, the latter have been becoming much more frequent.
3. MANDARIN. Mandarin, the official language of the Republic of China government on Taiwan, is spoken natively by the mainland refugees of 1948-50 and their children and grandchildren (15% of the population), and as a second language learned mainly in school by the majority of the rest of the population. As most mainlanders are concentrated in urban areas, Mandarin influence is strongest there. Nevertheless, it has lately begun to make inroads into the dialects of the country as well.

Although some of the literati in traditional Taiwanese society could speak a form of Mandarin called guānhuà that was used in the government of imperial China, the large-scale introduction of Mandarin to Taiwan dates from 1945. When the Chinese Nationalists took over the reins of government from the Japanese that year, they found a population speaking mostly Southern Min and Hakka whose upper classes were also fluent in Japanese, but which knew hardly any Mandarin at all. As early as November of 1945, several dozen members of the mainland Committee for the Promotion of Mandarin arrived in Taiwan and began setting up the machinery for the promotion of the national language. A three-part strategy was adopted: (1) prohibit all use of Japanese; (2) revitalize the native Chinese dialects; (3) through the dialects teach Mandarin.

In 1946 the government launched a "Speak Mandarin" movement and many instructional materials were soon produced to spread the national language among the Taiwanese. Much emphasis was placed on education, thousands of elementary and secondary school teachers being retrained to teach in Mandarin. Adult education programs helped spread knowledge of the language among the older segments of the population. Today, three decades later, the majority of Taiwanese under the age of 50--those who spent at least some time in Nationalist schools--are bilingual in their native dialect and Mandarin. Of those older than 50, many of the men can also speak some Mandarin (they leave the home more often and have more opportunity for contact with government); and others have learned to understand a fair amount from radio, television, and motion pictures.

Although the type of Mandarin decreed as the official standard by the ROC government is based on the dialect of Beijing, the Mandarin commonly spoken in Taiwan (hereafter termed "Taiwan Mandarin" [TM]) differs considerably from that standard in phonology, syntax, and lexicon. This is due primarily to language contact with Southern Min, the native language of the majority. It should be noted that Taiwan Mandarin is now spoken not only by the native Taiwanese but also by the younger generation of mainlanders who have spent their childhood in Taiwan.

Examples of Southern Min influence on Taiwan Mandarin phonology:
3.1. The Northern Mandarin retroflex initials zh-, ch-, and sh-, which do not exist in Southern Min, have merged with the dental sibilants z-, c-, and s- so that distinctions between pairs like zhù 'pig'/zu 'rent', chú 'out'/cù 'coarse', and shù 'book'/šù 'Russia (abbrevi-
ation)' have been lost.

3.2. Syllables which in Mandarin have a labial initial (b-, p-, m-, f-, or w-) and the final -eng, which does not occur in Southern Min, are often pronounced in Taiwan Mandarin with -ong. Examples: pōng 'touch', fōng 'wind', laowōng 'old man.'

3.3. The suffix -r, a distinguishing characteristic of Beijing Mandarin, does not occur in Southern Min. As a result, lexical items with -r in Mandarin are usually pronounced -r-less in Taiwan Mandarin. Thus Beijing Mandarin huār 'painting', nár 'where', yìdiār 'a little', and wār 'have fun' are nearly always pronounced huà, nà, yìdiàn, and wān.

3.4. The neutral tone is much less frequent in Southern Min than in Mandarin. This is reflected in Taiwan Mandarin in that words like Mandarin zuōtiān 'yesterday', yīshēng 'doctor', and zhīdào 'know' are usually pronounced in Taiwan Mandarin as zuōtiān, yīshēng, and zhīdào, with full tones.

Although the various Chinese dialects are generally quite similar in syntax, there do exist a few differences. Examples of influence of Southern Min syntax on Taiwan Mandarin syntax include:

3.5. Use of an auxiliary verb you in Taiwan Mandarin, corresponding to Southern Min òu, before the main verb of a sentence to indicate completed action:

M: Nǐ qùle meifàng? --Qule, wǒ qùle.
SM: Lǐ ù khí + bou? --U, gùa ù khí.
E: Did you go? --Yes, I did.

3.6. In Taiwan Mandarin, as in Southern Min, the verbs 'come' and 'go' very often occur directly followed by a place word instead of in a copular construction, as is more common in standard Mandarin. Example:

TM: Nǐ yà qù nàli?
M: Nǐ yà dào nàr qù?
SM: Lǐ bèng khí tōuï?
E: Where are you going to go?

3.7. In Taiwan Mandarin choice-type questions involving bisyllabic verbs of all kinds, the second syllable of the verb is usually deleted before the negative, as in Southern Min:

TM: Nǐ zhībùzhīdào?
M: Nǐ zhīdào bùzhīdào?
SM: Lǐ cái māi ià?:
E: Do you know?

3.8. In Taiwan Mandarin the verb yōng 'use' often occurs before another verb nominalized with de. Such usage, common in Southern Min
(with iēng 'use' and ē) does not exist in standard Mandarin. Example:

**TM:** Wǒ yòng zōude.
**M:** Wǒ shì zōu lù lafde.
**SM:** Guā ìēng kíā: + e.
**E:** I came on foot.

3.9. Examples of lexical borrowings from Southern Min in Taiwan Mandarin include:

- å (§ SM å '[prefix used with names and kinship terms]')
- éryi (§ SM niāniá 'only'; exists in M but uncommon)
- ho: (§ SM ho: '[sentence final particle]')
- bālā (§ SM pālā 'guava')
- cības (§ SM ciāpā 'eat until one is full'; exists in M but not so common)

In addition to "positive" influences of Southern Min on Taiwan Mandarin—when a new item from Southern Min is introduced into Taiwan Mandarin where it had not existed before, there are also many examples of what may be termed "negative" influences—i.e., where syntactic structures and lexical items common in standard Mandarin are rare in Taiwan Mandarin because they do not exist in Southern Min and thus lack reinforcement.

4. HAKKA. The Hakka dialect of Chinese is spoken by more than two million people in Taiwan, some 12% of the population. Like the Southern Min people, the majority of the Hakkas immigrated to Taiwan in the seventeenth and eighteenth centuries as a result of war and famine on the mainland. Landing mostly in the south of Taiwan near Tainan, they slowly spread in several directions throughout the island. Today, the largest settlements are in the north of Taiwan in Miaoli and Xin-zhu counties, where about two-thirds of the population speak Hakka, and in neighboring Taoyuan County, which is about half Southern Min and half Hakka. Smaller settlements exist near Taizhong, Pingdong, Hualian, and Taidong.

There are generally acknowledged to be four subdialects of Hakka in Taiwan: those of Xin-zhu, Miaoli, Dongshi (near Taizhong), and Pingdong. Of these, Miaoli Hakka is the most common and also closest to the standard Hakka of Meixian, Guangdong on the Chinese mainland. Although there are differences in phonology and lexicon, the various dialects of Hakka spoken in Taiwan are probably all mutually intelligible.

As Hakka is very much a minority language in Taiwan, having neither a large population like Southern Min nor official status like Mandarin, it has been considerably affected by other languages. Writes the author of a recently published Hakka textbook for missionaries: "There have been many linguistic influences on the Hakka of Taiwan. The Amoy dialect influenced it greatly. Japanese has left some traces of its influence
and now Mandarin is having its effect. Because in many cases the original Hakka way of saying something is hardly ever used any more this textbook will use the new form" (Harkin 1975: 8).

4.1. Most borrowings into Hakka have been lexical. Some examples of recent borrowings from Mandarin cited in the missionary text mentioned above:

chît kuaî chiên (Ｍ chîkuaî qiàn 'seven dollars'; cf. traditional Ｈ chît ê gnfun 'seven pieces of silver')
laô-sê (Ｍ laôshí 'teacher'; cf. traditional Ｈ lô-sê)
sâm gung-lî lû (Ｍ sângonglî lû 'three kilometers')
tai-tai (Ｍ taïtai 'wife'; cf. traditional Ｈ hsîn-sâng gnîng 'husband's girl')

As is typical of speakers of minority languages, many Hakkas are multilingual, speaking Southern Min, Mandarin, and Japanese in addition to their native language. However, only very few speakers of the other languages have learned Hakka. Although their language has been considerably influenced by other languages, because the Hakka people traditionally have a very strong sense of self-identity, they almost always speak only Hakka when among themselves. For this reason, Hakka in Taiwan at this time still seems to be holding its own.

5. MALAYO-POLYNESIAN LANGUAGES. Thirteen languages belonging to the Formosan branch of the Malayo-Polynesian language family are still spoken by some 300,000 people in Taiwan. They are usually divided into three groups: Paiwanic, including Paiwan, Ami, Bunun, Rukai, Saisiat, Puyuma, and Thao, spoken in a large area of the southeastern mountains; Atayalic, including Atayal and Seedeq, spoken in the northeastern mountains; and Tsouic, including Tsou, Saaroa, and Kanakanavu, spoken in a small area of central Taiwan (Dyen 1963; Ferrell 1969). In addition, there is a fourth group containing the Yami language of Lanyu island, usually classified with the Iватan group of Philippine languages.

Not much is known about the prehistory of the aboriginal people of Taiwan. Racially, as well as linguistically, they are related to the Philippine and Malayan peoples to the south and southwest. The problem of whether they stem from insular Southeast Asia or else have with their neighbors to the south a common mainland origin remains to be resolved.

At the time of the first large-scale Chinese immigration to Taiwan three to four hundred years ago, the aborigines occupied almost all of the island. With the coming of the Chinese settlers, the aborigines of the lowland plains were quickly assimilated or pushed into the less desirable mountain areas of central Taiwan, where practically all of the unassimilated aborigines live today. Four of the Formosan languages still have sizeable native speaker populations (Ami: 126,463, Atayal: 74,238, Paiwan: 64,299, and Bunun: 34,099); all the others vary between several hundred and a few thousand speakers and are rapidly de-
clining in importance. Indeed, several languages of the plains abori-
gines have already become extinct.

During the Japanese occupation, the Japanese authorities gave high
priority to "civilizing" the aborigines and teaching them Japanese.
To this end, special language schools—later reorganized into elemen-
tary schools—were established for each tribe. As part of the curricu-
lum, in addition to math and ethics, spoken and written Japanese were
taught sixteen hours per week (Wen 1957: 821). As a result, the influ-
ence of Japanese is today even stronger among the aboriginal peoples
of Taiwan than among the Southern Min and Hakka. To this day, Japanese
is important as a lingua franca among the aborigines for conversing
with members of other tribes.

Due to contact with Japanese and Southern Min, there are now hun-
dreds of borrowings in the Malayo-Polynesian languages of Taiwan. All
influence, however, seems to be lexical, the basic structure of the
languages remaining unchanged. As will be seen from the examples from
Tsou (Tung 1964) below, many borrowings are words for borrowed cultur-
al items.

5.1. Examples of borrowings from Southern Min in Tsou:

ąŋmu (<< SM ąŋmu ć 'red hair—Westerner')
chaña (<< SM chań ć 'rice field')
kamčia (<< SM kamćiä 'sugar')
panča (<< SM pānā 'bottle')
-suäi (<< SM suai:ä 'mango')

5.2. Examples of borrowings from Japanese in Tsou:

amelika 'the West' (<< J amerika<<E America)
hilíío (<< J híí'ryoo 'fertilizer')
khamísáam (<< J ka'misama 'God')
seikácu kaizen (<< J se'ekatuka'izen 'improvement of life,'
common in educational slogans of the time)
sinzílu (<< J si'ñzí'lú 'believe'; lone example of a verb)

Since the restoration of Taiwan to Chinese control, knowledge of
Mandarin has been rapidly increasing among the aborigines. In addi-
tion to their native language and some Japanese, younger aborigines
are likely to know Mandarin and possibly one or more other aboriginal
tongues. Those Formosan languages with relatively few speakers left
are gradually being replaced by more common ones—and all of these,
slowly, by Mandarin.

6. JAPANESE. When the Japanese occupied Taiwan in 1895, they im-
m ediately made the promotion of the Japanese language one of their
main goals. This was accomplished in two ways: through the regular
school system, where Japanese gradually replaced the Chinese dialects
and Classical Chinese as the language of education; and through adult
education programs, where tens of thousands of people were taught Japanese conversation and simple reading and writing.

In the 1930s, as Japan and China prepared for war, governmental linguistic policies in Taiwan became much harsher. The use of all languages other than Japanese was outlawed everywhere except in the home, and even there Japanese was strongly encouraged by a system where so-called _ko[kugoka]tee_ 'Japanese language families' were honored by the government and extended various privileges. All printing in Chinese became illegal and books and magazines from mainland China were no longer allowed in. The admitted objective of the Japanese was to turn the Taiwanese people into fully assimilated subjects of the Japanese empire.

As a result of the government's large-scale promotion of Japanese, the number of people in Taiwan who could speak and understand that language rose from practically 0 in 1895 to 1,451,340 in 1935, which represented 29.7% of the population of Taiwan at the time.³ Cities were largely Japanese-speaking, though the native languages were still quite strong in the country. As has already been noted, because of intense efforts on the part of the Japanese among the aborigines, the Japanese language gained a particularly strong foothold there.

When Taiwan was restored to Chinese rule in 1945, the use of Japanese was forbidden by the new regime. Japanese periodicals, movies, and radio broadcasts were banned and it was considered extremely unpatriotic to speak Japanese. In spite of these measures, the influence of half a century of Japanese rule is still felt today, over thirty years after the departure of the Japanese.

Today, most of the native Taiwanese over the age of 50 still speak Japanese with varying degrees of fluency. Many of the present Taiwanese intelligentsia—doctors, lawyers, engineers, teachers, and so on—spent their college days in Tokyo and are still more at home in Japanese than in Mandarin. When these people meet, they insert many Japanese words and phrases into their Southern Min or Hakka, especially if they are discussing technical subjects. This is probably not only because it comes more naturally to them but also to "show off"—to let the listeners know the social status of the speakers. Much technical terminology—the jargon of medicine and the railway system, for example—is still Japanese. One other common use of Japanese is as a "secret language" which parents use with each other when they do not want their children to understand them. It is interesting to note that because, from the point of view of the present government, Mandarin has now so successfully replaced Japanese, people seem to feel freer to use Japanese today than in the period immediately after the restoration of Chinese rule.

