SONRAI CAUSATIVES AND PASSIVES: TRANSFORMATIONAL VERSUS LEXICAL DERIVATIONS FOR PROPOSITIONAL HEADS

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1. Sonrai verbs of the form STEM + NDI

Diré Sonrai has a number of verbs of the form STEM + NDI where the stem is itself a verb. Consider variations on the verb ηa 'to eat':

(1) STEM WITHOUT SUFFIX
    Musa ηa tasu di NP₁ V NP₂
    'Mousa eat rice the'

(2) STEM + NDI: THE DIRECT CAUSATIVE
    Ali ηandi tasu di Musa se NP₃ V + ndi NP₂ NP₄ se
    Ali feed rice the Mousa to
    'Ali fed the rice to Mousa.'

1A revised version of a paper prepared for the Conference on African Languages and Linguistics, University of Illinois, Urbana, April 24-25, 1970. Acknowledgements and thanks are due to a number of people. More than anyone, Charles Bird has been of great assistance in working out the ideas in this paper. We thank our colleague Fred Householder for reading and criticizing the preliminary version of this paper and offering valuable information and suggestions. A lecture by Ray Jackendoff in December 1969 gave us important ideas on the form of lexical rules. Tim Shopen wishes to acknowledge a substantial debt to Dick Stanley, who, in several discussions in early 1969, helped him to formulate the idea of considering grammatical relations as a property of the lexical entries for propositional heads. Shopen had formulated that hypothesis in a working paper for the UCLA English Syntax project but had almost forgotten about it, and didn't think seriously about its consequences until the discussions with Stanley. We have heard indirectly rumors about work being done by Hugh Matthews along similar lines. Comments and criticisms from anyone who has been thinking about grammatical relations are invited.
(3) STEM + NDI: THE INDIRECT CAUSATIVE
Ali ṣandi ṭasu di Musa se NP₃ V + ndi NP₂ NP₁ se
'Ali cause-to-eat rice the Mousa to
Ali had Mousa eat the rice.'

(4) STEM + NDI: THE PASSIVE
Tasu di ṣandi NP₂ V + ndi
rice the be-eaten
'The rice was eaten (by someone).' 

In Sonrai there is no equivalent of the English by phrase, e.g. no way to say "The rice was eaten by Mousa", only "The rice was eaten". The existence of an AGENT is understood in (4), even though it cannot be expressed.

2. Direct versus indirect causation

The names we have given to the two causatives refer to the semantic role of the subjects of the sentences in which these verbs are used. Having indirect causatives expressed in simplex sentences is unusual although not unheard of in the languages of the world. The more usual situation is to have direct causation expressed in simplex sentences and indirect causation in complex sentences.²

²L. Maran has informed us (personal communication) that Kachin, a Tibeto-Burman language, has a parallel process. There is a productive process of prefixation on verb stems that produces causative verbs some of which are ambiguous in just the way Sonrai causatives can be, e.g. [kʰraᶜʰ] 'to fall' becomes [jækʰraᶜʰ] meaning either 'to drop' or 'to cause to fall'. Fred Householder reports that Turkic, Japanese and Korean have indirect causative verbs.

³English has no verb like ṣandi 'to cause to eat' with the combined meaning of indirect cause plus some additional element of meaning denoting the action that is caused. Indirect causation is typically expressed in complex sentences with matrix verbs like cause, make, force, have and persuade, where there are at least two propositional heads, the main clause verb and the subordinate clause verb. The verb cause can express indirect causation in a simplex, but a second propositional head has to be expressed or understood, e.g. with a nominalization as object, John caused the explosion; note the peculiarity of ?John caused the tree—explosion is a propositional head while tree isn't.
The subject of a Direct Causative (DC) is the immediate or determinant cause. In Sonrai, as in English, feeding someone something entails rather than asserts that person's eating it. Corresponding to this is the fact that the only NP understood as AGENT in (2) is Ali, the causative subject. Musa, the one who gets fed, is GOAL. In the Indirect Causative (IC), on the other hand, the subject is the indirect or antecedent cause of the event. Causing someone to eat something asserts that he eats it: In (3) two AGENTS are understood, Ali, the causative subject, and Musa who initiates the eating. In fact, both Ali and Musa are

Cf. Hall [1965] on the indirectness of cause. George Lakoff (personal communication) reports that there are other kinds of cause besides the two defined in the direct/indirect dichotomy, probably four in all. A more abstract analysis of the semantic functions AGENT and INSTRUMENT would reveal them to share a feature of direct causation. What Gruber [1965] calls CAUSATIVE AGENT, PERMISSIVE AGENT and INSTRUMENT respectively could be analyzed with binary features as [+CAUSE, +RESPONSIBILITY], [-CAUSE, +RESPONSIBILITY] and [+CAUSE, -RESPONSIBILITY]; any verb or other propositional head with a CAUSATIVE AGENT or INSTRUMENT would be thereby "causative". When this paper was presented Getatchew Haile pointed out that -ndi in all its occurrences, including passive, is a marker for the presence of some kind of cause, direct or indirect, and could be called a causative marker. This would work except for instances of the passive (which we did not discuss in our presentation) where the generalization does not appear to hold, e.g. the passive of any stative verb like gunandi 'be seen' from guna 'to see' where in our analysis there is no association with a semantic function of cause, no AGENT or INSTRUMENT.

"We are indebted to Fillmore [1968] and Gruber [1965] for their many insights into the semantic primitives necessary to capture grammatical relations. We borrow terminology from both of them. The essential difference in our system is that we build the semantic representations into our lexical entries. Their systems involved doing the same thing twice. They put semantic labels on the nodes of the trees in the underlying representations and then built the same information into the lexical entries for verbs to insure proper lexical insertion. This obscured the syntactic properties of underlying representations. The correspondences between semantic functions and syntactic configurations in lexical items is a link between two different kinds of systems. The semantic system has different regularities from the syntactic, but an important part of the semantic system converges with the syntactic in lexical entries for propositional heads. The word is central to our view of language."
causers, Ali an indirect one, and Musa a direct one.

The suppression of the AGENT function in 'to eat' which is essential to the meaning of 'to feed' should be captured in the rules for the derivation of direct causatives.

The difference between the two causatives is nicely illustrated by an example of a different sort. The following two sentences are not paraphrases of each other, (neere 'to sell', dey 'to buy', deyndi 'to cause to buy'):

(5) Ali neere bari di Musa se
    Ali sell horse the Mousa to
    'Ali sold the horse to Mousa'

(6) Ali deyndi bari di Musa se
    Ali cause-to-buy horse the Mousa to
    'Ali got Mousa to buy the horse'

In (5) Ali is AGENT and Musa is GOAL. In (6) both men are AGENT; moreover, in (6) a third person is understood, the one who sold the horse to Mousa. Ali in (6) cannot be understood as the salesman; the most likely explanation for this appears to be that Ali is the AGENT of indirect causation and that this function is incompatible with direct participation in the transaction.5

IC verb formation with -ndi is much more productive than DC verb formation with -ndi. Most DC verbs are unanalyzable morphemes. Note that 'buy' and 'sell' are unrelated to each other, despite the fact that their meanings are so closely related. The verb cowndi 'to teach' is derived from cow 'to learn', fahamndi 'to explain' from faham 'to understand', hayndi 'to impregnate' (actually 'to give a baby to') from hay 'to give birth to', and wafakundi 'to reconcile' from wafaku 'to agree with'; however, these verbs are the exception rather than the rule. A list of all the DC verbs in -ndi that we have found

5We owe these insights concerning the DC verb neere 'to sell' and the IC verb deyndi 'to cause to buy' largely to Bob and Pat Terry.
is located in the Appendix. Note that when -ndi is added to a stem which is a one place predicate to form a causative the result is a two place predicate (derey 'to get lost', dereyndi 'to lose'); when the stem is a two place predicate, the result is a three place predicate, at least most of the time (mow 'to hear', mowndi 'to translate, interpret'), but when the stem is a three place predicate, the causative can only be a three place predicate. We have an example of this with the IC verbs formed from the stems meaning 'buy' and 'sell'. With neerendi 'to cause to sell' we can get two objects [___NP NP se] and consistently ambiguous readings, e.g. 'Ali caused someone to sell the horse to Mousa', or 'Ali caused Mousa to sell the horse to someone'. There are only a limited number of syntactic slots available to verbs and if there are too many semantic functions, one of them has to be left out.

3. Lexical entries for propositional heads

We view grammatical relations as correspondences between deep structure configurations and semantic functions. These correspondences are defined in lexical entries for propositional heads. Consider the sentence:

(7) Feneter di ba
    window the break
    'The window broke'

This sentence describes a change of state for the object referred to in the subject NP. We will extend Gruber's notion [1965] and say that whatever undergoes a change of state is a THEME. The verb ba is the propositional head that provides us with the change of state meaning and with the information that the subject NP is to be interpreted as THEME. The deep-structure for (7) is:

(8)

```
S
 NP -- VP
   | V
```

The lexical entry for the propositional head of (8) is:
(9) (a) (b) (c) (d) (e)
\[ ba + V, [ NP___ ][ THEME___ ], change of state . . . \]

Under (c) in (9) we have the syntactic subcategorization of the verb: we include the subject NP because we want to represent all of the deep structure configuration for which the verb established grammatical relations. Under (d) is the semantic propositional structure that corresponds to the syntactic structure under (c). As a first approximation of grammatical relations, it is useful to think of (d) as a template that fits over deep structure (8) and gives the correct semantic interpretation. (e) represents the meaning of the verb.