6.1. The type of Japanese spoken by the Taiwanese as a second language has, of course, been influenced by the native dialects of the people speaking it. This is evident especially in phonology where, among other examples of Chinese influence, Japanese pitch-accent has been reinterpreted by Taiwanese in terms of Southern Min tones (Tung
1972). Taiwanese speakers of Japanese tend to interpret all two-mora Japanese words or phrases as high tone + mid-falling tone, e.g., Japanese はさ 'bridge' and はざ 'chopsticks' both being rendered in Taiwan Japanese as はさ. Three-mora words and phrases are usually interpreted as mid tone + mid-falling tone, Japanese はに 'life', こう 'heart', and はと 'man' becoming Taiwan Japanese はに�, こう, and はと respectively.

As the generation of speakers who reached maturity in Japanese Taiwan becomes older, native use of Japanese is gradually decreasing. In recent years, however, due to increased trade with Japan, there is a revival of interest in Japanese among younger people and it is being learned in schools increasingly as a foreign language in addition to English. Thus, the position of Japanese in Taiwan is changing from that of a true second language to a foreign language of wider communication learned as a subject in school.

7. CONCLUSION. In studying language contact in a multilingual society, it is important to consider the functions which the various languages have. The main domains of use of Southern Min and Mandarin in the under 50 sector of Southern Min society—the majority society of Taiwan—may be diagrammed as follows:

<table>
<thead>
<tr>
<th>domain</th>
<th>SOUTHERN MIN</th>
<th>MANDARIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Worship</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Playground</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Work</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Business</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Radio and TV</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>School</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Government</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Reading and Writing</td>
<td>+</td>
<td></td>
</tr>
</tbody>
</table>

Within the family Southern Min is the predominant language, although school children often insert Mandarinisms into their speech. In the last few years the parents in a few Southern Min families in Taipei and other large cities have begun purposely speaking Mandarin in the home to prepare their children for kindergarten and elementary school. As a consequence, there are now in the cities of Taiwan some Southern Min children who use Mandarin for all spheres of daily life and have only very limited knowledge of Southern Min.

The language of worship in Buddhist and Taoist temples as well as Christian churches is also Southern Min. In big city Sunday schools, however, teachers are beginning to switch to Mandarin in classes of younger children. On the playgrounds of Taiwan, where the next generation of speakers is learning language, Southern Min and Mandarin are used side by side with the latter predominating in the cities, especially if monolingual Mandarin-speaking playmates are present. At work
and in business both languages are common, choice of linguistic code often depending on the ages of those involved. For purposes of social mobility and employment, it is a distinct advantage to be fluent in both languages.

Most Taiwanese under age 30 think nothing of speaking Mandarin to each other. Older speakers prefer their native language, which they consider more intimate and sincere and which they may feel gives them group solidarity. For them, Southern Min is the language of insiders, Mandarin that of outsiders. In certain situations, however, as when country speakers with heavy local accents in their Southern Min move to the cities to work, Mandarin may be used as a neutral language to prevent ridicule because of dialectal particularities.

Radio and television broadcasts are made in both languages. The policy of the government has been slowly to decrease Southern Min programming and eventually broadcast only in Mandarin, but due to popular demand on the part of the people for retention of Southern Min broadcasting, progress toward this goal has been difficult to achieve. Still, the influence of radio and television in Taiwan is very strong. Children spend countless hours watching cartoons and other children's programs—all in Mandarin, which have a great effect upon their speech.

The Southern Min spoken on radio and TV is often very heavily influenced by Mandarin. This is true especially of radio news broadcasts and television soap operas, which use scripts written in Mandarin that are translated extemporaneously, often poorly, into Southern Min. Although many people complain how unnatural-sounding this type of Mandarinized Southern Min is, they have become used to it and understand it readily.

Since the Nationalists gained control of the island, all education has been in Mandarin. Most Southern Min children who live in the cities have picked up enough Mandarin before entering school that instruction from the first day can be in that language. In more rural regions, where preschool children usually know only their native dialect, the first few weeks are spent on Mandarin conversation, special texts being employed to teach children the national language. Children of that age learn rapidly, however, and it is not long before all instruction is in Mandarin.

The role of the school as a factor in language contact cannot be overestimated. Because they have received their education in Mandarin, younger Taiwanese can discuss certain subjects only in that language and generally can not help but introduce many Mandarin borrowings into their conversations. High school and college-age Taiwanese girls often consider it very fashionable to speak Mandarin. On dates, young couples frequently speak to each other in the national language through carry-over from the Mandarin environment of school. When such couples marry, they usually continue speaking Mandarin in their new family.

The language of the government is strictly Mandarin. The two years of compulsory military service play an important role in consolidating knowledge of Mandarin among male Taiwanese. All literature printed in Taiwan today is also written and read in Mandarin, the only exception
being Classical Chinese, which is also pronounced in Mandarin. Formerly, the Chinese classics were read with Southern Min pronunciation but only a handful of old people who once studied in private academies under Confucian scholars are still familiar with this tradition. Younger Taiwanese always read and write in Mandarin, though they may often subconsciously be aware of the Southern Min correspondences to many characters. Only personal names and street names are still commonly read off in Southern Min. Some older Taiwanese who received their education under the Japanese still read Chinese characters with Japanese pronunciation but this is slowly changing, too. The visual reinforcement which the Taiwanese receive by reading and writing Mandarin—as opposed to the purely oral position of the dialects—is an important factor in linguistic change in Taiwan.

The present study of language contact in Taiwan is admittedly somewhat uneven in coverage. As I have done original research only on Taiwan Mandarin and, to a lesser extent, Southern Min, the focus of attention has naturally been on those two languages. Secondary sources have had to be used for Hakka, the Malayo-Polynesian languages, and Japanese. In the future I hope to do a much more thorough study of language contact in Taiwan among all the languages involved. This paper may sketch out some of the problems in general outline but most of the details are yet to be filled in.

As we have seen above, all of the languages spoken in Taiwan have changed to some degree because of language contact. Some general tendencies, certainly not unique to Taiwan, that have emerged from this study are that men are more likely to be bilingual than women; city dwellers more likely to be so than people living in the country; and, with the exception of the mainlanders, who in spite of their comparatively small numbers have imposed Mandarin through control of the government and schools, minorities are more likely to be bilingual than majorities.

Linguistic prediction is dangerous business. Nevertheless, based on the present state of linguistic affairs, we may hazard some guesses as to the future sociolinguistic scene in Taiwan. As has been noted above, Japanese is already declining in importance as a native language and will probably largely disappear with the passing of the older generation that learned it in Japanese Taiwan. Southern Min, Hakka, and especially the Malayo-Polynesian languages, while holding on, are nonetheless increasingly coming under Mandarin influence. They will probably become more and more limited in function in the years to come. In contrast to this, the position of Mandarin is daily becoming stronger, even if at the price of a few concessions to outside influence. Of the languages spoken in Taiwan today, Mandarin will most likely some day become the native language of all.
NOTES

1 All figures given are estimates for 1979, based on the 1966 general census of Taiwan plus an average 2.36% estimated yearly increase in the thirteen years since then. This, of course, assumes an equal growth rate for all four groups, which is not necessarily true.

2 Transcription systems used here are as follows: Southern Min (abbreviation SM), Bodman 1955; Mandarin (M), Pinyin; Hakka (H), Harkin 1975; Japanese (J), Jorden 1963. The abbreviation for English is E.

3 Ide 1956: 78. Unfortunately, figures for 1945, by which time the number of Japanese speakers must have increased considerably, are not available due to war.

4 I would like to thank Professors Nicholas C. Bodman and Gerald B. Kelley of Cornell University for reading this paper and making several useful suggestions. I also thank my old friend Professor Eunice Lii of National Taiwan University for her discussions of the problem with me over a period of several years.

REFERENCES


TING PANG-HSIN. 1970. Taiwan yuyan yuanliu (Origin of the languages of Taiwan). Taiwan Shengzhengfu Xinwenchu, Taishong.


WEINREICH, URIEL. 1953. Languages in contact. Linguistic Circle of New York, New York.

WEN JI. 1956. Taiwan fanzhengzhi (Records of governmental policy concerning the Taiwan aborigines). Taiwansheng Wenxian Weiyuanhui, Taipei.

ZHANG BOYU. 1974. Taiwan diqu Guoyu yundong shiliao (Historical materials on the Mandarin movement in the Taiwan area). Taiwan Shangwu Yinshuguan, Taipei.
ON TWO ASYMMETRICAL USES OF THE
DEMONSTRATIVE DETERMINERS*

Rose Maclaran
Cornell University

I. In this paper I am going to look at two asymmetrical uses of
the demonstrative determiners -- uses in which there is not an
opposition between this/these and that/those. The first is the
widespread use of this to introduce a new referent into the dis-
course:

(1) a. There was this funny rattle under the hood.
   b. I'm afraid I can't come as I'm expecting these
      friends to call later.

It appears to correspond more closely to the indefinite than to
the definite article. When it is replaced by that the presenta-
tional sense is not preserved:

(2) There was that funny rattle under the hood.

(2) is only appropriate if the addressee is in a position to
recognize the funny rattle referred to, whereas use of (1a) does
not assume that the addressee has prior knowledge of the rattle.¹

The second case is a rather formal use of that:

(3) a. Those students who have completed their coursework
   by the beginning of the seventh semester are
   eligible for reduced tuition.
   b. Alimony payments will be based only on that
   income declared at the time of divorce, and not
   on projected future earnings.

Once again I am not concerned with the anaphoric use of demonstra-
tives, nor with their deictic use in which the reference is
clarified by the presence of the referent in the immediate context
(I shall henceforth call this the direct deictic use). The above
sentences can occur as discourse initial utterances and in the
absence of the referents. But if that/those is replaced by this/
these in example (3) only an anaphoric or direct deictic inter-
pretation is possible.

In this paper I will examine how these two asymmetrical uses
of the demonstratives are related to their direct deictic use. Section 2 is therefore an analysis of the more straightforward use of demonstratives and their place in the article system of English. I will leave discussion of the asymmetrical uses until section 3, where I will contrast them with the findings of section 2.

2. The articles. A standard analysis of the articles is the following (cf. Stockwell, Schacter and Partee 1973, Lyons 1977²):

```
  art
  -def  +def
   a/some   
   -dem  +dem
    the  
    -prox
   |
that/those
  
   -prox
   |
this/these
```

In both works cited above this is proposed as a syntactic analysis. A large part of the justification of decomposing the articles into syntactic features comes from the presence in the grammar of proposed transformational rules such as pronominalization and definitization. However, since recent treatments of anaphora suggest that coreference relations are more appropriately assigned in the semantic component by interpretive rules (e.g. Jackendoff 1972), I prefer to consider articles as being inserted in deep structure just like other lexical items. I shall therefore treat the distinctions given in the tree above as semantic rather than syntactic. Since my discussion does not directly address this issue, however, the analysis I propose is compatible with a framework in which the features distinguishing demonstratives are syntactic rather than semantic.

2.1 Referring expressions. Articles occur as constituents of noun phrases, and demonstrative noun phrases are typically used referentially:

(4) This book is mine.
(5) Look at those people.
(6) Rod Laver was one of the amateur tennis greats. This left-handed Australian won Wimbledon three times before turning professional.

(Predicate nominals, in particular, are excluded from this paper.)
I shall therefore begin with a brief consideration of reference as a background against which demonstratives can be discussed.

Most work in the philosophical tradition has focused on definite descriptions such as the following:

(7) The five-year-old senator lives in Arlington.

Given that there is no five-year-old senator, it has been argued both that the sentence is false (Russell 1905), and that it is neither true nor false (Strawson 1950). Russell argues that definite descriptions have an existential entailment; if the entailment is false then so is the sentence. Strawson, on the other hand, claims that they have an existential presupposition, the failure of which renders the sentence meaningless (neither true nor false) — the speech act has simply failed. More recently a compromise has been put forward within a truth-conditional semantic and a Gricean pragmatic framework (Kempson 1975, Wilson 1975, Stalnaker 1977). These accounts suggest that the existential proposition is semantically entailed, since it can fall within the scope of negation:

(8) a. My sister is dating the King of France.
b. You can't fool me. Your sister is not dating the King of France. France has no king.

But the existential proposition is also pragmatically presupposed — the use of a definite description conversationally implicates the existence of the referent, though since pragmatic presuppositions are derived from rules of conversation (Grice 1975), they are cancellable, as in example (8). For the purposes of this paper I will adopt without further argument this account of definite descriptions in terms of semantic entailment and pragmatic presupposition. A full discussion can be found in the works cited above. A major advantage of this approach is that indefinite descriptions can easily be accommodated. They have the same semantic representation as definite descriptions, for they also have an existential entailment, but they differ in the associated pragmatic presuppositions. I will return to this in section 2.4.

Demonstrative descriptions used referentially, like the definite and indefinite descriptions discussed above, have an existential entailment. Since in their direct deictic use the referent of the demonstrative description is in the immediate situation, it is difficult to imagine how the existential
entailment could be meaningfully cancelled; but in other uses it can be cancelled in opaque contexts:

(9) I sat up all night but I didn't see that monster you told me about. I'm convinced there is no monster.

In this way demonstrative descriptions are no different from other referring expressions.

2.2 Definiteness. Postal gives the following tests for definiteness and indefiniteness in English:

(i) preposed adjective construction.

(10) a. Big as Harry was, he could not lift it.
    b. Big as {the gorilla was, he could not lift it.
         \{#3
         this
         \}
         \{that

(ii) possessive construction.