Closely related to the intransitive sentence (7) is the following transitive one:

(10) Ali ba feneter di
    Ali break window the
    'Ali broke the window'

This is a causative sentence where the immediate cause of the event is an impact or direct application of force initiated by an AGENT (in the usual interpretation). We will call the AGENT the direct or determinant cause of the event in as much as he initiates the impact in some way. In this case the THEME is the NP which is the object of the verb, and the NP in subject position is the AGENT. Again, it is the lexical entry for the verb that provides the propositional structure corresponding to the syntactic configuration. The deep-structure configuration of (10) is:

(11)

\[
S \\
NP \quad VP \\
V \quad NP
\]

The lexical entry for the prepositional head of (10) is:

(12) (a) (b) (c) (d) (e)
\[ ba + V, [ NP___NP ][ AGENT___THEME ], change of state caused by an impact . . . \]
Under (d) we have what can be considered a template that fits over deep structure configuration (11) so that the two NPs are interpreted semantically as AGENT and THEME respectively.

There is no one-to-one correspondence between semantic functions and positions on a tree in a syntactically motivated deep structure. The correspondences vary from verb to verb. That this is the case for English has been made abundantly clear by Chomsky [1965:160-63], Fillmore [1966, 1968], and others. The situation is no different for Sonrai. Consider again ba 'to break' along with two other verbs, hina 'to cook' and ṇa 'to eat'. All three can be used both transitively and intransitively. Transitively (NP\textsubscript{1} V NP\textsubscript{2}):

\[
\begin{align*}
(13) & \text{ Ali ba gorongo tondi di } \\
& \quad \text{ Ali break chicken stone the } \\
& \quad \text{ 'Ali broke the egg'}
\end{align*}
\]

\[
\begin{align*}
(14) & \text{ Ali hina gorongo tondi di } \\
& \quad \text{ Ali cook chicken stone the } \\
& \quad \text{ 'Ali cooked the egg'}
\end{align*}
\]

\[
\begin{align*}
(15) & \text{ Ali ṇa gorongo tondi di } \\
& \quad \text{ Ali eat chicken stone the } \\
& \quad \text{ 'Ali ate the egg'}
\end{align*}
\]

On a significant level of abstraction, we can say that these three verbs have same grammatical relations in sentences such as these: \([ \text{ NP---NP } ] [ \text{ AGENT--THEME } ]\), as in parts (c) and (d) of (12). Their intransitive uses are different, however:

\[
\begin{align*}
\text{NP\textsubscript{1} V} & \quad \text{NP\textsubscript{2} V} \\
(16) \text{ Ali ba} & \quad \text{Gorongo tondi di ba} \\
& \quad \text{Ali break} \\
& \quad \text{'Ali broke'} \\
(17) & \quad \text{chicken stone the break} \\
& \quad \text{'The egg broke'}
\end{align*}
\]

\[
\begin{align*}
(18) & \text{ Ali hina} \\
& \quad \text{Ali cook} \\
& \quad \text{'Ali cooked'}
\end{align*}
\]

\[
\begin{align*}
(19) & \quad \text{Gorongo tondi di hina} \\
& \quad \text{chicken stone the cook} \\
& \quad \text{'The egg cooked'}
\end{align*}
\]
Sentences (16) and (21) are acceptable only when \( \text{Ali} \) is thought of as designating something brittle enough to break, in which case \( \text{Ali} \) could also occur in object position in a transitive sentence, or when, as in a folk tale perhaps, an egg is thought of as being capable of ingesting food in a manner similar to a fully-formed animal, in which case egg could occur in subject position in a transitive sentence. Syndetically these verbs are the same. They can all be inserted in deep structure configurations (8) or (11), but the sets of semantic templates assigned to these configurations, in particular to the intransitive configuration (8), are different:

\[
\begin{align*}
\text{(22)} & \quad (\text{a}) \quad (\text{b}) \quad (\text{c}) \quad (\text{d}) \quad (\text{e}) \\
\text{ba} & \quad + \ V \ [\text{NP}___] \quad [\text{THEME}___] \\
& \quad \quad \quad \quad \quad \quad [\text{NP}___\text{NP}] \quad [\text{AGENT}___\text{THEME}] \quad \text{impact... change of state...} \\
\text{hina} & \quad + \ V \ [\text{NP}___] \quad \{[\text{THEME}___]\} \\
& \quad \quad \quad \quad \quad \quad [\text{NP}___\text{NP}] \quad [\text{AGENT}___\text{THEME}] \quad \text{change of state...} \\
\text{\( \eta \text{a} \)} & \quad + \ V \ [\text{NP}___] \quad [\text{AGENT}___] \\
& \quad \quad \quad \quad \quad \quad [\text{NP}___\text{NP}] \quad [\text{AGENT}___\text{THEME}] \quad \text{change of state...}
\end{align*}
\]

Any grammar accounting for grammatical relations would have to indicate the difference between the above three verbs in the lexicon anyway, whatever other apparatus was proposed; our position is that the lexicon is the only part of the grammar where this distinction is appropriate.

4. Derivational morphology accounted for in the lexicon by word
structure conditions

We will not content ourselves with simply listing lexical entries as in (22). There are many Sonrai verbs which like ba 'to break' and hina 'to cook', and unlike \( \eta \text{a} \) 'to eat', can occur intransitively [\text{NP}___] with the semantic function [\text{THEME}___] as well as transitively...
[NP__NP] with the semantic functions [AGENT__THEME]. We call these **object middle verbs** in that they allow the same NP in subject position in intransitives as in object position in transitives. Some object middle verbs are:

(23) kukur 'to burn', pumay 'to wash', dumbu 'to sever', 
    kayrey 'to shatter', morro 'to pulverize', ba 'to break', 
    hina 'to cook', neere 'to sell', daabu 'to close', 
    kufal 'to lock', fer 'to open', ŋami 'to mix', dibi 'to mix together', 
    mun 'to spill', ton 'to fill', ko 'to dry', 
    ben 'to finish', menne 'to melt'

The above verbs all share the following grammatical relations:

(24) ... (c) (d) ...
    (i) [NP__] [THEME__] 
    (ii) [NP__NP] [AGENT__THEME]

The relationship between (i) and (ii) in (24) can be represented as Direct Causative Condition I:

(25) [NP__] [THEME__] ⊆ [NP__NP] [AGENT__THEME]

That is, if a propositional head can govern the grammatical relations on the left then it can also govern the grammatical relations on the right. It is a word structure (WS) condition for the part of lexical entries concerned with grammatical relations (cf. Stanley [1967] on morpheme structure conditions). A fuller treatment would have Direct Causative Condition II, concerned with causative sentences with instrumental subjects, etc. Condition (25) says nothing about morphological form: bun 'to die' and wi 'to kill', which are morphologically unrelated but semantically have the same propositional head. (25) could presumably apply to them equally well. There are few verbs, if any, which do not conform to (25), i.e. verbs which occur intransitively for which there is no transitive causative counterpart that shares their meaning. In the cases we have studied, causative verbs contain idiosyncratic accretions to the meaning of their intransitive non-causative counterparts, but not vice-versa.
Including (25) in the grammar amounts to a claim about native speaker competence, and the way language is learned: When a child learns to produce intransitive sentences with the verbs in (23), or pairs of verbs like 'die' and 'kill', he relies on the general knowledge of grammatical relations represented by the WS condition (25), rather than learning each verb as a totally separate unit.6

There are cases where verbs to which WS condition (25) applies must, in transitive usage, have the causative suffix -ndi. We will examine variations on the verbs of motion kam 'to fall', goro 'to sit', jur 'to run' and fatta 'to go out':

(26) Tu di kam pot the fall 'The pot fell'

(27) Garba kamndi tu di Garba drop pot the 'Garba dropped the pot'

(28) Usman goro Ousman sit down 'Ousman sat down'

(29) Garba gorondi Usman Garba sit down Ousman 'Garba sat Ousman down'

(30) Bari di jur horse the run 'The horse ran'

6There are important generalizations that could be made for universal grammar concerning grammatical relations. We have never heard of an SVO language which has transitive sentences [NP V NP] with the left-to-right order of semantic functions as [THEME verb AGENT] unless it is some kind of special sentence construction like the passive. The most common word order for intransitive sentences in SVO languages is [NP V]. Thus, the pattern of grammatical relations discussed here is very common: [THEME verb] for intransitive use of a given verb, and [AGENT verb THEME] for its transitive counterpart.
Garba jurndi barl di
'Garba rode the horse'