(11) a. Fido is John's.
    b. #A
       This
       That
       The
       dog is John's.

(iii) prearticle construction.

(12) Which \{the \}
    Some \{#some \}
    All \{#\}
    men ...
    \{these \}
    \{those \}

(iv) anticipatory there.

(13) There is \{a \}
    #the
    \{#this \}
    \#that

In their straightforward use the demonstratives must thus be aligned with the definite rather than the indefinite article. Postal considers these co-occurrence facts to be syntactic, but
I am maintaining a semantic/pragmatic account of articles so must therefore show that the above contexts impose a semantic or pragmatic constraint on the occurrence of the articles. The traditional logical representation of the definite article includes both existence and uniqueness entailments. The existence entailment has been discussed above. Hawkins (1978) reformulates the uniqueness entailment in pragmatic terms. Roughly, a definite noun-phrase is used appropriately when it denotes a referent unambiguously for the hearer. Example (14) is infelicitous because the speaker has not given the hearer enough information to identify which dog is being referred to -- the description does not pick out a unique dog:

(14) I have fourteen dogs and fifteen cats. I like the dog the best.

A speaker can felicitously use the definite over the indefinite article when there is reason to believe that the addressee knows or can infer to whom or what the speaker is referring:

(15) a. I have the copy of Aspects.
    b. I have a copy of Aspects.

(15a) is appropriate if the addressee is believed to be in a position to recognize which copy is being referred to; (15b) is appropriate if there is no such presupposition.

The important point is that what in traditional semantic accounts was formulated as a truth-conditional uniqueness entailment is here treated as a pragmatic condition on the appropriate use of definite articles, and appropriateness is determined by what speakers believe that their hearers know or can infer. Speakers are thus viewed as accommodating themselves to their addressees in their use of articles.

2.3 Demonstrative. As a syntactic feature 'demonstrative', like 'definite', is undefined. Lyons (1977) gives the following test environments to distinguish the demonstratives from the definite article:

(16) a.♯I like the/this/that book better than the book.
    b.♯I like the book better than the/this/that book.
    c. I like this/that book better than this/that book.

(17) a.♯I'll take this/that one and the one.
    b. I'll take this/that one and this/that one.
The difference in acceptability is due to the fact that although both sets of articles are definite and must therefore refer unambiguously, only the demonstrative succeeds in doing so in the above examples. This is because it contains the added information of the location of the referent in relation to the speaker. The use of a demonstrative situates the referent of the description as being near the speaker or not. The clearest case is the direct deictic use that locates the referent in physical space (18), (where the same demonstrative is used twice to indicate different objects it is the gesture accompanying its use that gives the location of the referent). Demonstratives are commonly used anaphorically, exploiting discourse distance (19), and can also refer to temporal distance (20) and emotional distance (21) and (22), (see Lakoff 1974).

(18) Shall we take these seats or those?

(19) Chomsky believed firmly in the autonomy of syntax, but this hypothesis was challenged by his successors.

(20) Do you want to go to a movie this evening?

(21) That Idi Amin is a real tyrant.

(22) The only good thing to come out of this Harrisburg thing is that it has really opened people's eyes to the problems of nuclear power.

An interesting difference between demonstrative descriptions and definite descriptions with the is that the referent of the former must be given in the linguistic or extra-linguistic context; it is not enough that it can be inferred:

(23) I got into the car and turned on the engine.

(24) The composer of this concerto must have had some familiarity with Eastern music.

Since cars are assumed to have engines and concertos are assumed to have composers, it can easily be inferred which engine and which composer is being referred to, although neither has been
previously mentioned or is in the visible context. Hawkins (1978) claims that whereas a definite description is appropriate here, a demonstrative description is anomalous because there is a 'matching constraint' on the use of demonstratives. In denoting a referent with a demonstrative description the speaker: 'instructs the hearer to match this linguistic referent with some identifiable object, where identifiability means either (i) visible in the situation or (ii) known on the basis of previous discourse.' [op. cit. p. 152] This formulation is a bit restrictive: visible should be replaced by perceptible, example (26) shows that the referent may be present only in the succeeding context, and 'previous discourse' will have to be stretched to include any way the hearer could know the referent. However, with these provisos, the matching constraint does seem to capture the difference between the demonstrative and definite articles.

It has been pointed out (Hawkins, Lyons 1977) that the co-occurrence of demonstratives with superlatives, only and other modifiers which imply the uniqueness of what is denoted is unacceptable:

(25) The {This: richest/only/next} customer bought up
     {That: everything in the store.}

This suggests that a demonstrative description carries the implication that the referent is not unique (due to the possible contrast between this one and that one). However, in their direct deictic and anaphoric uses the demonstratives do co-occur with uniqueness modifiers:

(26) This next slide is of Joey and Martha at the Cape.

(27) On every team there is one player who is not as strong as the rest. That weakest member is the one to play hardest against.

Nor in examples (21) and (22) is there any implication that there is more than one Idi Amin or Harrisburg disaster. The demonstratives in (25) are only anomalous if the referents of the description are not readily available in the linguistic or extra-linguistic context. But this is just the case in which demonstratives are generally inappropriate because of the matching constraint. The question of uniqueness modifiers is a red herring.
2.4 Specificity. A further feature, which is not formally marked, but which has been much discussed, particularly in relation to indefinite descriptions, is that of specificity. Indefinite expressions in opaque contexts have two distinct readings:

(28) John wants to marry a bank manager.
   a. She's called Sheila.
   b. He thinks it'll be an easy way to get rich.

(29) I didn't see a runner ahead of me,
   a. so I realized that I was first and would win the race.
   b. so I thought I was first. But then he appeared out of the shadows.

On one reading of (28) John wants to marry a particular individual who happens to be a bank manager; on the other he wants to marry such a person. The former is the specific reading, the latter the non-specific. Similarly, in (29) on the first reading there is a specific runner whom I did not see; but on the second there is no such runner — the description 'a runner' falls within the scope of negation. It is important to distinguish two questions here: first, whether or not the speaker has a particular individual in mind to whom he is referring, and secondly, whether such an individual need exist. Analyses which focus on the first question explain the two readings by claiming a lexical ambiguity in the article: it is either specific or non-specific. Analyses which focus on the second question, of whether such an individual need exist, claim a syntactic ambiguity in the scope of the existential operator with respect to the expression which sets up the opaque context. The existential entailment of the description is cancelled if it falls within the scope of the opaque expression (see section 2.1), but is not if it has wider scope. However, the existence or non-existence of a referent can be inferred from specificity. If John wants to marry a specific bank manager, then presumably such a person exists. Similarly, if I at first do not see a runner who later appears, then this runner must exist. If John, however, just wants his future wife to be a bank manager, then no claim is being made about the existence of bank managers. Thus we do not have to claim a syntactic ambiguity. Partee (1972) argues persuasively that the specific/non-specific analysis is the correct one for these ambiguities, which she shows can also turn up with definite descriptions, called variously the de dicto/de re or the attributive/referential (Donnellan 1966) distinction:

(30) John wants to marry the Dean of the medical school.
(31) The police haven't yet arrested Smith's murderer.

In (30) John may once again want to marry Sheila, who is now Dean of the medical school, or he may be having a difficult time getting into the school and think that by marrying whoever happens to be Dean he will get a place. Similarly, in (31) the police may be looking for a known individual who murdered Smith, or they may be looking for whoever it is that committed the crime. Further support is lent to this analysis by the fact that the distinction is apparent not only in opaque but also in transparent contexts where there can be no question of a scope ambiguity:

(32) Smith's murderer is insane.

In Donnellan's famous example (32) the subject noun-phrase either can be understood to refer to a particular individual who the speaker has in mind, and who could be picked out equally using another description, or it can be understood the denote whoever fits the description, i.e. whoever murdered Smith. On this latter attributive or de dicto reading the description is an important part of the statement made. If a different description is substituted something different is said (cf. Stalnaker 1972).

(33) The Dean \{Fred Smith\} is the person to see about that complaint.

(34) The Dean \{Fred Smith\} is married to a Tasmanian.

Though Fred Smith may be the present Dean, if he were not he would presumably no longer be the person to complain to, whereas he would still be married to a Tasmanian. The predicate in (33) is relevant to the definite description in a way it is not in (34). In (34) it is the specific man who happens to be Dean at the moment who is at issue.

The speaker has no formal way of signalling whether the hearer is to take the description as specific or non-specific. The hearer must divine from the context the speaker's intention, whether the speaker has a particular individual in mind or not. In direct deictic uses the demonstrative description is clearly specific since the referent is in the visible context:

(35) a. [pointing to bread] I'd like three of those loaves.
b. [holding book in hand]
   Have you read this book?

In anaphoric uses the description can either be specific (36) or non-specific (37), depending on the antecedent:

(36) Sue suggested we open up a phoneme repair-shop, but I didn't think much of that idea.

(37) Michelin is looking for ten tire inspectors. These new employees will be required to work the night shift for the first three months.

It has been suggested that since the specific/non-specific distinction is not formally marked in English it is a pragmatic ambiguity (Klein 1978, as cited in Gazdar 1978; cf. also Stalnaker 1972). Furthermore, the specific reading entails the non-specific reading: if it is true that the specific individual who murdered Smith is insane, then it is also true that whoever murdered Smith is insane. (In opaque contexts the entailment does not go through, for I can want to marry a specific bank manager without wanting to marry such a person.) Such examples of sense inclusion are increasingly being treated as pragmatic within the formal semantic/Gricean pragmatic theory that I mentioned at the beginning of the paper. The seeming lack of ambiguity in sentences such as (38) can easily be accounted for by conversational rules.

(38) I am married to an Englishman.

If the speaker is married to an Englishman, then presumably she is acquainted with the particular individual and can supply further identifying descriptions. Thus the specific reading is salient. A pragmatic account also explains the ambiguity test facts. Normally it is impossible for an anaphor of a semantically ambiguous expression to take a different reading from the antecedent (Zwicky and Sadock 1975):

(39) #John declined a drink and Mary did a Latin noun.

But such crossed readings are possible with the articles:

(40) My sister didn't marry a doctor as my parents had always hoped, but my brother did, so that comforted them a bit, even though she's no longer practicing.

So there are many reasons for wanting to call this a pragmatic
ambiguity, not the least of which is that it avoids the need to double the number of underlying articles. An analysis in terms of semantic ambiguity would predict that all the articles have two semantic interpretations.

2.5 Summary so far. Demonstrative descriptions used referentially:

(i) have an existential entailment.

(ii) are definite, i.e. the speaker must believe that the hearer knows or can infer the referent.

(iii) locate their referent with respect to the speaker.

(iv) are subject to a matching constraint: the referent must be available in the physical context or have been mentioned previously in the discourse (a more restrictive form of definiteness).

(v) are represented semantically as being non-specific, but may have only a specific reading in context.

3.1 Presentational this. The most striking feature of presentational this is that it seems to correspond to the indefinite rather than to the definite article:

(41) There is \{ this, a \} man who lives upstairs from me

who is driving me mad because he jumps rope at 2 a.m. every night.

It cannot occur in any of the contexts given above as diagnostic of definiteness. For sentences (42) through (44) to be appropriate they must be construed anaphorically or deictically:

(42) # Big as this gorilla was, he could not lift it.

(43) # This dog is John's.

(44) # Some of these men came into the building.

None of the above sentences could occur discourse initially without extra-linguistic clarification. But presentational this, like a, does -- see particularly its use at the beginning of anecdotes:
There was this farmer from Ballycastle who was taking his donkey to market.

Presentational this evidently does not observe the matching constraint proposed in section 2.3. The speaker does not expect the hearer to recognize the referent of the description. It shares two other properties with the indefinite article. First, it cannot occur with uniqueness modifiers:

\[(46) \ I \ met \begin{cases} \text{the} \\ a(n) \\ \text{the} \end{cases} \text{richest/only stockbroker at the party.}\]

Uniqueness modifiers require a definite article because the referent of a unique description can be inferred by the addressee. The anomalies of (46) constitute further proof that presentational this is indefinite. Secondly, like a, under stress this does not retain its presentational sense.

\[(47) \ I \ met \ this \ stockbroker \ yesterday.\]

(47) can only have a direct deictic or anaphoric reading. Stressed this implies a contrast with that, but no opposition is possible in the presentational use. It can only take weak stress.

Like a then, it is indefinite, but unlike a it does not give rise to a specific/non-specific ambiguity:

\[(48) \ I \ didn't \ see \begin{cases} a \\ this \end{cases} \text{man ahead of me, so I knew} \begin{cases} a \\ this \end{cases} \text{I was the winner.}\]

\[(49) \ John \ wants \ to \ marry \begin{cases} a \\ this \end{cases} \text{bank manager, but he doesn't know any.}\]

Prince (1978) suggests that presentational this is an existential quantifier which always has widest scope, since the existential entailment is not cancellable in opaque contexts. I have argued above that the fact that descriptions in opaque contexts have a reading in which the existential entailment appears not to be cancelled is due not to a structural ambiguity but to the specific reading of the description, which has an existential presupposition. Thus I would reject Prince's analysis and propose instead that presentational this is always specific. This is supported
by the fact that a can be ambiguous even in sentences where there is no scope ambiguity, but this can not:

(50) a. A teller at the First National makes $300 a week.
    b. This teller at the First National makes $300 a week.

While (50a) can be about either a particular teller known to the speaker or about tellers in general, (50b) can only be about a particular teller. Furthermore, if there is nothing more to be said about the referent other than what is contained in the description, or if further description is utterly irrelevant, it is strange to use this:

(51) I've added a tablespoon of flour. What do I do next?

#this

(52) a. He put on a 3¢ cent stamp, so he must want it to go airmail.
    b. He put a 3¢ cent stamp on the envelope, and only realized later that it was worth a fortune because it was unperforated.

(53) a. John has a telephone, so you can reach me there.
    b. John has this weird purple telephone.