Musi di fatta
cat the go out
'The cat went out'

Garba fattandi musi di
take out cat the
'Garba took the cat out'

The morphological form of the verbs in the transitive sentences above can be described as the result of a lexical rule, the Verb Morphological Form Rule I: 

\( V +\text{ndi} = V \)

A unified lexical entry for kam and kamndi can be represented as follows:

\[
\begin{align*}
\text{kam} & \quad [\text{NP}_] & \quad [\text{THEME}], \quad \text{physical motion}\cdots \\
\text{[\_\_]} \text{ +\text{ndi} } & \quad [\text{NP}_\text{NP}] & \quad [\text{AGENT\_THEME}], \quad \text{physical motion caused by release from a grip, etc.}\cdots
\end{align*}
\]

Given that there are a number of lexical items in Sonrai with the category label +V which also have the internal structure \( V +\text{ndi} \), the entries under part (a) of (35) can be considered less costly to the grammar. We are claiming that a child learning verbs such as kam, kamndi, and the others in (27)-(33), recognizes the internal structure of the morphemically complex verb and simplifies the learning by reference to the general principle of morphological form (34); furthermore, the form-meaning relationship in pairs of verbs such as kam/kamndi can be

\[\text{We got the formulation of this kind of rule, also the idea of separating the rules for morphological form from the generalizations concerning meaning in the content of lexical entries, from Ray Jackendoff in a lecture at Indiana University in December of 1969.}\]
captured as a statement of entailment between the rule of morphological form (34) (an MF rule) and rule (25) of Direct Causative Condition I (a GR condition):

\[(36) \text{MF rule (34) } \supset \text{ GR condition (25)}\]

The importance of this condition to the grammar corresponds to the number of items in the lexicon to which it applies. Although it characterizes a substantial subclass of verbs, it does not apply exhaustively to the language, i.e. not all verbs of the form V +ndi are direct causatives. We will call such a statement a minor condition: It characterizes a subpart of the language but not the language as a whole. For this subpart we are saying in effect that the morphological form V +ndi entails direct causative meaning.

It is our purpose to concentrate on the portion of meaning of sentences which is least idiosyncratic, the system of semantic functions that can be used to characterize the grammatical relations governed by all propositional heads. Even at that we have not been comprehensive. A more detailed account would take into consideration a number of facts we have passed over here. Note that for kamndi and gorondi, 'to drop' and 'to sit down (trans.)', the meaning involves physical contact between the subject and the object, and motion for the object; while for jurndi 'to ride' and fattandi 'to take out', the meaning involves not only these elements of meaning, but motion for the subject as well. In a fuller account of grammatical relations it could be argued that the subjects as well as the objects of the latter two verbs are THEME in propositions of motion, so that the subjects would be simultaneously AGENT and THEME.

There are subtleties which we have skipped about AGENT in kamndi 'to drop'. We have also passed over the fact that whereas the subject of kam 'to fall' is THEME, that of jur 'to run' and fatta 'to go out' may be AGENT as well as THEME, and that of goro 'to sit down (in-trans.)' must be AGENT as well as THEME. These facts should not detract from the point that we intend to make here, which is that there are aspects of sentential meaning, closely related to aspects of form, which can be shown to be quite general and can be accounted for in the lexicon.
It happens that each of the causative sentences, (27), (29), (31) and (33) are ambiguous. Given above are only the direct causative meanings. Each of them also has an indirect causative meaning:

(27') Garba kamndi tu di
Garba cause-to-fall pot the
'Garba caused the pot to fall'

(29') Garba gorondi Usman
Garba cause-to-sit Ousman
'Garba had Ousman sit down'

(31') Garba jurndi bari di
Garba cause-to-run horse the
'Garba made the horse run'

(33') Garba fattandi musi di
Garba cause-to-go-out cat the
'Garba made the cat go out'

To account for these meanings, we need another Grammatical Relations condition and another condition showing an implicational relationship between form and meaning.

We are making the following important distinction between DC and IC constructions (e.g. (27) versus (27')): Although they both are assigned a simplex tree (11) as their deep structure syntactic analysis, only DC constructions will be treated semantically as simplex propositions; IC will be treated as complex propositions. A simplex S is everything dominated by an S node without an intervening S. A simplex proposition is all the meaning governed by a propositional head without another one intervening. The lexical entries for the V +ndi verbs in sentences like (27') will contain the following grammatical relations:

(37) [NP[NP][AGENT IC [THEME___] ]

\[ \alpha \beta \alpha \beta \]

The semantic representation [AGENT IC [THEME___] ] is to read:

(37') 'AGENT cause indirectly [THEME to (STEM verb)]'
(e.g. 27'), 'Garba caused the pot to fall' with kam+ndi from kam 'to fall'). The Greek letter indexes are to show the correspondences between NPs and semantic functions unequivocally. The head of the matrix proposition, in the outside set of brackets is a proverb IC meaning pretty much what the lexical item cause does in English, i.e. indirect cause, cf. the discussion in Hall [1965]; the head of the subordinate proposition is the stem of the V+ndi verb.

As we will show in Section 5, not all of the co-occurrences of the stem verb in its independent occurrences are allowed in IC constructions; but in those that are allowed, the full meaning of the stem verb is preserved. The most compelling reason for the complex proposition analysis of IC constructions is that the subject of the IC verb V+ndi is always interpreted as an indirect cause, while a direct cause may be associated with the part of the meaning governed by the stem verb, as in the cases discussed in Section 2, where there can be two AGENTS.

If complex structure is the appropriate semantic analysis for IC sentences, then one can ask why we do not assign a complex sentence deep structure to IC sentences for our syntactic analysis. In Section 6 we give arguments to show that the deep structure must be a simplex S.

We now see a case where we have different symmetries in our syntactic and semantic representations. This raises an important question in principle. Actually, left-to-right order in semantic representation has no value in our scheme except as an arbitrary convention for the purpose of exposition; hierarchy does have value, though, so the question of principle remains. Our position is that describing grammatical relations as correspondences between two systems of structure, one syntactic and one semantic and each with its own regularities, will allow simpler and more revealing descriptions of syntax and semantics respectively, which are, we think, properly defined as independent aspects of linguistic competence. By opting for such an approach, we also make a claim about a third aspect of competence, namely we attribute importance to the correspondences themselves, e.g. the Greek letter subscripts in (37), or, in more usual parlance, to the projections from syntactic onto semantic representations. Surely these correspondences are themselves systematic:
we believe that they are and that interesting regularities in correspondences can be revealed in WS conditions on grammatical relations such as we are outlining here. The working out of detailed problems in the analysis of IC verbs here, and more particularly in Section 6, is offered in the way of empirical evidence for the validity of our position.

Two more conditions are necessary, the first, Indirect Causative Condition I:

\[(38) \quad [\text{NP}\_\_][\text{THEME}\_\_] \supset [\text{NP}\_\_\_\_\_][\text{AGENT IC}[\text{THEME}\_\_\_\_\_]]\]

\[a \quad a \quad \beta \quad a \quad \beta\]

This condition accounts for pairs of sentences like (26) 'The pot fell' and (27') 'Garba caused the pot to fall'. In a comprehensive account, many other constructions would be accounted for by conditions of this kind. The formation of IC verbs V +ndi from already existent verb stems is pervasive but not fully productive (this matter will be discussed further in Section 6). Thus, (38) will have to be called a minor condition. However, it has greater importance for the grammar than other conceivable conditions of this kind, because there are so many lexical items to which it applies. Another condition is:

\[(39) \quad \text{GR Condition (38) } \supset \text{MF Rule (34)}\]

Condition (39) can be called a major condition, since it applies exhaustively in Sonrai: The only Sonrai verbs governing IC propositions like those above have the form V +ndi.

We are now prepared to display a unified lexical entry for the three related verbs kam 'to fall', kamndi 'to drop' (DC) and kamndi 'to cause to drop' (IC):

\[(40) \quad (a) \quad (b) \quad (c) \quad (d)\]

\[
\begin{align*}
\text{kam} & \quad [\text{NP}\_\_\_] & \quad [\text{THEME}\_\_] \\
[\_\_] +\text{ndi} & \quad +\text{V} & \quad [\text{NP}\_\_\_\_\_][\text{AGENT}\_\_\_\_\_\_][\text{THEME}\_\_\_\_\_\_]\quad \text{caused by physical} \\
\text{V} & \quad \text{V} & \quad \text{release from grip} & \quad \text{motion} \\
[\_\_] +\text{ndi} & \quad [\text{NP}\_\_\_\_\_][\text{AGENT IC}[\text{THEME}\_\_\_\_\_\_]]
\end{align*}
\]
It should be reiterated that we are making generalizations about lexical items, and that in actual sentences it is the propositional head that is the repository of the native speaker's knowledge of grammatical relations: they are part of the meaning of this kind of word. An analysis of words is essential to the understanding of the deepest regularities of language. The WS conditions that we have formulated for grammatical relations and for form-meaning relationships in morphology are claims about linguistic competence, the way languages are learned and the way they change. We are saying that the primary elements involved are these generalizations and not lexical items as unrelated parts of a list. The ultimate arbitration of theoretical dispute over competing theories of grammatical relations should involve evidence from language learning and language change.

5. **Lexicalist versus transformationalist hypotheses for derivational morphology**

The distinction between lexical and transformational derivations of morphological items arises only in a theory that posits an abstract level of representation where lexical insertion takes place before the application of syntactic transformations. It is hard to imagine how in a theory in which all lexical insertion takes place after the cyclically ordered rules of syntax such a distinction would be possible or even desirable. We adhere to the notion of a syntactically-motivated deep structure where lexical insertion takes place, and we do so for two main reasons: first, we want such a level on which to make an abstract characterization about word order; and second, we want a level on which to define grammatical relations in the lexical entries for propositional heads. The two functions of deep structure coincide: the optimal point at which to specify grammatical relations for propositional heads is on the level at which syntactic co-occurrence restrictions are defined for them.

In our view there are two kinds of systematic sound-meaning correspondences: propositional meaning defined by lexical heads at the same level at which syntactic co-occurrence restrictions are specified, i.e. in deep structure before the application of syntactic transformations; and scope meaning, which depends on order after the application of syntactic
we believe that they are and that interesting regularities in correspondences can be revealed in WS conditions on grammatical relations such as we are outlining here. The working out of detailed problems in the analysis of IC verbs here, and more particularly in Section 6, is offered in the way of empirical evidence for the validity of our position.

Two more conditions are necessary, the first, Indirect Causative

Condition I:

(38) \([\text{NP}_\_][\text{THEME}_\_] \supset [\text{NP}_\_\_\_\_][\text{AGENT IC}[\text{THEME}_\_\_\_\_]]\)

\(\alpha \alpha \beta \alpha \beta\)

This condition accounts for pairs of sentences like (26) 'The pot fell' and (27') 'Garba caused the pot to fall'. In a comprehensive account, many other constructions would be accounted for by conditions of this kind. The formation of IC verbs \(V +ndi\) from already existent verb stems is pervasive but not fully productive (this matter will be discussed further in Section 6). Thus, (38) will have to be called a minor condition. However, it has greater importance for the grammar than other conceivable conditions of this kind, because there are so many lexical items to which it applies. Another condition is:

(39) \(\text{GR Condition (38) \supset MF Rule (34)}\)

Condition (39) can be called a major condition, since it applies exhaustively in Sonrai: The only Sonrai verbs governing IC propositions like those above have the form \(V +ndi\).

We are now prepared to display a unified lexical entry for the three related verbs kam 'to fall', kamndi 'to drop' (DC) and kamndi 'to cause to drop' (IC):

(40) (a) (b) (c) (d)

kam \([\text{NP}_\_\_\_\_][\text{THEME}_\_-\_\_\_]\)

\([\_\_] +ndi \quad +V [\text{NP}_\_\_\_\_][\text{AGENT IC}[\text{THEME}_\_-\_\_\_]]\]

caused by \quad physical\n
release from grip \quad motion

\([\_\_] +ndi \quad [\text{NP}_\_\_\_\_][\text{AGENT IC}[\text{THEME}_\_-\_\_\_]]\)
'to break', etc. It is frequently the case semantic functions are changed in the derivation of these verbs, and sometimes in different ways for different items. For example, as we have said in the DC verb derived from kam 'to fall', kamndi 'to drop', the causative subject is stationary, while the DC verb derived from jumbu 'to go down' is jumbundu 'to bring down' where the causative subject either moves with the object of the causative verb or is stationary at the terminal point of motion. In the latter case there is a level of meaning in which the causative subject would have to be represented as THEME or GOAL as well as AGENT, in the former the causative subject would be AGENT and SOURCE. No DC verb can have more than one AGENT: in DC verbs of the form STEM+NDI where the stem used without the affix is an agential verb, e.g. ṇa 'to eat', goro 'to sit down', the semantic function AGENT is always suppressed for the stem, cf. Section 2. The effect DC verb formation has on grammatical relations can be seen to be even more extensive when a wider set of facts is considered. For example, agential verbs such as ṇa 'to eat' can take an INSTRUMENT used by the AGENT, e.g. a fork, but in the derived DC verb, the only INSTRUMENT allowable is the one used by the causative AGENT—X's feeding Y with a fork entails Y's eating, but not Y's eating with a fork. All this evidence concerning grammatical relations argues in our view for a lexical derivation of DC verbs. For supporting argument, we can point to the idiosyncratic nuances in the meaning of the DC verbs not predictable from either the meaning of the stems or the general meaning of direct causation, e.g. (35e), etc.

6. Why indirect causatives must be derived lexically

Among causative verbs of the form STEM+NDI, the most likely candidates for a transformational derivation are the IC verbs. The only IC verbs occurring as part of what appear to be simplex sentence constructions in surface structure are those of the form STEM+NDI. The only other way indirect causation can be expressed in Sonrai is in complex sentence constructions, e.g. with the verb gab! 'to force'. Usually, in the languages of the world, indirect causation is expressed only in complex sentences. One could hypothesize then that sentences such as (41) below are simplexxes in surface structure only and that in their deep
transformations, either cycle by cycle, or after all syntactic transformations have applied, cf. Chomsky [1969] on the notions of focus and presupposition, Jackendoff [1969] on coreference, scope of negatives, quantifiers and adverbs.

If such a point of view is correct, then it is easy to see one of the things that syntactic transformations should not be allowed to do: they should not be allowed to change the value of lexical items as propositional heads. If the morphological item in question is a propositional head, and it is proposed that the morphological item be created by a syntactic transformation, then it would have to be the case that all the propositional properties of the derived item can be accounted for in the lexical entries present in the deep structures of the sentences in which it occurs. Conversely, if the derived item governs a new set of grammatical relations, then it has to itself be a lexical item inserted in deep structure.

An obvious example of a class of morphological items which cannot be derived transformationally in this view are the direct causatives, 'to feed', 'to teach', 'to sell', the transitive ba

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In Chomsky [1968], the paper that inspired the title of this section, Chomsky gives a great deal of evidence to show that the meaning and co-occurrence restrictions for English deverbal nouns, e.g. criticism, are idiosyncratically related to the verbs from which they are derived so that the nouns should be lexical entries in their own right. He makes it clear that he expects cooccurrence restrictions between heads and their complements to be lexically defined, but does not go so far as to say that grammatical relations are also relevant to the problem. He treats grammatical relations as an open question in the theory, cf. Chomsky [1965:160-63; 1968:fn15]; however, he does much to suggest that grammatical relations are relevant to the problem. For example, he points out the following data:

(a) John amused the children with his stories.
(b) *John's amusement of the children with his stories . . .
(c) John's amusement at the children's antics . . .

We would say that the verb *amuse* in its lexical entry allows for the imposition of the semantic function AGENT, while the noun *amusement* does not. This in itself would be a reason for having a lexical rather than a transformational derivation of *amusement*. 
structure (42) into the appropriate surface structure, a transformation involving seven elementary operations. More serious is the fact that this hypothesis makes the wrong predictions about what is grammatical. First, although hina can take an INSTRUMENT subject when used in a simplex sentence, the object of se after hinandi cannot be interpreted as INSTRUMENT:

(44) Boosi kono hina gorongo tondi yo
    embers hot cook chicken stone pl.
    'Hot embers cooked eggs'

9 If the deep structure were (42), the embedding transformation would have to totally rebuild the tree:

(i) TRANSFORMATION FOR THE COMPLEX SENTENCE HYPOTHESIS:

\[
\begin{array}{c}
\text{S.I. } X - [ \_ \_ \text{NDI} - [ \_ \_ \text{NP} - V - \text{NP} - X ] \\
\text{VP} \\
1 2 3 4 5 6 7 8 \\
\text{S.C. } 1, 2, 6+3, \emptyset, 2>7, \emptyset, 2>\text{PP}>5 + \text{POST}>\text{se}, 8 \\
\end{array}
\]

(a) Attach a copy of 6 as left sister of 3.
(b) Attach a copy of 7 as left sister of 4
(c) Attach PP as right sister of 4
(d) Attach a copy of 5 as left daughter of the PP in (c)
(e) Attach POST as the right daughter of the PP in (c)
(f) Attach se as daughter of the POST in (e)
(g) Erase 4 and everything under it

Several of these operations become unnecessary under the Revised Complex Sentence Hypothesis (47), but another transformation must be added for Equi-NP deletion. Any hope of limiting the power of transformations when rules of this kind are allowed is completely lost. The forms that these transformations can create can occur freely in subordinate as well as main clauses. The promising work by Emonds [1969] on a structure-preserving theory of transformational grammar makes the claim for English that transformations can do least to rearrange the structure of deep structure trees in embedded position. Our preliminary investigation of Sonrai syntax leads us to believe that this principle is appropriate for Sonrai too. For example, there is a preposing emphasis construction that moves phrase nodes from the right of the verb and places them in front of the sentence. This rule operates freely only in main clauses.
structure they are complex sentences with a matrix verb NDI 'to cause'. We will call this the Complex Sentence Hypothesis for IC verbs of the form STEM+NDI (see hinandi 'to cause to cook' from hina 'to cook'):