If John has a telephone, then a telephone must exist. Scope cannot explain the strangeness of this in (53a). If this is taken to signal specificity of reference, though, the oddness can be explained. For the purposes of getting hold of someone all working telephones are equivalent; in our culture telephones are usually quite unremarkable. The point of referring to a telephone in (53a) is to tell the hearer that the speaker is reachable. But the use of this, signalling that the speaker has a particular phone in mind, is in contradiction with the point of the sentence. This is acceptable in (53b) because the individuality of the particular phone is important. The difference is clear if John is imagined to get a new, non-identical phone. This makes no difference to what is said in (53a),
but does to (53b), even if the new phone is still weird and purple, for the speaker has a different referent in mind. It is the token and not the type that is important. (Despite the way I have presented the examples it is not the case that this is only used when the referent is going to be further talked about. Examples such as (54) are common:

(54) I went to this party on Saturday, and you'll never guess who I saw there. Sandra. And she told me that she had decided to come back to school after all these years...

People often associate presentational this with narrative and say that it adds vividness to the story (cf. Lakoff (1974) who classes presentational this under "emotional deixis"). If, as I am claiming, this forces a specific reading, then the vividness is explained. By using presentational this the speaker introduces a new referent from his world into the discourse and requires the addressee to believe in its existence (at least for the purposes of the discourse). The individuality of the referent is being emphasized.

3.2 Restrictive that. In the second asymmetrical use under discussion the demonstrative always occurs with a restrictive modifier:

(55) a. Only attempt those questions for which you think you know the answer.
    b. Only attempt those questions.

The reference in (55b) can only be understood if it is anaphoric or clarified by the physical context, but (55a) can be used discourse initially without reference to the context. The relative clause is vital to the establishment of reference. This cannot be used in the non-anaphoric, non-direct-deictic sense:

(56) Those
    #These
    British subjects who are resident outside of the United Kingdom are exempt from British taxes.

In this use the demonstrative description is definite, as the following examples show:

(57) Fluent as the English of those foreign students who enroll at American universities is, it is not always adequate for academic purposes.
(58) Those swans which live on Britain's waterways are the queen's.

(59) \{All\} \{Some\} of those candidates who pass the written test will be required to take an oral.

The description denotes unambiguously for the hearer since it picks out a unique set. However, once again the matching constraint on demonstratives does not hold. The referent need not have been previously mentioned nor be in the physical context.

The description is also non-specific (de dicto, attributive). The speaker does not have a particular referent in mind:

(60) Only that income in excess of $5000 earned outside the country will be taxable.

(61) My daughter will marry that man who chooses the right casket.

In (61) the father cannot have decided ahead of time which of the suitors his daughter will marry. The descriptions in (60) and (61) can only refer to such income and such a man. Furthermore, the description is an important part of what is said. Choosing the right casket is understood as qualifying the man as a fitting husband. Even if the man who chooses the right casket were also the man who had most recently eaten Welsh rarebit, (61') would be a puzzling statement, given the apparent irrelevance of eating Welsh rarebit to being a good husband.

(61') My daughter will marry that man who has most recently eaten Welsh rarebit.

Though the descriptions in (61) and (61') may denote the same individual, the propositions expressed by (61) and (61') are not equivalent.

In this respect restrictive that resembles the generic, and especially the generic use of the bare plural and mass singular, with which it is often equivalent:

(62) \{That\} \{Those\} students who have completed their coursework by the seventh semester are eligible for reduced tuition.

(63) Only \{That\} \{Those\} income in excess of $5000 earned outside the country will be taxable.
(See Carlson (1978) for a discussion of the existential and the
generic bare plural.) Like generic descriptions, this use of
the demonstrative description with that does not carry an
existential entailment. The description denotes possible individ-
uals, not just actual ones; in (62) there may be no students
who fit the description at the time of utterance, but this does
not render the sentence false, since there are possible students
who would fit the description. In most of the examples above the
fact that it is possible individuals that are being denoted is
made explicit by the use of the future tense, but the generic
present tense can also occur.

4. Conclusion. It is now possible to ask why these two uses
under discussion are asymmetrical. Why is it that that/those
and this/these cannot be interchanged in the examples given in
section 1 as they can be in the direct deictic use? In the
direct deictic use the demonstrative description is definite
and picks out a specific referent either near or far from the
speaker. With presentational this the description picks out a
specific referent, but it is indefinite. With restrictive that
the description is definite but non-specific. Thus each use
differs by one feature from the direct deictic use, but they differ
from each other in both definiteness and specificity.

A speaker who uses an indefinite description does not pre-
suppose that the hearer will know or be able to infer the referent.
If a description is specific then the speaker has a particular
referent in mind. The combination of specificity and indefinite-
ness indicates that the speaker is introducing into the discourse
something new known to him, though not necessarily to the hearer.
The hearer is being instructed that the referent is to be found
in the speaker's world, not in the shared world of speaker and
hearer. This/these expresses proximity to the speaker, while
that/those expresses distance from the speaker. Clearly only the
demonstrative marked for proximity to the speaker is appropriate
here. Conversely, the use of a definite description presupposes
that the addressee knows or can pick out what the description
denotes and non-specificity indicates that it is the content of
the description that is important in determining the referent, not
the speaker's intention. Thus the description is oriented away
from the speaker. And consistent with this meaning is the demon-
strative which expresses distance from the speaker. Thus the two
asymmetrical uses can be accounted for as extensions of the direct
deictic use.

A question remains as to how the uses are to be represented
in the semantics. It was suggested (section 2.4) that the
specific reading is contextually implicated. This avoids the need to have homophonous specific and non-specific articles in the lexicon. Restrictive that poses no problem since it only differs from the deictic use of that in never having a specific reading, and this can be explained contextually. However, presentational this only has a specific reading, and it cannot be argued that it is the context that imposes the specific reading, for in precisely those opaque contexts in which the indefinite article is ambiguous, this/these is not (see egs. 48 and 49). The non-specific counterpart of presentational this is a different lexical item, the indefinite article a. Specificity thus seems to be part of the conventional meaning of presentational this. It appears that a pragmatic distinction is here being lexicalized.
FOOTNOTES

*I'd like to thank Christopher Lyons, Sally McConnell-Ginet, Pete Siegel and Deirdre Wilson for their valuable comments.

1 The following examples with that, in which the speaker does not assume that the addressee has prior knowledge of the referent, were suggested to me by Pete Siegel.

(i) Policeman: Was there anyone else at the scene of the crime?
Witness: No ... Oh, wait a minute. There was that man in the blue coat who brushed past me as I arrived.

A: Would you like to come for dinner tonight?
B: Yes, I'd love to ... Oh, damn! I forgot that that paper on demonstratives is due tomorrow.

The use of the demonstrative over an indefinite article here serves to focus the discourse on the speaker's private world of recollection. But whereas with presentational this the speaker presents a referent from this private world to be shared, in the above examples the speaker seems more to be talking to himself. Typically the speaker will go on to introduce this new referent into the discourse more fully:

B: Yes, I'd love to ... Oh, damn! I forgot that that paper on demonstratives is due tomorrow. I'm giving my class presentation for Ling 401 on demonstratives and I've got to give in the first draft tomorrow. So I'm afraid it looks as if dinner is out for tonight.

This suggests that the first time the speaker mentions the referent it is not to introduce it to the addressee, but just because it has occurred as a sudden thought.

2 This is in fact a simplified version of the analysis presented by Stockwell et al., who include the syntactic features generic, specific and [+WH]. They also treat the first and
second person pronouns as underlying articles.

3 I am using # rather than * since the examples seem to be semantically anomalous rather than ungrammatical. I also cross-hatch examples which are anomalous in the use or context given, although they may be perfectly acceptable in other contexts and uses.

4 The cross-hatched examples are acceptable in the list use of there, but it is anticipatory there which serves as a test for indefiniteness (cf. Rando and Napoli 1978). Presentational this is of course acceptable here. I am marking as anomalous the direct deictic use.

5 I am not considering the use of superlatives as intensifiers:

(ii) A
     This
most beautiful bird has been singing at
     my bird-feeder.

Since there is no implication of uniqueness with this use, the indefinite article and presentational this are acceptable.

6 Perlmutter (1970) argues that the stressed form of a is one.

(iii) A piggy went to market and a piggy stayed at home.

(iv) One piggy went to market and one piggy stayed at home.

7 Defenders of a scope ambiguity analysis could argue that this example too is structurally ambiguous by invoking a generic operator. But in both cases the verb is in the generic present tense, so only the article seems to be able to provide the generic interpretation that is present in one case and not in the other. This cannot be explained structurally.

8 It was suggested above (p. 155) that the specific/non-specific ambiguity is pragmatic and that the speaker's meaning is inferable from the context. The anomaly of the specific reading of (51), (52a) and (55a) can easily be explained by conversational rules. In these examples the individuality of the referent is unimportant. The use of this, marked for specificity, serves
to draw attention to the individuality of the referent. But this is in violation of Grice's maxim of Quantity "Do not make your contribution more informative than is required" (Grice 1975). Hence the anomaly of the examples.
REFERENCES


Prince, E. 1978. 'This this', unpublished paper presented at the pragmatics workshop, University of Illinois.


I. Introduction

In See Gebauer 1979 I argued that the surface distribution of negative morphemes in Chinese depends on the distinction between phrasal and clausal relations on the one hand and on the affinity to aspecual interpretation on the other, so that a clausal negative always surfaces as bu-shi 'not be', while phrasal negation shows up as mei(you) 'not (have, exist)', hai mei(you) 'still not (have, exist) yet' in case an aspecual reading is involved, or as bu 'not' in case no aspect is involved. This is roughly illustrated as follows:

1. **Affirmative**
   a. [ta qu le]$_S$  
      he go ASP  
      'He went/has gone.'

   ---phrasal
   b. [ta mei(you) qu]$_S$  
      'He did not go./He has
      he NEG EXT/have go$_S$  
      not gone.'

   c. [ta hai mei(you) qu]$_S$  
      he yet NEG EXT/have go$_S$  
      'He hasn't gone yet.'

   ---clausal
   d. bu shi [ta mei(you) qu]$_S$
      hai mei(you)
      NEG be he NEG EXT/have go
      yet NEG EXT/have
      'It's not that he didn't go/hasn't gone yet.']
Affirmative
e. [ta qu]$_S$
   he go
   'He goes/ is going/ will go.'

Negative---phrasal
f. [ta bu qu]$_S$
   he NEG go
   'He does not go/ isn't going/ will not go.'

---clausal
g. bu shi [ta bu qu]$_S$
   NEG be he NEG go
   'It's not that he doesn't go/isn't going/won't go.'

The conclusion drawn was that one cannot just describe a single construction in a language without taking into consideration the set of constructions in which it occurs. The aspect markers (ASP) which trigger the presence of mei (you) 'NEG (EXT/have)' and hai mei (you) 'yet NEG (EXT/have)' are the perfective marker (Lp) and the inchoative marker (Li) respectively. Although these two aspect markers have the same surface manifestation in the form le, a particle without any stress or inherent tone, they differ syntactically because they can co-occur in the same sentence, e.g.

2. ta chi le fan le.
   he eat Lp rice Li
   'It's now a fact that he has eaten.'

In See Gebauer (1979), I was mainly concerned with the syntactic derivation of the negative particles (NEG), the semantic significance of NEG was presented roughly in terms of aspectual affinity. In the present study I shall re-examine the status of Lp and Li in the light of communicative function and show that they are both markers of focus (in the general sense of the word). I further propose that in order to understand the behaviour of negative particles in Chinese, one has to take into account the semantic extensions of aspect, focus and modality. This then leads to the reconfirmation of my previous claim that it is necessary not only to consider construction sets when analysing a single construction, but also to obtain information from all levels in the grammar, since any phenomenon at a single level may be elucidated and explained with pertinent phenomena at other levels.

II. Negation as a focusing device

A. Functions of negation. When one considers the functions of negation, a general notion immediately comes to mind: to negate is to deny what is previously given in some way. Semantically, to negate a sentence is to give its complementary set or to state the conditions
under which the proposition represented by the sentence is false, but logically there is more than one interpretation or proposition that can belong to this complementary set, that is, negation of any proposition yields something equivalent to a disjunction of the denial of each of the conditions for the truth of the corresponding positive sentence (cf. Kempson 1977:132 ff). Jespersen (1917) points out that the chief use of a negative sentence is to contradict and to point to a contrast (Jespersen 1917:4-5). In fact, one can even regard contradiction as the overall concept of negation, and each pointing to a contrast is an instance of denying a particular condition among a set of conditions for the corresponding positive or affirmative to be true. Each such denial reflects exactly the scope of negation (i.e. the scope of assertion in a negative sentence) and each instance is an association with focus (cf. Jackendoff 1972:255). Usually the scope of negation ranges over that part of a sentence which carries the new information, it is a site for focus marking, focus being understood à la Jackendoff (1972:230) as the information in the sentence that is assumed by the speaker not to be shared by him and the hearer. In this sense focus is somewhat similar to new information. But since within the part of the sentence which carries new information for the hearer there can be various subparts that in turn assume a certain prominence over the rest of assertion, one may want to specify these as special foci. Here it is necessary to clarify a few points concerning the term focus. There has been among the various interpretations of focus a view that connects the notion of focus with such processes as topicalization, clefting, passivization and the like, so that topics and fronted NPs are considered the sites of focus. Now since such fronted elements are generally part of what is known as given or old information, we have a case of conflicting interpretations of focus. One way to resolve this conflict is to employ the notion of prominence which ranges over all types of information, focus viewed in this way thus covers prominence in both old and new information. To understand how this works we need only to look at some surface cues associated with it. Phonologically there is usually a slight pause between the topic or left-dislocated NP and the comment/assertion in Chinese, just as there is generally a contrastive stress on topic and left-dislocated NPs in English. Notice that this contrastive stress is applicable to any constituent in a sentence regardless of the type of information involved, as shown in 2.