(41) Garba hinandi gorongotondi yo Ali se
     Garba cause-to-cook chicken stone pl. Ali to
     'Garba had Ali cook eggs'

The Complex Sentence Hypothesis would assign to (41) the deep structure:

(42)  

The deep structure (42) would be converted into a simplex sentence by an obligatory transformation. In the meanwhile semantic interpretation for the propositional content of the sentence could be carried out in deep structure, with grammatical relations defined in the lexical entries for the two verbs NDI 'to cause' and hina 'to cook', that is

THEME is extended to apply to entities that are caused, where cause is a kind of change of state, and we obtain:

(43)  

The first problem with the Complex Sentence Hypothesis is the sheer complexity of the transformation that would be required to convert deep
If the Complex Sentence Hypothesis were right, there would be nothing syntactically ill-formed about (46), for clause-by-clause it is a grammatical sentence. Instead of positing the unlikely constraint of a selection between the main clause verb and the subject of the embedded sentence, the only way to account for the ungrammaticality of (45) is to revise the Complex Sentence Hypothesis as follows, e.g. for sentence (41):

(47)

Now instead of having the subject of the embedded sentence raised into the main clause by the embedding transformation, we could say that there is a rule of equi-NP deletion that deletes the subject of the embedded sentence on identity with the object of se in the main clause. All the objects of se must be interpreted as animate. If instead of Ali, we had boosi kono 'hot embers' as the embedded subject, this same NP would have to be the object of the postposition se and the main clause. The structural description for equi-NP deletion and embedding could be met, but boosi kono 'hot embers' in the main clause would be incompatible with the presuppositions of se (under normal circumstances). Thus, the ungrammaticality of (45) would be accounted for. But it turns out that troubles are just beginning for the Complex Sentence Hypothesis. Sentence (41) had the form [Garba V NP [Ali se]]; it is also possible to get [Garba V [Ali se] NP] and [Garba V Ali NP] as paraphrases. This suggests that there might be a Sonrai rule of "Dative Shift" with a sentence
Sentence (45) is grammatical only in the fanciful situation where the embers are personified and thought of as AGENT.

The problem is how to block the embedding transformation posited for the Complex Sentence Hypothesis from operating on what would have to be the deep structure for (45):

(46)

The formulation of transformation (i) becomes much more complicated when a fuller range of examples is examined. The [NP se] phrase can occur only when the causative verb has a double object; this is a general constraint on double object verbs. Some of the same causative verbs that take double objects will also take single objects.

(ii) Garba hinandi mo di Ali se
    Garba cause-to-cook the rice Ali

(iii) Garba hinandi mo di (*se)
    'Garba is having someone cook the rice.'

(iv) Garba hinandi Ali (*se)
    'Garba is having Ali cook.'

Generating sentences (iii) and (iv) correcting is a very complicated problem for either the Complex Sentence Hypothesis (42) or the Revised Complex Sentence Hypothesis (47). An algorithm can be found but it doesn't look like a rule of language.
The embedding rule would raise the embedded PP into the main clause and then the hypothetical dative shift rule would have to obligatorily move the main clause PP next to the verb and delete the se to ensure output of the grammatical (48') instead of the ungrammatical (41'). Making an otherwise optional rule obligatory just in case a certain kind of embedding transformation has operated is a highly dubious solution, and one which in fact throws the Complex Sentence Hypothesis into doubt.

The logically conceivable range of sentences under the Complex Sentence Hypothesis would include one with two benefactives, one for the main clause and one for the embedded sentence. Sentence (41) is actually ambiguous.

(41) Garba hinnandi goroogo tondi yo Ali se

Garba cause-to-cook chicken stone the pl. Ali to

a. 'Garba had Ali cook the eggs'

b. 'Garba had someone cook the eggs for Ali'

We leave aside the question of what the deep structure would be for the second interpretation of (41) (further reason to doubt the Complex Sentence Hypothesis). Imagine the sentence for the following situation: 'Ali cooks the eggs for Ousman and Garba causes this to happen for Kalil'.
such as (41) as input, and then shift of the postpositional phrase with optional deletion of the se. This rule would apply to most if not all sentences with double object verbs occurring in the environment

(a) \([\text{NP}_1, \text{NP}_2, [\text{NP}_3, \text{se}]]\) giving (b) \([\text{NP}_1, [\text{NP}_3, \text{se}], \text{NP}_2]\) or (c) \([\text{NP}_1, \text{NP}_3, \text{NP}_2]\) as output. The (c) variant for (41) would be as follows:

(48) Garba hinandi Ali gorongo tondi yo
Garba cause-to-cook Ali chicken stone pl.
'Garba had Ali cook eggs'

Now the dilemma: sentence (48), but not (41) can be extended by another [NP se] phrase, which must have a benefactive meaning.

(48') Garba hinandi Ali gorONGO tondi yo Usman se
Garba cause-to-cook Ali chicken stone pl. Ousman to
'Garba had Ali cook eggs for Ousman'

(41') *Garba hinandi gorongo tondi yo Ali se Usman se
Garba cause-to-cook chicken stone pl. Ali to Ousman to
'Garba had Ali cook the eggs for Ousman'

For one of the possible interpretations of (48'), the Complex Sentence Hypothesis would have to posit (49) as an embedded sentence in the deep structure (50); the latter giving the deep structure of (48'):

(49) Ali hina gorongo tondi di yo Usman se
Ali cook chicken stone the pl. Ousman to
'Ali cooked the eggs for Ousman'
if the environment is \([V \ NP_]\) and the verb is a single object verb, they can have only a benefactive meaning; whereas if the verb is double object, as is hinandi, then their meaning is usually ambiguous between benefactive and something else. Our analysis takes note of the fact that benefactives are an optional semantic function with a wide range of sentences, that se always has a meaning best glossed by 'to' and that its object is always a [+animate] goal for some kind of abstract motion.

What the GOAL may receive may be simply an object, or the meaning associated with benefactives, or in the case of IC verbs like hinandi the predication of the semantic function associated with the deep structure subject of the stem of the IC verb, i.e. for hina 'to cook' as in hinandi, AGENT; for mow 'to hear' as in mowndi, GOAL. The evidence that we have summarized here briefly leads us to believe that there is no Dative Shift Rule and that VPs of the form \([V \ NP \ NP \ldots]\) can be generated in deep structure, where the PS rule for VP is as follows:

\[
(53') \quad VP \rightarrow V \ (NP) \ (NP) \ (PP)^* \ (S)
\]

Some general co-occurrence restriction (a semantic one?) would prevent more than one se per VP in a simplex sentence in deep structure.

If one did away with the Dative Shift Rule within the framework of the Complex Sentence Hypothesis, then new measures would have to be taken to bar the generation of the ungrammatical *(54) (cf. (44) and *(45)):

\[
(54) \quad \ast \text{Garba hinandi} \ boosi kono gorongoro tondi di \ yo
\]

\quad Garba cause-to-cook embers hot chicken stone the pl.

\quad 'Garba caused the hot embers to cook the eggs'

The ungrammaticality of (45) and (54) are representative. All IC verbs on the form STEM+NDI are constrained in the same way: if the event that is caused indirectly itself has a direct cause, that direct cause must be AGENT and not INSTRUMENT. The co-occurrence restrictions for the complements of STEM+NDI IC verbs altogether the cases involving both INSTRUMENT and BENEFACTIVE appear unmanageable with the framework of a Complex Sentence Hypothesis. Such a hypothesis means positing
The deep structure for this sentence would be as follows:

(51)

There is no grammatical output for such a deep structure, e.g. (52), (53), etc. are ungrammatical:

(52) *Garba hinandi goronggo tondi yo Ali se Usman se Kalil se
Garba cause-to-cook chicken stone pl. Ali to Ousman to Kalil to
'Garba had Ali cook eggs for Ousman for Kalil'

(53) *Garba hinandi Ali goronggo tondi yo Usman se Kalil se
Garba cause-to-cook Ali chicken stone pl. Ousman to Kalil to
'Garba had Ali cook eggs for Ousman for Kalil'

A blocking transformation designed just to block deep structures such as (51) would be needed, or else a principle of semantic interpretation. The problem with the latter is that more than one se can occur in complex sentences in Sonrai. It is only in simplex sentences that only one se and only one benefactive is allowed. We would be left with the principle that surface structure simplexes can have only one se and only one benefactive and need a principled way of incorporating that in our grammar in order to block sentences like (52) and (53).

The general situation for [NP se] phrases is that they can occur in the environment [V NP_] or [V NP NP_] and in those environments only;
cause to eat', pumeyndi 'to cause to wash' and dumbundi 'to cause to sever'. Others cannot, e.g. hinandi 'to cause to cook', neerendi 'to cause to sell', kufalndi 'to cause to lock up'. Such idiosyncracy can be accounted for only in lexical entries for the IC verbs themselves.

The final argument against the Complex Sentence Hypothesis concerns verbs of the form [STEM+NDI]+NDI, where the inside -NDI is usually a DC suffix, sometimes an IC suffix, but never a passive suffix; the outside -NDI can be a passive suffix or an IC suffix, never a DC suffix:

(55) [STEM+NDI]+NDI: [DC or IC] + PASSIVE
Tasu di ñandindi Musa se (Ambiguous)
rice the ... Mousa to
Passive of DC: 'The rice was fed to Mousa (by someone)'
Passive of IC: 'The rice was caused to be the object of Mousa's eating (by someone)'

(56) [STEM+NDI]+NDI: [DC, perhaps IC]+IC
Garba ñandindi tasu di Musa se (Ambiguous)
Garba ... rice the Mousa to
IC of DC: 'Garba had someone feed the rice to Mousa'
IC of IC: '?Garba had someone have Ali eat the rice'

Sentences like these can and do occur, although Sonrai speakers do their best to avoid them. They seem awkward, not because of their meaning, but because of their form, about as awkward as two -ing

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10A nice example of a natural use of double -ndi was supplied to us by Susan Higgins:

(i) A go sendu boro ma berndindi ka
   it's hard person SUBJUNCTIVE be honored CONJ
   kaynandindi han fo
   be reprimanded day one

   'It is hard to be congratulated and reprimanded both on the same day.'

Berndindi is the passive of berndi 'to honor', which is the DC of beri 'to be big'; kaynandindi is the passive of 'to reprimand, to insult' kaynandl, which comes from kayna 'to be small'.

two sentences each having a main verb with its own lexical entry. The
lexical entry for the matrix verb, the hypothetical \texttt{NDI}' to cause' can
be anything we want to make it since it is an abstraction created only
for the purpose of deriving \texttt{STEM+NDI} IC verbs, but the lexical entry
for the stem verb, the one in the embedded sentence, would have to ac­
count for what we know about the use of that verb in all contexts. What
we have shown is that when we allow the full generation of sentences in
embedded sentence allowed by the lexical entry for the stem verb we get
deep structures that require transformational machinery to filter bad
c o-occurrences out and rearrange constituents in poorly motivated ways.

By using transformations to account for the possible co-occurrence
of grammatical relations with the verb stems, we would be violating the
theoretical criterion we have posited as checks on the power of trans­
formations. We would be allowing transformations in effect to change
the value of verbs as propositional heads.

If on the other hand we treat the co-occurrence restrictions after
\texttt{STEM+NDI} IC verbs as applying within a simplex sentence in deep struc­
ture with a single lexical entry for one main verb, the situation be­
comes much more manageable.

There are several aspects in which IC verbs are idiosyncratic and
the idiosyncracies themselves mitigate against the Complex Sentence
Hypothesis. First, there are idiosyncracies concerning which stems can
and cannot take -ndi to form IC verbs, e.g. koosu 'to slaughter' is
related to koosundi 'cause to slaughter', but wi 'kill' has no
corresponding IC verb *windi (' to cause to kill'); similarly, dumbu
'to sever' is related to dumbundi ' to cause to sever', but kayrey
'to shatter' has no corresponding IC verb, *kayreyndi (' to cause to
shatter').

Another idiosyncracy is the syntactic co-occurrence restrictions on
IC verbs; there are differences that cannot be explained by reference
to lexical entries of the stems. It appears rather that syntactic co­
ocurrence restrictions are a property of the IC verbs themselves. We
will cite one instance here. Some IC verbs can be used intransitively-­
elliptically, with their objects understood. For example, \texttt{ândi}' to
we have ordered morphological processes, with causative formation and passive formation strictly ordered, although WS conditions can make comparable generalizations; in case passives were proved to be lexical, it would be even more implausible to consider causatives as products of syntactic transformations.\(^{11}\)

We conclude by saying the IC verbs, like DC verbs, are lexical items, produced by lexical rules. The deep structure configuration for sentences such as (41) with hinandi 'to cause to cook' is the same as that for (5) with neere 'to sell', i.e. with the simplex sentence in (58) below representing the deep structure for 'Garba had Ali cook eggs':

\[
(58)
\]

\[
\begin{array}{c}
S \\
\text{NP} \\
\text{VP} \\
\text{V} \\
\text{NP} \\
\text{PP} \\
\text{NP} \text{ POST} \\
\end{array}
\]

\[
\begin{array}{c}
\text{Garba} \\
\text{hinandi} \\
\text{gorongo} \\
\text{tondi yo} \\
\text{Ali} \text{ se} \\
\text{Garba} \\
\text{cause-to-cook} \\
\text{eggs} \\
\text{Ali} \text{ to} \\
\end{array}
\]

The simplex sentence in (59) will then represent the deep structure for 'Ali sold the pot to Mousa':

\[
(59)
\]

\[
\begin{array}{c}
S \\
\text{NP} \\
\text{VP} \\
\text{V} \\
\text{NP} \\
\text{PP} \\
\text{NP} \text{ POST} \\
\end{array}
\]

\[
\begin{array}{c}
\text{Ali} \\
\text{neere} \\
\text{tu di} \\
\text{Musa} \text{ se} \\
\text{Ali} \\
\text{sell} \\
\text{the pot} \\
\text{Mousa} \text{ to} \\
\end{array}
\]

\(^{11}\text{Fred Householder informs us that in Turkish, too, where passive and causative verbs are formed by suffixation, the causative suffix can never follow the passive, only be followed by it; moreover, Turkish can have two causative suffixes in a row followed by a passive, just as in Sonrai, e.g. (57).}\)
suffixes in a row in an English sentence like "I began stopping working at 7 o'clock." Even three -ndi suffixes seem marginally acceptable, e.g.

(57) \[
[[\text{STEM+NDI}]+\text{NDI}]+\text{NDI}: [[\text{DC}]+\text{IC}]+\text{PASSIVE}
\]
Tasu di əndindindi Musa se
rice the be-caused-to-be-the-object-of-feeding Mousa to
'The rice was caused to be the object of (someone's) feeding to Mousa (by someone)'

What is crucial in the instances with more than one -ndi is that there are no cases where -ndi is added to a passive form. In the Complex Sentence Hypothesis it would, after the first cycle, be possible to have a sentence such as (4) as the embedded clause under NDI 'to cause' as main verb, that is the passive 'The rice was eaten'. Then a sentence of the form of (56) ought to allow an interpretation appropriate for the causative of a passive 'Garba had the rice eaten by Ali' or 'Garba had the rice eaten for Ali'. But such an interpretation is not possible. Some third person is understood as the one who feeds Ali, or the one who causes Ali to eat, an interpretation possible only when there is a double causative construction.

Whatever the status of the passive is, this is strong evidence against the Complex Sentence Hypothesis. We assume that -ndi is added by a process of suffixation, i.e. at the end. If the passive is formed by a syntactic transformation, the hypothetical embedding rule for causative formation would have to be constrained by a very unnatural condition, i.e. the rule will not apply if passive has applied on the lower cycle. If the passive is formed by syntactic transformation and sentences like (43) and (45) are simplexes in deep structure, then the data receives the most natural explanation: passive can be involved in multiple -ndi verbs only when it adds the last -ndi to the verb. The penultimate -ndi or the ante-penultimate one can only be causative, since causatives are formed in the lexicon before lexical insertion, and before syntactic transformations begin. If the passive is formed lexically as well, then we might have evidence for saying that
transformationally: they pass the two tests that we have described. Passivization does not change node labels and it does not change the value of lexical items as propositional heads.

The passive could be characterized as an elliptical variant of the active. For every passive of the form \([NP_2 \text{ V+ndi}]\) there is always a corresponding active of the form \([NP_1 \text{ V } NP_2]\). The passive has the same meaning as the active except that there can be no \(NP_1\) expressed; however, whatever semantic function would be associated with \(NP_1\) in the corresponding active sentence is understood in the passive sentence. Consider the following paradigm of examples with \(\text{ba} \ 'to break'\). A similar paradigm could be presented for any of the \textbf{object middle verbs} cited in (23). \textbf{ACTIVE} sentences are:

\[(61) \quad \text{Garba ba feneter di } \quad NP_1 \text{ V } NP_2\]
\quad Garba break window the
\quad 'Garba broke the window'

\[(62) \quad \text{Garba ba feneter di nda tondi di } \quad NP_1 \text{ V } NP_2 \text{ nda } NP_3\]
\quad Garba break window the and stone the
\quad 'Garba broke the window with the stone'

\[(63) \quad \text{Tondi di ba feneter di } \quad NP_3 \text{ V } NP_2\]
\quad stone the break window the
\quad 'The stone broke the window'

\[(64) \quad *\text{Tondi di ba feneter di nda tu di } \quad *NP_3 \text{ V } NP_2 \text{ nda } NP_3\]
\quad stone the break window the and pot the
\quad '*'The stone broke the window with the pot' per sentence)

\[(65) \quad \text{Feneter di ba } \quad \text{window the break}\]
\quad 'The window broke'

while \textbf{PASSIVE} ones are:

\[(66) \quad \text{Feneter di bandi (Ambiguous) } \quad NP_2 \text{ V+ndi}\]
\quad window the be-broken
\quad 'The window was broken (by someone or by something);
\quad \text{NB: (66) corresponds to (64) or (63) in its semantic functions, and not to (65).}
The difference in semantic interpretation as far as grammatical relations is concerned is accounted for by the lexical entries for the main verbs:

(60) (a) (b) (c) (d) ...
neere  +V [NP NP NP se][AGENT THEME GOAL] α β γ 
[hina] +ndi +V [NP NP NP se][AGENT IC [AGENT THEME ] GOAL] α β γ α TH γ β TH γ

For the IC verb hinandi 'to cause to cook', there is abstract motion of the THEME (TH) of the main clause to the GOAL (Ali in 58); this THEME is itself the proposition governed by the STEM verb.