2. a. regou, wo xihuan. 'Hotdogs I like.'
   hotdog I like
2'.  b.  you, wo xihuan zunya.  'As for fish, I like trout.'
    fish I like trout

Here we see that the prominent constituent in both old/given and new information slots can receive contrastive stress; in fact, the stress pattern shows two points of highlight for each of the English sentences.

Syntactically, constituents of prominence can occupy the first constituent position in a sentence (cf. 2.), thus topics, surface subjects in passive constructions are the highest NPs of the sentence. Another way of marking prominence is by clefting. e.g.

3.  a.  wo xihuan de shi regou.
    I like nominalizer be hotdog
    b.  What I like is hotdogs.  (pseudo-cleft)
    c.  It's hotdogs that I like.  (cleft)

Note, however, that it is here that the division between given and new information is significant: a topic or left-dislocated NP is never new information whereas a clefted NP is always new information. One may wish to think of processes which anchor constituents in the first syntactic slot in a sentence as the discoursal focusing devices which pick out something from the conversational or communicative context and sets it up as the item of concern for the following utterance and thereby recognizing formally its prominence for that sentence. But as far as that sentence is concerned, it is pre-established and therefore given information. The new information (syntactically the part known as the comment) or assertion, on the other hand, is not pre-established for the hearer/addressee, it is that which the speaker wants to communicate to the hearer about a certain set topic.

What Jackendoff describes as focus is thus the same phenomenon as assertion or new information. There seems to be a tacit assumption that there can only be one focus per sentence, but this is not quite correct (cf. 2. and cf. Ladd 1980). What is causing the confusion is actually the tendency to interpret contrast as identical to prominence or focus, when the former is in fact a specialized case (hence subset) of the latter. Thus while there is normally only one contrastive item per utterance, there may be more than one prominent constituent in the same utterance. Therefore, if the term focus (or prominence) is taken to be a general notion of focus ranging over any discoursal unit including any subparts thereof, things are in order.

B. The scope of negation. As in English, the unmarked position for NEG in Chinese is at the head of the
VP in the comment part of the sentence, but unlike in English, NEG can precede the main verb of the sentence without the presence of an accompanying auxiliary verb,

good child NEG casually hit person
'A good child does/will not easily hit others.'

b. [ta] topic [bu lai chi-fan ] comment 
he NEG come eat rice
'He does/will not come to eat./He is not coming to eat.'

The scope of negation in both Chinese and English is realized as the part of the sentence immediately to the right of the NEG. Notice that in both languages the scope of any focusing device is immediately to the right of the focus marker. In the unmarked case the scope of negation is the assertion of a corresponding affirmative sentence. Moving NEG rightward down the line of constituents in the sentence results in narrowing the scope of negation (cf. 6). One remark should be made before we proceed to the examples, however. The distinction between clausal and phrasal negation does not neatly match the kind of distinction made in logic between external and internal negation, here the subject of the sentence is excluded from the scope of negation in the case of internal negation but not necessarily in phrasal negation (more on this later). I use the term subject and not topic as I see a major difference between the two: while subjects are normally topics, topics, on the other hand, can include time and place adverbials, objects and other constructions; subjects are a subset of topics, not vice versa. The topic of a sentence, since it is given or pre-established, cannot be negated and kept in the same sentence, otherwise there would be no point in making a comment about it, as there would be nothing to make a comment about (see 5.). This is in fact reflected in the need for external negation in addition to internal negation: in external negation the whole sentence is a comment or assertion, and the topic is not realized linguistically but inferable from the context. Such all-comment sentences set the scene for the following examples:

5. a. [yu ] topic wo xihuan zunu.
fish I like trout
'As for fish/ Oh fish, I like trout.'

b. *[mei (you) ] topic wo xihuan zunu.
NEG fish I like trout

6. a. ni kaiche dao niuyue qu. (AFFIRMATIVE)
you drive arrive N.Y. go
'You are driving to N.Y.'
6.  

b.  ni bu kaiche dao niuyue qu. (VP-FOCUS)
you NEG drive arrive N.Y. go
'You are not driving to N.Y.'

c.  ni kaiche, bu dao niuyue qu. (COMP-FOCUS)
you drive NEG arrive N.Y. go
'You are not driving to N.Y., but somewhere else.'

d.  bu shi ni kaiche dao niuyue qu. (SUBJ-FOCUS,
    NEG be you drive arrive N.Y. go S-FOCUS)
'It's not you who's driving to N.Y./
It's not that you are driving to N.Y...'

In the above, 6.b. entails or conversationally implies
6.c. (for conversational implicatures cf. Wilson 1977:70
ff.). 6.b. also shows NEG in its unmarked position, where-
as 6.c. and 6.d. are definitely more contrastive. More-
over, 6.b. and 6.c. are instances of phrasal negation;
6.d. indicates clausal negation. Notice, however, that
both 6.b. and 6.c. can become exclusively contrastive if
they have a shi 'be' following NEG, i.e. if they have a
clausal negator instead of a phrasal one.

C. Contrastive or clausal negation. In the following
I shall briefly discuss the various focusing devices
found in Chinese which happen to be related to negation,
and show that apart from the external/internal and
aspektual/non-aspektual distinctions there is also a need
to distinguish between contrastive and non-contrastive
negation in Chinese. Contrastive negation calls for the
marker bu shi 'NEG be' which also happens to be the same
one used for clausal negation. One can treat bu shi as a
single form which covers two not-so-unrelated functions
(more later). Consider the following examples:

7.  

a.  (bu) shi ta mingtian dao chengli chifan qu.
    NEG be he tomorrow reach city eat rice go
    'It is (not) he who is going to town tomorrow
to eat.' (SUBJ-FOCUS.)

b.  ta (bu) shi mingtian dao chengli chifan qu.
    he NEG be tomorrow reach city eat rice go
    'He is (not) going to town tomorrow to eat./
    It is (not) tomorrow that he is going to town
to eat.' (VP-FOCUS, ADV-time-FOC.)

c.  ta mingtian (bu) shi dao chengli chifan qu.
    he tomorrow NEG be reach city eat rice go
    'Tomorrow he is (not) going to town to eat.'
    (VP-FOCUS without ADV-time, COMPLEMENT-FOCUS)

d.  ta mingtian dao chengli (bu) shi chifan qu.
    he tomorrow reach city NEG be eat rice go
    'He is going to town tomorrow (but not) to eat.'
    (PURPOSE CLAUSE-FOCUS)
The set of contrastive negatives are, as indicated by the data above, the negative counterparts to a set of contrastive affirmatives which use *shi* 'be' as the contrast/emphasis marker. To this may be added a similar set of sentences employing the nominalizer *de* as a focusing marker as well. This particular usage of *de* requires it to be located at the sentence-final position and be always used in conjunction with *(bu)* *shi* '(NEG) be' for a contrastive reading. Thus from 7. we can get another set of contrastive/emphatic sentences by simply adding the marker *de* to the end of each sentence, resulting in what is usually known as the *shi*...*de* construction *(bu shi*...*de* under negation). Traditionally *de* is treated as a nominalizing marker or particle. The *shi*...*de* construction is known as a nominalizing specification (cf. Chao 1968). The function of the *shi*...*de* construction is to express the speaker's judgment on the state of affairs, it shows what is claimed to be subjective interpretation or deduction of the given facts. It is precisely in focusing on the objective observation of facts that the particle *le* (Lp and Li) differs from the particle *de* (cf. Yang et al 1977:240, also cf. See Gebauer 1979).

Interestingly, another focusing device, viz. cleft uses the same particles *shi* and *de*, but with them next to each other in the reversed order, ...*de* *(bu)* *shi*... , e.g.

8. a. mingtian dao chengli chifan qu *de* *(bu)* *shi* ta. tomorrow reach city eat rice go NOM NEG be he 'He's the one who's (not) going to town tomorrow to eat.'

Unlike the *(bu)* *shi*...*de* construction, the ...*de* *(bu)* *shi*... construction (clefting) applies to surface headed NPs or nominals only, that is, only NPs can occur after the cleft marker ...*de* *(bu)* *shi*... , predicting the following in addition to 8.a.

8. b. *ta* dao chengli chifan qu *de* *(bu)* *shi* mingtian. he reach city eat rice go NOM NEG be tomorrow (time word used as adverb)

8. b'. *ta* dao chengli chifan qu *de* rizi *(bu)* *shi* mingtian. 'The day of his going to town to eat is (not) tomorrow.' (time word used as N)

c. *ta* mingtian chifan qu *de* *(bu)* *shi* dao chengli. he tomorrow eat rice go NOM NEG be reach city

c'. *ta* mingtian chifan qu *de* difang *(bu)* *shi* chengli. (place word as N) place
8. 'The place that he is going to eat is (not) the city.' (place word as N)
   d. *ta mingtian dao chengli qu de(bu)shi chifan.
   he tomorrow reach city go NOM NEG be eat rice
   (V-compound as VP)
   d'. ta mingtian dao chengli qu de yuanyin (bu) shi
   chifan
   reason
   (V-compound as N)

At this point, a few words about the flexibility of the assignment of major syntactic category are warranted.
There seems to be quite a flexibility in this respect in Chinese, at least when compared to English. In English there is some derivational morphology which handles the category change for certain lexical items, thus we get paradigms showing alternations like "derive, derivation" which enables each of its members to be consistently of a particular syntactic category, not so in Chinese. What we find in Chinese is that some lexical words or phrases may be predominantly of one syntactic category, but they can also be assigned to other syntactic categories depending on the constructions they occur in. For instance, the form tiaowu 'dance' is predominantly a verb (see 9.a.), but it can function as a noun (see 9.b.) or an adjective (see 9.c.).

9. a. ta zhengzai tiaowu.
   he ASP prog/dur dance
   'He is/was dancing.'
   b. zher liuxing tiaowu.
   here popular dance 'Dancing is popular here'
   c. tiaowu zhuankia jiu shi ta.
   dance expert exactly be he
   'He is the dancing expert.'

To a certain extent this is reminiscent of the variations accorded English infinitives and participle forms, e.g.

10. a. He wants to dance slowly. (verbal function)
    b. To dance is the best way out of your problem.
       (nominal function)
    c. This is a nice piece to dance to.
       (attributive/adj. function)

11. a. I left him dancing on his own.
    (verbal function)
    b. Dancing is my favourite pasttime.
       (nominal function)
    c. The dancing man ran away.
       (attributive/adj. function)

Hence the same form may assume various syntactic functions
in accordance with its flexibility in distribution. This fact accounts for the variations in 8.b. through 8.d'.

D. Further ramifications of the phrasal/clausal distinction in negation. Returning to the question of focusing mechanism, I draw from the above data in II. the conclusion that regardless of whatever focusing device involved, NEG can be applied as a higher modifier to the corresponding affirmative construction, that is, its semantic scope can be exactly the same as the assertion of its corresponding affirmative, thus its assertion is always richer than that of the latter simply by the additional semantic input of contrast or contradiction. This may seem at first glance counter to previous claims (cf. Givon 1975) for a more presupposed status of negation, and to a certain extent this is true, but if we examine the surface marking of negation, it is obvious that the negative marking system usually breaks down according to various distributional characteristics. Givon's (1975) claim that a negative sentence contains more pragmatic presupposition than its corresponding affirmative is basically correct, since a negative sentence is uttered with the knowledge of a corresponding affirmative which may either have been mentioned or exist as what the speaker assumes to be a potential belief of the hearer/addressee prior to the actual utterance of the pertinent negative sentence.

E. Restatement of clausal/phrasal distinction. As mentioned above, the surface manifestation of negative markers varies according as whether a phrase or a clause is involved, and whether aspective reading is called for. I have shown in See Gebauer (1979) that aspect is in essence a VP phenomenon, a reason why aspective negatives mei (you) and hai mei (you) are not used in clausal negation. However, this statement should now be modified somewhat as things are more complicated than they seem to be. So far I have used only non-existential sentences in the examples; the facts from existential sentences show that for Chinese, mei is used when the referent of the subject NP is denied, thus fulfilling one of the disjunctive conditions for external negation (also cf. Kempson 1977:149). But if one takes the communicative functions of sentences into consideration, it is quite clear that existentials are all-comment linguistic expressions which can be uttered contrastively (e.g. for emphasis) or non-contrastively (as a simple statement of facts). Jespersen (1911:42 ff.) discusses the difference between special negation, wherein one definite idea is negated, and nexal negation, wherein a combination of ideas is negated, but he uses such a distinction within the bounds of a sentence, that is, only phrasal elements
are considered, in other words, only when NEG has the
narrower scope than or the same scope as the affirmative
scope of assertion. To mark the distinction between the
contrastive usage and the non-contrastive usage in
negation one can still use the term clausal vs. phrasal,
such that clausal is always contrastive and phrasal non-
contrastive, as the following examples show.

12. a. affirmative existential -- phrasal
   you ren lai le.
   EXT person come ASP
   '(There is) someone (who) has come.'

   b. affirmative existential -- clausal
   shi you ren lai le.
   be EXT person come ASP
   'It's true that (there is) someone (who) has come.'

13. a. negative existential -- phrasal negation
   mei(you) ren lai le.
   NEG EXT person come
   '(There is) no one (who) has come/ came.'

   b. negative existential -- clausal negation
   i. bu shi you ren lai le.
      NEG be EXT person come ASP
      'It's not true that (there is) someone (who)
      came/ has come.'

   ii. bu shi mei (you) ren lai.
      NEG be NEG EXT person come
      'It's not true that (there is) no one (who)
      came/ has come.'

In English, the same idea is expressed by reserving stress
or the use of a preceding "It's not true that" phrase
for the more marked function or contrast and the lack
of it for the neutral non-contrastive usage. Taking the
evidence from 12. and 13. in tandem with our findings in
the discussion of focusing devices (cf. 6.8.) a con-
clusion can be drawn to the effect that contrastiveness
is basically the same notion as special focus, or, to put
it more precisely, contrastive usage and emphasis all
contribute to the expression of focus. It is worth pointing
out that even in existential sentences the semantic scope
of negation is not necessarily narrower than the scope of
assertion, in other words, given any affirmative expression
there is always a corresponding negative. In existential
sentences, phrasal negation is certainly external, since
it denies the referent of the subject np. It is at this
level that I disagree with Givon's claim that the scope
of negation is never wider than the scope of assertion
of the affirmative, as the phrasal/clausal distinction is
clearly indicative of such a possibility. This is probably
due to the fact that in most languages the negative
markers tend to stay next to or very close to the verb, a constituent which is itself nexal in nature. One of the basic functions of negation is to deny that there is a referent to the expression, or if there is one, then it is not the right one. The first of these corresponds to phrasal negative existentials while the second one is conveyed by a clausal negation and whether the referent exists or not is not the major issue, i.e. not in focus, although such a denial can be conversationally implied.

III. Negation and Modality

According to See Gebauer (1979) the preliminary distinction between the two negators bu and mei(you) lies mainly in the non-aspectual meaning of bu vs. the aspectual meaning of mei(you), since bu never replaces any aspectual markers under negation while mei(you) always replaces the perfective aspect marker le (Lp) as well as the inchoative aspect marker le (Li) under negation. The paper addresses itself only to the effect of these two aspect markers on the surface forms in the process of negation, it does not cover more details of the aspect system. Although according to the rules proposed in that study we still get the right or desired outcome it seems that such a step will further help our understanding of negation in Chinese, especially when one considers this in connection with the other distributional facts of bu and mei with modals and also with the findings in the previous sections.

A. Aspects and negation. The particle le is by far the most frequently used aspect formative in Chinese perhaps because of the discourse-oriented function of the inchoative le (Li), which acts as a comment marker and has as its scope the whole VP immediately to its left. Of all the aspect markers in Chinese, the only one that seems to reject mei under certain circumstances is the continuative/durative aspect marker (zheng) zai (henceforth CONT/DUR), literally 'precisely at'. I shall argue in the following that this incompatibility has to do with the implausibility of getting a non-evaluative reading under given conditions. Let us now turn to the examples:

14. a. ni zai gan shenmo? you CONT/DUR do what 'What are you doing?'
b. wo mei gan shenmo. I NEG do what 'I am not doing anything.'
c. ?wo bu shi zai gan shenmo. I NEG be CONT/DUR do what 'I am not doing anything.' (?)
d. *wo bu zai gan shenmo. I NEG CONT/DUR do what
If 14.a. is the question asked by the speaker when he/she sees the addressee moving around, then the appropriate answer to it is 14.b. Notice that someone is eliciting a neutral fact and not an evaluation, thus 14.c. is not relevant to the question, even if interpretable. Now look at the following:

15. a. tamen (zheng) zai shuohua.
   they CONT/DUR say word
   'They are/were talking.'

b. tamen mei shuohua.
   they NEG say word
   'They are/were not talking.'

c. tamen bu shi (zheng) zai shuohua.
   they NEG be CONT/DUR say word
   'They are/were not talking, but...'

d. *tamen bu (zheng) zai shuohua.
   NEG CONT / DUR

16. a. tamen (zheng) shuo zhe hua.
   they CONT DUR
   'They are/were talking.'

b. tamen mei shuo (zhe) hua.
   they NEG say DUR word 'They are/were not talking.'

c. tamen bu shi (zheng) zai shuo zhe hua.
   they NEG be CONT / DUR say DUR word
   'They are/were not talking, but...'

d. *tamen bu (zheng) zai shuo zhe hua.
   NEG CONT / DUR DUR

For this group of data, there are several points worthy of attention. First, unlike the negation of Lp and Li, the negation of the CONT/DUR markers is only compatible with mei 'not' and not mei you 'not exist/have', this is largely due to the perfective connotation inherent in you 'EXT/have'. Secondly, the CONT/DUR prefixes zheng, zheng zai are obligatorily deleted under negation whereas the suffix zhe is only optionally deleted in the same environment. Interestingly, some speakers allow the occurrence of you and CONT/DUR with mei even under these circumstances but admit that this is predominantly influenced by Southernism, a dialectal infiltration caused by Southern Chinese who simply extend the features of their native language into Mandarin which they usually learn only at school. One significant fact pertaining to the mei-V-zhe 'NEG-V-ing' sequence is that its surfacing is related to the static reading one gets from it, as evidenced by the general readiness for even Northerners to accept 17.

17. Hou men mei suo zhe.
   back door NEG lock DUR
   'The back door is not locked.'
In general, one can conclude that while the notion of aspe ctual distinction is important within the area of internal negation, the notion of contrastiveness (marked by clausal negator bu shi) is equally important there. Thus my comparing internal negation and identifying it with phrasal negation (and external with clausal) as suggested in See Gebauer(1979) should really be modified here. The internal/external distinction is more of a semantic notion, whereas the phrasal/clausal distinction has directly to do with pragmatic factors like contrastiveness or focus, the latter distinction being superimposed on the former which is dependent upon aspe ctual markings which in turn interacts again with the clausal/phrasal distinction in negation. Surface variations of negation in Chinese are therefore very sensitive to pragmatic-discoursal constraints. In this sense one can agree with Givon (1975) over the pragmatically pregnant status of negation.

In 15. and 16., notice that all the d. sentences are totally ungrammatical. A superficial observation one can immediately draw is that NEG always occur in front of a major constituent which has more than just a grammatical meaning (e.g. N, V et c). Aspect markers are grammatical particles whose meanings are not referential, but relational and intensional. Hence if we remove all the aspect markers from these particular examples, what we have are fully grammatical sentences like

18. tamen bu shuohua. 'They do not (intend to) talk./They will not talk.'

The three interpretations (statement of fact, intention and futurity) available to a bu-V construction are unmarked. If we allow a past-time expression to co-occur with this construction, then the only readings available are the ones of intention or volition as well as the one of simple statement of facts, e.g.

19. tamen yiqian bu shuohua.
y they before NEG say word
'Before, they did not (want to) talk to each other.'

B. Modals and negation. If we look at modals under negation, we find that bu and not mei is the negator used (except perhaps for the modal neng 'able, can', but more on neng later). Basically, modals are modifiers of lexical verbs and verb phrases. They can be viewed as elements which combine with a V or VP to yield another VP and which have three functions in addition to any inherent
"lexical verbness", these three being alethic, deontic and epistemic (cf. also Allerton, 1979:3)10

20. tamen *mei neng shuohua.  
    { bu } capable (innate)  
    they NEG be allowed to say word  
    be possible that  

a. 'They are not able to talk.' (alethic) 

b. 'They are not allowed to talk.' (deontic) 

c. 'It isn't possible for them to talk.' (epistemic) 

21. tamen *mei hui shuohua.  
    they { bu } capable (learned) say word  
    NEG be probable that  

a. 'They are not able to talk.' (alethic) 

b. (not available-- neither in aff. (deontic) 
    nor in neg. ) 

c. 'It is not likely that they talk' (epistemic) 

22. tamen *mei yao shuohua.  
    they { bu } want (lex. verb) say word  
    NEG be necessary that  
    be obligated to  
    be certain that  

'They don't want to talk.' (as lex. verb) 

a. *'They do not need to talk.' (alethic) 

b. *'They are not obligated to talk.' (deontic) 

c. *'It is not certain that they'll talk.' (epist.) 

23. tamen *mei keyi shuohua.  
    they { bu } capable (regained) say word  
    NEG be permitted to  

a. *'They are not able to talk.' (alethic) 

b. 'They are not permitted to talk.' (deontic) 

c. (not available-- neither in aff. 
    nor in neg.) (epistemic) 

The morpheme gloss under each modal stand for their meanings in affirmative constructions. The present time interpretations are used in the glosses for brevity, it should be noted that future and volitional readings are also appropriate for the given sentences, and past reading too in the presence of certain past time expressions. It is obvious that under negation some modals here exhibit a certain narrowing or specialization of function, for negation blocks some of the readings normally ascribed to modals in affirmative constructions, as illustrated by the starred sentences of 22. and 23. From the entire set of sentences we see that bu differs from mei in having a much wider range of distribution than mei, that is, bu can be attached to higher predicates and exercise its force even to its left to include the subject of the sentence in its scope (cf. the epistemic readings of 20., 21., 23.) despite its own non-initial position;
this is never possible with mei. This is why mei almost never co-occurs with modals, as modals can have an epistemic reading which is itself directly related to the presence or availability of phrasal negation or assertion. Mei can at best co-occur with the modal neng, but it always has a narrower scope than a bu in the same position, that is, mei neng can only indicate VP-focus and never sentence-focus (represented by alethic and epistemic readings respectively). Moreover, mei neng can only be used to refer to actual events or states, i.e. events that have already occurred and/or state that were in effect in the past. It follows logically that the deontic reading is certainly not available with mei, just as we cannot get the epistemic reading, for mei can only mark actuality and not potentiality. This characteristic is further supported by the fact that only bu and not mei can be a negative potentialization marker in the so-called resultative verb construction, e.g.

24. a. kan- (*mei) jian  
    { bu }  
    see NEG perceive 'be unable to see'

b. zuo (*mei) wan  
    { bu }  
    do NEG finish 'be unable to finish'

c. zou (*mei, shang-lai  
    { bu }  
    walk NEG up come here.'

At this point one can try to assemble the various functional characteristics of mei and bu in the form of a table of features in 25. The positive sign signifies that the marker can (not has to) occur in the given environment; conversely, the negative sign implies that it cannot occur in that environment. There seems to be a tendency towards more simplicity in the system, e.g. via decreasing the number of environments or categories in the chart below. Thus if one particle is chosen or marked for a specific function, then the particle with the wider distribution may tend also to specialize in the opposite direction, e.g. in the negation of aspectually marked VPs and the denial of NP referents, bu is entirely excluded from participation (cf. the d. sentences in 14.-16. as well as examples in See Gebauer 1979). But this is not an obligatory move, as is obvious from the fact that bu can also occur in environments specifically connected to mei (see 25.), e.g. mei can only appear in sentences with an alethic and not deontic nor epistemic interpretation, while bu can be used in all three environments. This is nothing extraordinary if we take into consideration our general knowledge of the world.
25. FUNCTIONAL-SEMANTIC
   FEATURE       mei   bu
   a. aspectual   +     -
   b. EXT of referent +     -
       actual     +     +
       virtual   -     +
   c. alethic     +     +
       deontic    -     +
       epistemic -     +
   d. evaluative -     +
       narrative +     +
   e. phrasal/non-contr. +    +
       clausal/contrastive -    +

There are some interesting aspects to the abundance of pluses for 
mei in 25., most importantly, that it supports my claim that bu is the less restricted of the two negators. Except for aspectual marking and also where the existence of the referent, bu is usable regardless of what value mei assumes, mei therefore serves as a quasi-subset of bu. Take 25.c. for instance, our evaluation or judgment may be based on the state of affairs in this world or reality, or it may not. In the latter case, our beliefs and feelings can contribute to what we think and express, hence the epistemic reading. But there is no reason why our beliefs cannot sometimes coincide with the actual state of affairs, in that case the epistemic and the alethic input to our utterance will be the same, this is also indicative of the fact that clausal assertion/negation can have as its subset phrasal assertion/negation. Thus mei is said to be alethically bound and bu can be used in alethic, deontic as well as epistemic environments. It is no wonder that on the level of objects (persons, things etc.) mei usually denies the existence of a referent (e.g. mei ren 'no person/one', mei shijian 'no time', mei shi 'no matter') without at the same time sounding judgmental or evaluative; bu on the other hand is not used to specifically deny such an existence but rather to express that the referent is not the right one (e.g. bu (shi) ren bu (shi) gui 'neither a person nor a ghost', bu shi shi 'not matter'), hence definitely evaluative. On the level of events, mei can refer to the actuality only, and is thus limited to denying the existence of a past or on-going event, but not a future one, whereas bu can express the denial of not only a present (habitual) event or fact, but also a future potential. In addition, bu can be used contrastively with shi...(de) to cast an opinion or judgment on the actual state of affairs.
IV. Conclusion

In this study I have taken the syntactic distribution of negators in Chinese in tandem with their semantic marking and pragmatic behaviour. The distributional difference of **bu** and **mei** with respect to aspects is echoed not only by a referential semantic distinction of external as against internal negation, but also a pragmatic-functional opposition of contrastiveness vis-a-vis non-contrastiveness. Our understanding of the syntactic behaviour of negators in Chinese would not be complete if we neglect the other syntactic constructs which work with them in a construction set (e.g. aspects markers), or if we disregard the parallelisms in the semantic (e.g. denial of referential existence) and pragmatic components (e.g. contrastiveness). My preliminary analysis of negative markers in Chinese (See Gebauer 1979) is basically correct as far as syntactic generation is concerned; the present study gives it further support by giving more detailed information on the contribution of semantic and pragmatic workings. By investigating the interaction of negation with aspect, focus and modality I have shown that the study of different sets of constructions can lead us to a better understanding of not only the semantic and functional complexity of a particular construction of one's concern, but also its syntactic distribution. Mei and **bu** provide us with a systematic reflection of the interaction of the various factors to enrich the contents of a single phenomenon called negation. A grammar ought to capture such interactions between members of a construction set as well as interactions across the components via some interpretive rules. Such a formalization is of course the topic for another study.
FOOTNOTES

1 The author expresses her gratitude to Sally McConnell-Ginet and Claudia Ross for their encouragement, to Louis Mangione and Elaine Schuetz for their comments and for proofreading part of the manuscript, to the instructors of Chinese and other native speakers for their contribution to the data. All errors are of course my own.

1 Another reading is 'He is not the one who didn't go/ hasn't gone yet'. This is a subset of the gloss in 1.d.

2 Ladd (1977 and personal communication) confirms this observation.

3 An alternative will be to use the term Prominence for general focus, then we can keep Jackendoff's original meaning of focus.