7. **Passives in Sonrai**

It is not an open and shut case that passives should be derived by syntactic transformations. It is of course possible to provide algorithms for generating passives by either syntactic transformation or lexical transformation; what is important is the justification for the choice.

We will once again approach the question by asking what syntactic transformations should not be allowed to do, given a commitment to a deep structure level where lexical insertion takes place. The strongest universal claim that could be derived from the work of Chomsky [1968] and Jackendoff [1969] on the lexicalist versus transformationalist hypotheses is that transformations should not be allowed to change node labels. For English, Chomsky gave arguments against allowing transformations to change verbs into nouns and Jackendoff gave arguments against allowing transformations to change adjectives into adverbs. But none of the processes we have been discussing would violate that constraint, i.e. neither DC formation, nor IC formation nor Passive formation change node labels; we are dealing with verb-to-verb derivation rules.

We have proposed a still stronger claim: transformations should not be allowed to change the value of lexical items as propositional heads. This is a principle that will apply whether or not a derivational process changes node labels. We have shown why this principle is of central importance to grammatical theory, and have proceeded to apply it to the causative data to argue that causatives cannot be derived transformationally. Passives, in contrast to the causatives, however, could be derived
As a description of a natural disaster, this sentence is not paraphrasable by either of the following two:

(69) Boro fo kukur subu di kul
    someone burn grass the all
    'Someone burned all the grass'

(70) Haya fo kukur subu di kul
    something burn grass the all
    'Something burned all the grass'

It is equally important, on the other hand, to keep in mind that sentence (55) is not paraphrasable by the following active intransitive sentence:

(71) Subu di kul kukur
    grass the all burn
    'All the grass burned'

In this last sentence the burning is understood to be a spontaneous event, cf. (65), whereas in (68) the semantic function AGENT or INSTRUMENT is understood as the direct cause of the event. But if having a deleted by someone or by something in English is dubious, it is even more so in Sonrai. In English it would be a case of partial neutralization; in Sonrai it would be a case of absolute neutralization; the AGENT or INSTRUMENT corresponding to deep structure subject position are never expressed in passives. The Sonrai data lends theoretical support to the treatment of agentless passives in Chomsky [1965] and Emonds [1969] in which no lexical material is inserted for the deep structure subjects of agentless passives. Following Chomsky and Emonds in this respect, we could propose (72) as the deep structure for (68), (73) as the rule that creates passives, and (74) as the output, i.e. where the triangle symbol means 'lexically empty'. This analysis follows closely that of Emonds [1969] for agentless passives in English:

\[\text{\footnotesize 12} \]

\[\text{\footnotesize In our formulation, were we to adopt a theory that required empty phrase nodes as receptacles for the contents of full ones to be moved}\]
With verbs like ṇa 'to eat', ñín 'to drink', mów 'to hear', guna 'to see', ḡay 'to give birth to', jow 'to take', lenje 'to carry', kar 'to beat', garey 'to chase away', verbs which take only animate subjects in the active voice, an animate being is understood though not expressed in the passive. With cow 'to learn' and warra 'to throw', which take only human subjects in the active voice, there is always a person understood but not expressed in the passive. Thus one of the main arguments in support of the passive in Chomsky [1957], the one concerning selectional restrictions, applies to Sonrai as well, with the interesting twist that we are talking about a part of the meaning which is always understood in active-passive sentence pairs, but which is syntactically manifested only in the active.

The above evidence shows that grammatical relations and selectional restrictions in passives are identical to those in a subset of the possible active sentences in which the same verb occurs. That subset of active sentences is definable syntactically: those sentences that have NPs in object position. This makes it appear quite plausible that passive formation takes place after deep structure and after lexical insertion.

How the passive is best defined in Sonrai is an interesting problem in itself. Recall that in Katz-Postal [1964] agentless passives are generated with an underlying someone or something in deep structure subject position which is deleted after being moved into the by phrase. But this is a dubious procedure even for English: 'Germany was defeated' (from [Emonds 1969]) is certainly not paraphrasable by either 'Germany was defeated by someone', or 'Germany was defeated by something'. Similar sentences exist in Sonrai, e.g. from kukur 'to burn' (an object middle verb like ba 'to break'):

(68) Subu di kul kukurndl
    grass the all be-burned
    'All the grass was burned'
The semantic interpretation for (68) can be accounted for by the theory of grammatical relations that we have proposed. Grammatical relations are read from the lexical entries for propositional heads, on deep structure trees. Below is the lexical entry for kukur 'to burn'. Either line (i) or (ii) could be selected for the semantic interpretation since the semantic configuration corresponds to transitive configuration, cf. deep structure (72):

(75)  (a) (b) (c) (d) (e)
(i) kukur, +V, [NP__NP (nda NP)][AGENT__THEME(INSTRUMENT)], change of state...
(ii) [NP__NP] [INSTRUMENT__THEME]
(iii) [NP__] [THEME__]

Since deep structure (72) has a configuration corresponding to lines (i) and (ii) of the lexical entry for kukur one of the two templates from those two lines must be imposed for semantic interpretation, and thus either AGENT or INSTRUMENT must be interpreted, even though there is no syntactic manifestation of it on the surface.

This analysis, to make an analogy to work in phonology by Kisseberth, makes the passive look like part of a syntactic conspiracy to insure having a subject for sentences in surface structures. In current theory it would be possible to claim that the subject NP is the one obligatory NP node generated by the PS rules. An empty NP node with no lexical
one could then describe object raising in Sonrai as:

(72)

\[
\begin{array}{c}
S \\
NP \\
\Delta \\
kukur \\
VP \\
V \\
subu di kuł \\
\end{array}
\]

burn all the grass

into, we still would not need to leave empty nodes behind after movement transformations have applied. In the preliminary version of Chapters I and II of his thesis, Emonds needs the device of empty nodes left behind after a movement transformation for his formulation of the full English passive and the process of there insertion, but we have no comparable cases in Sonrai. Emonds has stipulated that empty nodes can be deleted in surface structure provided that they have been filled at some point during the derivation. But this formalism, part of a system designed to constrain the power of transformations, will in fact allow power in transformational grammars which probably no one would want to say within the domain of natural language. A reductio ad absurdum involves a hypothetical transformational process not very different from the Complex Sentence Hypothesis we have tried to argue against for Sonrai indirect causatives: imagine a deep structure complex sentence with nested embeddings 500 clauses deep where only the last clause down is lexically filled; then imagine a transformation that moves all lexical material from a subordinate clause into its matrix; this transformation operates cyclically empty phrase nodes as it goes; on the first cycle the 500th clause is emptied of lexical material and all the phrase nodes of the 499th clause are properly filled, the 500th clause remains a set of empty phrase nodes, and so on, on up the tree. After the last cycle the topmost clause is lexically filled and the 499 other clauses are nothing but empty phrase nodes. All the empty phrase nodes can be deleted because they have been filled at some point in the derivation; what happens to the S nodes is not clear to us (they are called phrase nodes too), but it would not be inconsistent for them to be deleted too. So in the end only a simplex sentence would be left. All sentences could have infinite structural ambiguity with this grammar: the sentence in question could have had 501 clauses instead of 500, etc. As an alternative to Emonds' formalism, we are working on a structure-preserving constraint based on lexical entries for propositional heads (cf. Shopen [forthcoming]).
(77) Kalil ka farikoy  
Kalil became farmer  
'Kalil became a farmer'

(78) *Farikoy kandi  
farmer be-became  
'A farmer was become'

Even if it were established that passivization changed meaning, perhaps that the -ndi added to verbs to form passives carried meaning with it, it could still be argued that passive is a legitimate transformation, since it does not violate either of the criteria that we have suggested: it does not change node labels, and, although it changes meaning, it doesn't change the part of meaning which concerns the function of lexical entries as propositional heads—it does not change grammatical relations.

We cannot end our discussion without pointing out what could be gained if passives were derived lexically. Let us point out first that not so much would be lost as one might think.