4 Actually there is a certain constraint between the verbs of going and their complements, e.g. if one is going, then the destination or goal is conversationally implied. 6.c. sounds better if one inserts a comma between the two subparts, and even better if dan 'but' is inserted between the comma and NEG.

5 cf. footnote 1.

6 In See Gebauer (1979) I suggested that Li is the semantic extension of Lp, I shall now point to a similarity in syntactic behaviour. Both markers are replaceable by the nominalizer de in a cleft construction, e.g. corresponding to

a. shi wo qu le.
   be I go Lp  'I was the one who went.'
   b. shi wo da le ren le.
   be I hit Lp person Li
   'I am the one who has just hit someone.'
we have a'. qu { de } shi wo.
   {*le}  'The one who went was I/me.'
   b'. da le ren { de } shi wo.
   {*le}  'The one who has just hit someone is I/me.'

In other words, there is no way that le can be preposed (also thanks to Claudia Ross; personal communication). This supports my previous assumption that both le's are some sort of new information markers, since a preposed nominal construction is always regarded as old, established or shared information. It seems that the
notion of old vs. new information is not enough. When one talks about communicative functions. A more precise way of describing the situation is to use shared vs. unshared new information, because some new information may not be shared between the speaker and the hearer/addressee, i.e. new to the hearer only. Such is the case when the main verb of the sentence is either you 'EXT/have' or shi 'be' preceding any NP in the sentence.

7 The negative can of course be attracted to other elements in the sentence, but then the nexal reading is by extension rather than by default.

8 mei (you) is directly generated from an S.D. involving Lp and Li rather than ASP.

9 A reading in the past continuous is also possible.

10 Allerton (1979) is concerned about the polysemy of auxiliaries and suggests the use of traditional distinction of "état des choses", "état de connaissance" (épistémique) and "norme" (déontique) to map the various meanings of modals, as follows:

Valeurs modales (Tableau I)

<table>
<thead>
<tr>
<th>Etat des choses</th>
<th>Etat de connaissance</th>
<th>Norme</th>
</tr>
</thead>
<tbody>
<tr>
<td>possible keyi, neng</td>
<td>plausible hui, neng</td>
<td>permis keyi, neng</td>
</tr>
<tr>
<td>non nécessaire</td>
<td>certain yao</td>
<td>interdit bu neng, (bu keyi), bu yao</td>
</tr>
<tr>
<td>impossible bu neng</td>
<td>exclu bu hui</td>
<td>facultatif [bubi]</td>
</tr>
<tr>
<td>non nécessaire</td>
<td>contestable</td>
<td></td>
</tr>
</tbody>
</table>
REFERENCES


GENERATIVE PHONOLOGY
VERSUS AKKADIAN

Elizabeth Ungar
Cornell University

In recent years there has been a proliferation of phonological theories, all of which purport not only to describe the linguistic data, but also to mirror the speaker's competency. This paper attempts to put the claims of some of these theories to the test by applying their various methods of analysis to a problem from Akkadian.

Few attempts at a rigorous linguistic description of this language have been made, the one notable exception being Erica Reiner's A Linguistic Analysis of Akkadian. This neglect is understandable. Akkadian is the Semitic language which was spoken in a wide region of the ancient Near East as early as 2500 B.C. and used, in written form at least, into the first century of the present era. Our knowledge of this language, then, is based on written records of considerable geographical and historical diversity. Moreover, the ambiguities of the writing system utilized, a mixture of logographic and polyvalent syllabic signs, make the exact phonological shape of many words difficult to determine. To minimize the problems stemming from these factors, I have chosen to analyze linguistic processes which are fairly well understood, and to present them as they functioned within one historical and geographical dialect, i.e., Old Babylonian, a stage of the southern dialect used during the period from the 20th to the 16th century B.C. My descriptions of these processes are based on the discussions appearing in Riemschneider's Lehrbuch des Akkadischen, and the Ugnad-Matous Grammatik des Akkadischen. The majority of my examples are also drawn from these two works.

In Akkadian, consonant clusters are severely limited: no more than two consonants ever occur together within a word; one, at most, appears word-finally. These facts may be summarized in a rule of syllable structure which prohibits sequences of the form [Cc][C] Two morphological processes, feminine and compound formation, create structures violating this constraint. In the following discussion, I shall describe how the language breaks up the non-conforming clusters and present some possible formalizations of the
processes involved within the framework of current theories of Phonology.

**Feminine Formation**

To form the feminine of a noun or adjective in Akkadian, the morpheme -t is suffixed to the masculine stem.1

ex. belum "lord" (nominative case) : root=bel; nominative marker=um

\[
\text{bel} + t + \text{um} = \text{beltum} "lady" \text{ (nom.)}
\]

\[
\text{marum} "son" \text{ (nom.)} \quad \text{mar} + t + \text{um} = \text{martum} "daughter" \text{ (nom.)}
\]

\[
\text{rabiüm} "large" \text{ (nom., masc.)} \quad \text{rabi} + t + \text{um} = \text{rabitum} "large" \text{ (nom., fem.)}
\]

If the stem ends in a vowel or a single consonant, the derivation ends here. If, however, it terminates in a consonant cluster, the unacceptable sequence CCT- results. Akkadian breaks up this cluster in two ways:

a. The epenthetic vowel "a" is inserted before the feminine -t when the stem is -

i. an adjective or noun derived from a verbal root ending in two identical consonants;

ex.: dannum "strong" (nom., masc.)

\[
\text{dann} + at + \text{um} = \text{dannatum} \text{ (nom., fem.)}
\]

or:

ii. a "primitive" (i.e., non-derived) noun.

ex.: kalbüm "dog" (nom.) kalb + at + um = kalbatum

"bitch" (nom.)

b. The last stem vowel is copied and inserted between the two final consonants of the stem, in one case only: deverbial nouns and adjectives ending in two non-identical consonants.

ex.: pulüm "fear" pul/\text{u}/\text{a}/t + um = pulluptum

\[
\text{(nom., masc.)} \quad \text{(nom., fem.)}
\]

\[
\text{rapšum} "broad" \quad \text{rap} / \text{a} / \text{r} + t + \text{um} = \text{rapaštum}
\]

\[
\text{(nom., masc.)} \quad \text{(nom., fem.)}
\]

\[
\text{nakrum} "enemy" \quad \text{nak} / \text{a}/r+t+um = \text{nakartum}
\]

\[
\text{(nom., masc.)} \quad \text{(nom., fem.)}
\]

The process of feminine formation is perfectly regular with regard both to meaning and morphological form. In a generative
analysis, therefore, only the masculine forms need be entered in the lexicon, the feminine forms being derived via morphological and phonological rules. This derivation may be formalized in several ways.

Solution I: Conventional Generative Phonology (GP) could take the following approach. The lexicon contains the feminine morpheme -t and a rule for combining this with masculine stems by simple concatenation. The resultant forms then go through a cycle of phonological rules (P-rules) which "conspire" to produce outputs conforming to the syllable-structure constraints of the language. These P-rules must be sensitive to the derivational history as well as grammatical category of the input, in order to correctly differentiate the treatments of primitive and deverbal nouns. One way to accomplish this is through bracketing. I will assume that only non-derived forms are entered in the lexicon, and that all entries are labeled for grammatical category. Moreover, derivational processes taking place within the lexicon leave "traces" in the form of labeled brackets. For example, a noun derived from a verbal root in Akkadian will be doubly bracketed as follows:\[ [\text{[ROOT]}_\text{Verb}][\text{Noun}] \] Since the overwhelming majority of Akkadian adjectives have corresponding stative verbs, these may also be regarded as derived and be similarly double-bracketed. The P-rules apply to the bracketed forms and are sensitive to the information conveyed by the labels. Extrinsic ordering of these rules is unnecessary if we adopt something like the universal ordering principles proposed by Koutsoudas, Sanders and Noll 1974. Specifically, the "Proper Inclusion Precedence" condition will assure proper application of the rules (1) and (2). (See Figure I for sample derivations.) The first of these rules which is pertinent to this derivation is:

(1) \[ \left[ \begin{array}{c} \text{V} \\ \text{Adj} \end{array} \right] \]

This gives us the correct form of the feminine for deverbal nouns and adjectives having stems ending in non-identical consonants. The second relevant P-rule would be of the form:

(2) \[ \text{X V C}_1 \text{C}_2 + t \]
This solution is based on an even more fundamental assumption than those yet mentioned — that morphological information making explicit a word's derivational history may be included in the structural description (SD) of F-rules. Chomsky and Halle 1968 use labeled-bracketing similar to mine in formulating their stress-rules. Given the controversy surrounding almost every facet of their analysis, however, it seems best not to regard their precedent as decisive. In the next section, therefore, I shall investigate alternatives to this "mixing-of-levels".

Solution II: In the first of these alternative solutions, the feminine forms are derived within the lexicon, before lexical insertion. The rules involved are identical to those proposed above (and the derivations, therefore, the same as those in Figure I). Inclusion of non-phonological information regarding the derivational history of the forms seems more appropriate in lexical, as opposed to phonological rules. The lexicon, however, is usually regarded as the province of idiosyncratic processes whose application must be specified for certain limited groups of items. Feminine-formation, as I mentioned above, is a very regular process, and we thus seem to be missing a generalization when we group it with suppletive and other highly limited processes. Moreover, the syllable structure constraint (SSC) is a general phenomenon in Akkadian, and we therefore run the risk of duplicating in the lexicon rules which are needed in any case in the phonological component.

Solution III: The second alternative adopts an approach much like that of Natural Phonology (NP). Here, the feminine morpheme is represented as \[ a/\{XV c_1 c_2 t\} \] where \( a/\{XV c_1 c_2 t\} \) is an "archiphoneme". A morphophonemic rule, sensitive to derivational history, determines the realization of this abstract element:

\[
\begin{align*}
(3) \{a/\emptyset\} & \rightarrow \begin{cases}
\frac{a/\left[XV c_1 c_2 \right] \nu}{\text{Adj}} \\
\emptyset \text{ elsewhere}
\end{cases} \\
& \text{Condition: } c_1 = c_2
\end{align*}
\]

This will generate the correct form of the feminine for all stems except deverbal nouns and adjectives ending in two non-identical consonants. At this stage, the latter feminines will be of the form \text{*XVCct}. A later, and presumably phonological, rule will break up this unacceptable cluster:

\[
(4) \quad XV c_1 c_2 t \rightarrow 1 \ 2 \ 3 \ 2 \ 4 \ 5 \\
1 \ 2 \ 3 \ 4 \ 5
\]
<table>
<thead>
<tr>
<th>Roots as they appear in the lexicon</th>
<th>bel- ( N )</th>
<th>dann- ( V )</th>
<th>kalb- ( N )</th>
<th>pul- ( V )</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Morphological and Phonological Rules</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Solution I</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( MR_{\text{Adj}} ) derivation</td>
<td>( )</td>
<td>[( \text{dann}_V ) _\text{Adj} ]</td>
<td>( )</td>
<td>[( \text{pul}_V ) _\text{Adj} ]</td>
</tr>
<tr>
<td>( MR_{\text{Feminine}} )</td>
<td>( \text{bel}_N \times t )</td>
<td>[( \text{dann}_V ) _\text{Adj} ] _\text{t} ]</td>
<td>( \text{kalb}_N \times t )</td>
<td>[( \text{pul}_V ) _\text{Adj} ] _\text{t} ]</td>
</tr>
<tr>
<td>( P\text{-rule (1)} )</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
<td>[( \text{pul}_V ) _\text{Adj} ] _\text{t} ]</td>
</tr>
<tr>
<td>( P\text{-rule (2)} )</td>
<td>( )</td>
<td>[( \text{dann}_V ) _\text{Adj} ] _\text{at} ]</td>
<td>( \text{kalb}_N \times \text{at} )</td>
<td>( )</td>
</tr>
<tr>
<td><strong>Low-level rules (excluding bracketing and boundary)</strong></td>
<td>belt -</td>
<td>dannat -</td>
<td>kalbat -</td>
<td>puluğt -</td>
</tr>
<tr>
<td><strong>Morphological and Phonological Rules</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Solution III</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( MR_{\text{Adj}} ) derivation</td>
<td>( )</td>
<td>[( \text{dann}_V ) _\text{Adj} ]</td>
<td>( )</td>
<td>[( \text{pul}_V ) _\text{Adj} ]</td>
</tr>
<tr>
<td>( MR_{\text{Feminine}} )</td>
<td>( \text{bel}_N \times \text{t} )</td>
<td>( \text{bel}_N \times \text{t} )</td>
<td>( \text{kalb}_N \times \text{t} )</td>
<td>[( \text{pul}_V ) _\text{Adj} ] _\text{t} ]</td>
</tr>
<tr>
<td>( MR_{\text{Archi} \text{phonemes det.}} )</td>
<td>( \text{bel}_N \times \text{t} )</td>
<td>[( \text{dann}_V ) _\text{Adj} ] _\text{at} ]</td>
<td>( \text{kalb}_N \times \text{at} )</td>
<td>[( \text{pul}_V ) _\text{Adj} ] _\text{at} ]</td>
</tr>
<tr>
<td>Removal of bracketing</td>
<td>belt -</td>
<td>dannat -</td>
<td>kalbat -</td>
<td>puluğt -</td>
</tr>
<tr>
<td>( P\text{-rule (4)} )</td>
<td>( )</td>
<td>( )</td>
<td>( )</td>
<td>puluğt -</td>
</tr>
</tbody>
</table>
No morphological information is included, since, in this theory, P-rules must involve only phonetic conditioning. Indeed, none is necessary, because (3) has already eliminated all other input from the SD of this rule. (See Figure I for sample derivations.)

Given the general principles of current linguistic theory, this formulation, while it takes care of the data, is less satisfactory than solution I in one respect: although the morphological alternation and P-rule (4) both serve the same function -- breaking up consonant clusters -- they are represented as very different processes, the one lexical, the other phonological. The formalisms, thus, do not mirror what seems to be a significant parallelism.5 Another objection to this solution could arise in connection with the condition in NP that all and only P-rules must express phonological tendencies of the language. In the next section, we shall see that (4) is indeed part of such a general tendency. Unfortunately, so is (3), a fact which is obscured by this formulation.

**Compound Formation**

When an Akkadian noun enters into a collocation with a dependent noun or pronominal suffix, it takes a special form, termed the "construct state" of the noun. In the nominative and accusative cases, this "state" is basically the nominal stem without inflectional endings.

ex.: *ummanum* "army"  
*umman ūrarrim* "army of the king"  
(nom. of inflected state)  
*umman ūsu* ("his") = *umman ūsu* "his army"

As before, if the noun-stem, masculine or feminine, ends in two consonants, the unacceptable sequence CC[CC] results, and several mechanisms are brought into play to break up the non-conforming clusters:

a. An epenthetic vowel is appended to polysyllabic, feminine nouns and to monosyllabic masculine nouns with stems ending in two identical consonants. This vowel appears in the writing as "i" in compounds, and "a" before pronominal suffixes. These different spellings very possibly correspond to different allophones of a single phoneme. In fact, Von Soden 1952:82, indicates that this "i" was pronounced [ɔ]. Thus "i" probably represents a reduced version, in final position, of the normal helping-vowel.
ex.: libbum "heart" libbi matim "heart of the country"
libbaša "her heart"
kakkum "weapon" kaki immittim "weapon of the right"
kakkašu "his weapon"
napištum "life" napišti awilim "life of men"
napištiša "your life"

b. One of two, identical, stem-final consonants is dropped
in polysyllabic, masculine stems. This process
also applies, in free alternation with a., to mono-
syllabic masculines ending in geminates.

ex.: kak bartim "weapon of rebellion"
(compare kaki immittim above)
ekallum "palace" ekal nakrim "palace of the enemy"

c. The last stem vowel is copied and inserted between the
final consonants when these are non-identical.

ex.: alpum "cattle" alap awilim "the man's cattle"
nikpum "push" nikip alpim "goring of oxen"
beltum "mistress" belet bitim "mistress of the
house"
lumnunum "evil, distress"
lumnunšu "his distress"

The first and third of these processes are almost identical to
the two described in connection with feminine formation. The
conditions under which they apply, moreover, are also very similar
to the ones outlined earlier. The distinction between derived
and primitive stems is no longer pertinent, but this is explained
if we regard all compound forms as products of a derivation
which creates complex words. This interpretation is suggested by
the lack of inflectional ending on the governing noun of such
collocations (i.e., the one in the construct state). It is also
supported by the stress pattern of such forms -- most scholars
assume that there is only one stress, occurring on the second
member of the construction, and that the noun in construct state
has lost its original, independent accent. The only substantial
difference between the two sets of conditions, then, is that
word length is relevant in the second derivation, but not the
first. Given these remarkable similarities, the general principles
of GP prescribe that one set of rules should describe the
mechanisms for bringing both feminine and construct forms into
compliance with Akkadian SSC's. Any other solution would be
missing "significant generalizations."
Solution III: The NP approach cannot accomplish this in any natural manner. If, as seems logical given its purely phonetic conditioning, the epenthetic vowel of compound formation is introduced by a P-rule, there will be no way to relate this process to the feminine morpheme alternation. To get around this difficulty, we might propose a "compound morpheme" of the form \{∅\}. This would be added to noun stems after feminine formation, and realized as:

$$ (5) \{a\} \rightarrow \left\{ \begin{array}{l} a/XV_{c_{1}c_{2}} \quad \text{Condition:} \\ 1. c_{1}=c_{2} \text{ and } X \text{ does} \\ \quad \quad \text{not contain } V; \text{ or} \\ \quad \quad \emptyset \text{ elsewhere} \\ 2. c_{2}=t \text{ and } X \text{ does} \\ \quad \quad \text{contain } V. \end{array} \right\} $$

(there must also be an indication somewhere that the realization as "a" after forms meeting condition 1. is optional.)

Some later, phonological, rule will transform "a" to "i" in the correct environment. This generates the correct compound forms of polysyllabic feminines and monosyllabic masculine nouns whose stems end in geminate consonants. A modification of P-rule (4) extends its domain of application to compounds as well as feminines with stems ending in non-identical consonants:

$$ (4') XV_{c_{1}c_{2}} \left\{ \begin{array}{c} \emptyset \\ C \end{array} \right\} \rightarrow 1 2 3 2 4 5 \text{ Condition: } c_{1} \neq c_{2} $$

The condition $c_{1} \neq c_{2}$ is necessary, since polysyllabic nouns ending in geminate consonants follow a different pattern of cluster simplification:

$$ (6) XV_{c_{1}c_{2}} \left\{ \begin{array}{c} \emptyset \\ C \end{array} \right\} \rightarrow 1 2 3 \emptyset 5 \text{ Condition: } c_{1}=c_{2} $$

(See Figure II for sample derivations.)

A problem arises when we try to form the construct state of feminine nouns derived from deverbal stems ending in two, non-identical consonants, for example puluhtu in Figure II. After applying the feminine morphophonemic rules, we have the form *pulht. Archiphoneme rule (5) will generate the ∅ rather than the desired "a" alternative. This can only be remedied by having
(5) apply after P-rule \( (4') \): the latter inserts a vowel and thus brings the form into compliance with condition 2 of (5). This ordering entails either allowing morphological rules to be interspersed with phonological ones, or else making (5) a P-rule. It is not clear that the former option is open to us in a NP approach, and the latter obscures the relationship between compounding and feminine-formation.

Solution I: This solution, as I pointed out earlier, presupposes a cycle of morphological rules in the lexicon, each of which involves the addition of an exterior set of labeled brackets. A partial cycle might be something like the following: noun/adjective derivation, with addition of brackets labeled \( \{ N, \text{Adj} \} \); feminine formation, involving nesting within another set of \( \{ N, \text{Adj} \} \)-labeled brackets; and complex word formation. This last, in order to create the proper environment for the application of the P-rules, must entail the insertion of word boundaries and the addition of suffixes.

In order that this solution may account for the construct form of feminine nouns, another assumption must be made. This is a modified version of the "general principle of the transformational cycle" put forth in Chomsky and Halle 1968:15. P-rules apply first to the most deeply nested string meeting their SD's; after all relevant rules have applied, the innermost brackets are erased, including all those which served as environments for the application of this first cycle of rules; the rules then reapply, brackets are erased and so on, until the maximal domain of phonological processes is reached.

Given these principles, the P-rules already proposed may be modified and expanded to take care of the enlarged corpus:

\[
(1') \begin{cases} 
X \downarrow \begin{array}{c} \{ +C_3 \} \\
\{ N, \text{Adj} \} \\
\{ \# \} \\
\end{array} \\
\begin{array}{cccc} 1 & 2 & 3 & 4 \end{array} \\
\begin{array}{c} 5 \end{array} \\
\end{cases} \rightarrow 1 \ 2 \ 3 \ 2 \ 4 \ 5 \\
\text{Condition:} \\
1. C_1 \neq C_2 \\
2. \text{If } C_2 = t, X \text{ does not contain } V. \\
3. C_3 = t \\
\]

This transformed version of (1) applies to deverbal nouns in the feminine and to all nouns (except polysyllabic feminines) in the construct state, which have stems ending in two, non-identical
consonants.

\[(2') \quad X \overset{\mathbb{C}, \mathbb{C}_2}{\mathbb{C}_1} \quad \{ \begin{array}{c}
\mathbb{C}_2 \\
\mathbb{C}_3 \\
\end{array} \} \quad \rightarrow \quad 1 \ 2 \ 3 \ 4 \ a \ 5 \qquad \text{Condition:}
\]

If 5≠t, then X does not contain V. In this case, (2') applies optionally.

This rule takes care of all remaining cases except polysyllabic nouns in the construct state, ending in identical consonants. Rule (7) is added to account for these:

\[(7) \quad X \overset{\mathbb{C}_1 \mathbb{C}_2}{\mathbb{C}_1} \quad \{ \begin{array}{c}
\mathbb{C}_2 \\
\mathbb{C}_3 \\
\end{array} \} \quad \rightarrow \quad 1 \ 2 \ 3 \ \emptyset \ 5 \]

1 2 3 4 5

As in Solution III, a low-level rule will change "a" to "i" in the appropriate environments. (See Figure III for sample derivations)

Solution II can be expanded in one of two ways. The first alternative is identical to Solution I except that rules involving morphological information are part of the lexicon or morphological component, not the phonological component. This arrangement, however, obscures the fact that such information is important only in feminine formation, where primitive nouns must be differentiated from derived. There is no justification for assigning the rest of the rules to the lexicon. We might, therefore, wish to factor out the morphologically conditioned part of (l') and incorporate the rest in the phonological component. This alternative, however, gives rise to the same duplication of function already criticized in the section on feminine-formation.

All three of the solutions presented so far have drawbacks: Solution I necessitates incorporating morphological information in P-rules; Solution II allows overlapping between the rules of the morphological and phonological components; Solution III not only assigns to two different components rules which accomplish the same end, but also fails to formulate as one process the two instances of suffixed, epenthetic vowels. Of them all, the conventional GP approach is the most satisfactory. This formulations seems to demonstrate explicitly not only the generality but also the similarity of the three processes for reducing consonant clusters in Akkadian. Closer scrutiny, however, reveals that both these qualities are more artifacts of the formalisms than accurate reflections of the linguistic reality. The similarity
of the rules is expressed in the fact that the SD's of all three may be formulated in practically identical manners. This is a product of the transformational format which I have used. It would be considerably lessened were I to translate the rules into the more usual Change/Environment framework. The three rules would then appear, in general outline, as follows:

\[
\begin{align*}
(1') \emptyset & \rightarrow V_1' \times V_1 \times C_1 \quad \text{to} \quad C_2 \{^{+C_2}_{\#3}\} \\
(2'') \emptyset & \rightarrow a/x \times C_1 C_2 \quad \text{to} \quad \{^{+C_3}_{\#3}\} \\
(7) \quad C & \rightarrow \emptyset/x \times C_1 \quad \text{to} \quad \{^{+C_3}_{\#3}\}
\end{align*}
\]

The similarity is reduced in this manner to a common function -- the reduction of consonant clusters.

The apparent generality, on the other hand, is attained only at the expense of a complex set of conditions, such as those restricting the application of Rule \((1')\). The comparative simplicity of the following rules, \((2'')\) and \((7)\), is also illusory, made possible only by the ordering convention. Indeed, \((7)\) is an extremely limited process, a fact hidden, because, being last in line and thus bled of inappropriate input, conditions on its application do not have to be stated.

In attempting to describe the processes used by Akkadian to preserve certain syllable-structures, I have explored several of the methods of analysis proposed by current linguistic theories. Each was capable of accounting for the data. I found, however, that all suffered from one major weakness. Despite the claims of "explanatory adequacy", none of these analyses truly mirrored the actual linguistic situation. This gap between the linguistic reality and its formal representation is not merely a matter of inadequate formalisms. It is the outgrowth of some of the basic assumptions of GP and NP. The first of these assumptions is that morphological processes must be described in terms of concatenations of base forms of roots and affixes. The second is that these concatenations are modified by a separate level of phonological rules in order to conform to the surface patterns of the language. The third is that each P-rule must be applicable to the widest possible range of related forms. This last assumption affects not only the formulation of the rules themselves, paradoxically making them more and more complex as they become less and less specialized,
but also the shape of the underlying morphemes. As the rules
become more general, the underlying forms must be modified,
usually away from their surface shapes, to fit the SD's of all
and only the appropriate rules.
FOOTNOTES

1Vowel-length is usually symbolized in transcriptions of Akkadian by a circumflex or macron. Since length is not immediately involved in the processes I am analyzing, I have omitted such indications from my examples.

2For this use of the term "conspiracy", see Kisseberth (1970).

3The usual way of presenting the roots of Semitic verbs is ABC, where A, B, C are the first, second, and third consonants of the verb. Vowels are not normally included in the representation, since these are regarded as mere modifications of the basic meaning carried wholly by the consonantal skeleton. There are some objections to this mode of representation, but these do not affect the present study. I shall therefore use this method to symbolize the verbal roots in my examples. Non-derived nouns, on the other hand, do not lend themselves to the "radical" form of representation, since the vowels in these words are not predictable given the syntactic function or semantic class of the noun. I shall therefore include vowels in the base forms of primitive nouns.

4The authors state the condition as follows: "For any representation R, which meets the SD of each of two rules A and B, A takes applicational precedent over B with respect to R if and only if the SD of A includes the SD of B." (p. 8). To put this in plainer terms, if two rules may apply to a single string, that one with the more restrictive SD will apply before the more general, "elsewhere", rule.

5Although Kisseberth, in the article cited above (footnote 2.), stresses the importance of a functional rather than structural unity between rules in a grammar, I think that he would agree that locating such similar processes in different components should be expensive in terms of any evaluation metric.

6The condition C=t is used throughout this paper to represent the fact that the word in question is feminine in gender. It is possible that such a procedure will run into problems, that the rules will incorrectly apply to masculine nouns meeting this
description. As yet, I have not come up against such problems in my corpus. Such a situation would, however, lead to great complication in the statement of the rules, unless it is possible to use bracketing to indicate that the -t in question is the feminine morpheme \([-t]_{\text{Fem}}\). This solution, however, does not seem altogether natural.

Since, in NP, only phonetic information may be incorporated into the P-rules, and since word boundaries do not constitute phonetic information, it is not clear that (4') and (6) are acceptable rules. Hooper does, however, allow for "sandhi" rules which refer to word boundaries. Although it is not clear where such rules fit into the grammar, I shall assume that (4') and (6) are of this type, and may be left in their present form.
REFERENCES