True, adding passive forms to the lexicon increases the number of lexical entries. But we have already shown that on independent grounds there is a need for word structure conditions concerning grammatical relations in order to account for systematic aspects of linguistic competence, cf. our discussion of WS conditions to account for the systematic relation between causative and non-causative verbs. A Passive WS condition could show the systematic relation between active and passive verb forms. A paradoxical situation exists here with respect to cost to the grammar: the more productive passive-formation is, the more material would be added to the lexicon, but at the same time the more generality and the more importance a Passive WS condition would have. Although passive-formation is very productive it is also very simple and regular in its form-meaning relation to active sentence formation. Thus, we could say that the language learner learns passive-formation largely in terms of the Passive WS condition, and the long list of items added to the lexicon would seem to have very little cost.
material would have no value in surface structure, since there would be no way to give it a phonological interpretation. If subjects are obligatory elements in surface structure sentences of most kinds, they have to be lexically filled. The creation of passives helps bring this about. The existence of empty nodes in deep structure could be claimed to have independent motivation for just such a construction as the Sonrai passive, since it supplies the appropriate configuration for deep structure semantic interpretation.

While we are much in agreement with Emonds' proposal for a structure preserving constraint on transformations in its general conception, we find no need for the device of empty nodes. The lexical entries for propositional heads already carry sufficient information about ideal tree structure to themselves apply the structure-preserving constraint. There is no space here to discuss the alternate approach in detail, (cf. Shopen [forthcoming]), but we feel that a better transformational solution to the Sonrai passive would involve the generation of an elliptical deep structure tree, i.e. with no subject. The lexical entry for the propositional head would allow for semantic interpretation of the elliptical structure supplying the semantic function for the missing NP. The same lexical entry would allow the Object Raising transformation to apply moving object NP into subject position, since the lexical entry for all verbs allows subject NPs. Thus, alternatively, the deep structure for (68) will be given not as (72), but rather as:

(76)

```
S
   VP
      V NP
         kukur subu di kul
burn all the grass
```

It appears that the passive transformation changes meaning. One evidence of this is that there is something semantically incompatible about the passive and the meaning of certain verbs that occur in the context [NP____NP] in the active voice, cf. English:
heads never govern meaning or co-occurrence restrictions beyond the simplex sentence; indeed, they can govern less than the simplex S, as when sentence adverbs are involved, or when the propositional head is the head noun of an NP in a simplex and not the head of the S as a whole. In stating the passive transformationally it is necessary to constrain it to simplexes, but no WS condition of the kind we are discussing can have a scope greater than the simplex S, so no such constraint need ever be stated.

Talmy Givón has pointed out to us that it is doubtful that any syntactic transformation must be ordered before the passive in any language. This is the case for Sonrai: as far as we know, there is no syntactic transformation that precedes the passive. Thus, we have also argued against a Sonrai Dative Shift transformation (see Section 6), which, if it existed, would have to be ordered before the passive. This doesn't in itself provide a proof of the location of the passive rule in the grammar, but it does leave the way open for putting it in the lexicon.

Passives are not strictly regular from a syntactic point of view, e.g. (77) and (78), and the idiosyncracies could be more easily captured with a lexical analysis.

A major benefit from a lexical analysis of passives is that a major class of expressions could be generated in a much less complicated fashion: infinitives. Infinitives on surface structure are typically subjectless clauses preceded by a subordinating conjunction; in many languages it is also the case that there are certain auxiliary verb or adverbial elements that cannot occur in infinitives. Infinitives are analyzed as Conjunction S in many cases only because there are passive infinitives and it is believed that there must be a full S for the passive to be derived transformationally. If passives were lexical, however, infinitives could be simply Conjunction VP in deep structure.

All of this gives a perspective of a grammar in which greater importance is given to lexical entries for propositional heads and the transformational machinery is less complicated. Transformations would then be confined to essentially one function: the permutation of words.
Given that the relation to items already in the lexicon is regular, it seems that the longer the list of items added to the lexicon, the less the cost!

Let us say that an elliptical semantic function is one which is understood though not expressed and that it can be represented as an obligatory part of the semantic template of a propositional head which is not manifested syntactically. Thus, with (74) as the deep structure for (68), 'All the grass was burned', the possible interpretations of the sentence could be accounted for by the following continuation of lexical entry (75) for kukur 'to burn':

(79) (a) (b) (c) (d) ...

(iv) [___] +ndi +V [NP__(nda NP)]

\[
\begin{array}{ll}
\text{AGENT THEME (INSTRUMENT)} & \\
\alpha & \beta \\
\text{INSTRUMENT THEME} & \\
\alpha
\end{array}
\]

Then WS conditions of the following form would also be appropriate (where X, Y and Z are variable constants): first, the Passive Condition:

(80) \[\text{NP}_{\alpha} \text{NP}_{\beta} \text{X}_{\alpha} \text{Y}_{\beta} \text{Z}_{\alpha} \supset \text{NP}_{\alpha} \text{X}_{\beta} \text{Y}_{\alpha} \text{Z}_{\beta}\]

then, a more general condition:

(81) \text{GR Condition (80) \supset MF Rule (34)}

GR Condition (80) says that if a lexical entry allows insertion in a deep structure environment with an object NP, then it will also allow the passive. Condition (81) says passives have the form V+ndi.

It might be said that (80) and (81) together have the same effect as the passive transformation, that we are proposing WS conditions that give the grammar the same power as transformations, that our theory is a notational variant of generative semantic theory with prelexical transformations. The change in indexing in (80) amounts to a permutation. There is, however, a crucial difference in domain. These conditions concern grammatical relations in lexical entries for propositional heads, and not trees of potentially infinite expansion. The maximum possible domain is the simplex sentence since it can be shown that propositional
<table>
<thead>
<tr>
<th>Arabic</th>
<th>English</th>
<th>Arabic</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>wafakundi</td>
<td>'to reconcile'</td>
<td>wafaku</td>
<td>'to agree with'</td>
</tr>
<tr>
<td>suburndi</td>
<td>'to mediate'</td>
<td>subur</td>
<td>'to tolerate'</td>
</tr>
<tr>
<td>nondi</td>
<td>'to denounce, sell out'</td>
<td>no</td>
<td>'to give'</td>
</tr>
<tr>
<td>bayndi</td>
<td>'to inform'</td>
<td>bay</td>
<td>'to know'</td>
</tr>
<tr>
<td>fahamndi</td>
<td>'to explain'</td>
<td>faham</td>
<td>'to understand'</td>
</tr>
<tr>
<td>mowndi</td>
<td>'to interpret, translate'</td>
<td>mow</td>
<td>'to hear'</td>
</tr>
</tbody>
</table>
APPENDIX: Direct causative verbs ending in -ndi

A. From intransitive stems:

kamndi  'to drop' kam  'to fall'
jumbundi  'to take down' jumbu  'to go down'
jijindi  'to take up' jiji  'to go up'
fattandi  'to take out' fatta  'to go out'
tondi  'to take to, complete' to  'to arrive'
timmendi  'to complete' timme  'to be complete'
yendi  'to take back' ye  'to go back'
kayndi  'to stop, decide' kay  'to stop'
tundi  'to start (a car)' tun  'to get up'
hunandi  'to feed, support' huna  'to live'
kumandi  'to reduce' kuma  'to be lacking'
dereyndi  'to lose' derey  'to get lost'
kandi  'to put to bed' kani  'to lie down'
gorondi  'to seat' goro  'to sit down'
nimsindi  'to punish' nimsi  'to be regretful'
farandi  'to tire out, annoy' fara  'to get tired'
hemndi  'to make cry' hem  'to cry'
hereyndi  'to starve' herey  'to be hungry'
dukurndi  'to anger' dukur  'to be angry'
kondi  'to dry' ko  'to dry'
teyndi  'to wet, soak, dampen'
korondi  'to heat' koron  'to be hot'
yeyndi  'to make cold' yey  'to be cold'
borindi  'to beautify' bori  'to be beautiful'
merundii  'to make ugly' meru  'to be ugly'
jendi  'to make old, to wear out'
tawondi  'to renew' tawo  'to be new'
kandii  'to make yellow' kara  'to be yellow'
firjindi  'to make green' firji  'to be green'
cireyndi  'to make red' cirey  'to be red'
koreyndi  'to make white' korey  'to be white'
dungurandi  'to shorten' dungura  'to be short'
berndi  'to honor' beri/ber  'to be big'
kaynandi  'to insult, reprimand' kayna  'to be small'
cinandi  'to reduce' cina  'to be small'
jurndi  'to ride' jur  'to run'

B. From transitive stems:

ŋandi  'to feed' ŋa  'to eat'
ŋindi  'to feed (liquid)'  nin  'to drink'
hayndi  'to empregnate' hay  'to give birth to'
cowndi  'to teach' cow  'to learn, study, read'


Prost, R. P. A. 1956. La langue Sonay et ses dialectes. Mémoires de l'Institute Français d'Afrique Noire, 47. Dakar: IFAN.

Shopen, Tim. Forthcoming. "A generative account of ellipsis".

REFERENCES


