

TRANSFORMATIONAL CONCEPTS IN THE HEBREW TEXT OF THE PSALMS

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The purpose of this paper is to present certain transformational concepts which have evolved in part as a result of the work of the writer of this paper on his dissertation, Syntactic Structures in the Masoretic Hebrew Text of the Psalms (1969). This paper is a sequel to an earlier paper on deep structure (Battle 1970).

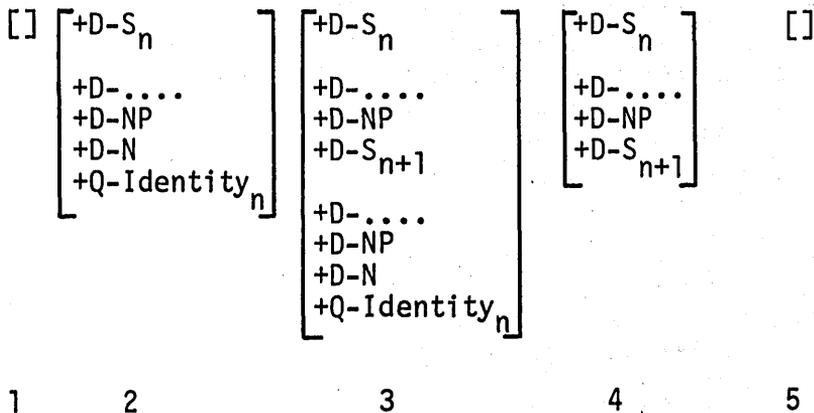
Transformations may be understood as the processes, described in statements of rules, which taken together have the effect of converting structured elements of meaning in the deep structure into the form of an uttered sentence in the surface structure.

Each transformational rule is stated in two phases, as in /0.1/:

A structural description, which specifies in order the segments for the sentence to which the rule applies. The segments are represented by bracketed sets of features, which are correlated with a numerical structure index.

A structural change, which describes the change to be effected, in terms of segments designated by numbers in the structure index.

/0.1/ Structural Description:



Structural Change:

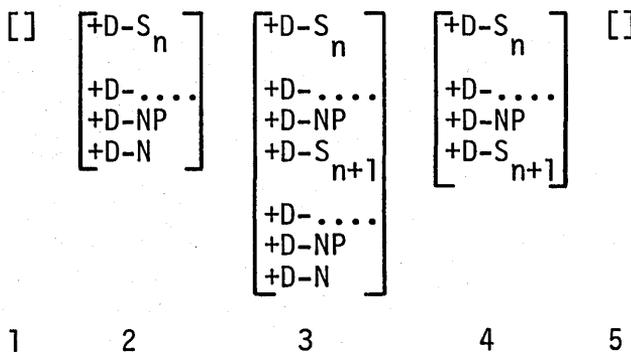
3 →
$$\left[\begin{array}{l} +F-Economy \\ +T-Deletion \end{array} \right]$$

/0.11/	Example:	<u>Index</u>
w:	But,	1
y:hwah	O Lord,	1
ʔatah	thou (art)	1
māgen	a shield,	2
māgen	a shield (is)	3
bašādty.	about me.	4
+3:4	+3:3	

The result of the above transformation is the deletion of structural index item 3, a constituent which, within embedded sentence S_{n+1} , is identical and relative to item 2, a constituent which the embedded sentence S_{n+1} complements.

1. Structural Description Conformity as the Sole Criterion for Applicability of Transformation

/1.1/ Structural Description:



Condition: 2 = 3

Structural Change:

$$3 \rightarrow \left[\begin{array}{c} +F-Economy \\ +T-Deletion \end{array} \right]$$

In transformation /0.1/, the feature +Q-Identity_n, n being constant, indicates identity of reference. The use of this feature in the structural description eliminates the need for a supplementary statement of condition such as "2 = 3", as in /1.1/.

The subscript _n represents a number which serves as a referential index. The number is identical in all and only those segments which are not only identical but refer to the same object.

Exactness of description can be served by eliminating supplementary statements of condition in favor of the structural description as the sole form for complete statement of conditions whereby the transformation is applicable.

Although statements of transformational rules in earlier works of Noam Chomsky (Fodor and Katz 1964:230-31) and other grammarians contain such supplementary conditions as " $X_2 = X_3$ ", Chomsky later suggests, "Suppose that certain lexical items are designated as 'referential', and that by a general convention, each occurrence of a referential item is assigned a marker, say, an integer, as a feature. (Chomsky 1965:145.)"

The feature $+Q\text{-Identity}_n$ could serve the purpose Chomsky has in mind, so that "the domain of transformations can be limited to Boolean conditions on Analyzability." (Chomsky 1965:144; Boole 1854:101.)

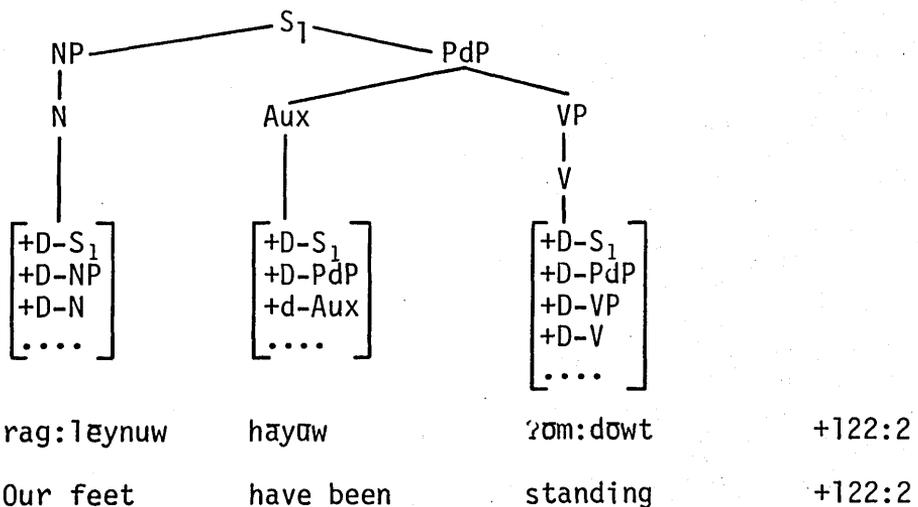
2. Class of Features

Classes of features are indicated by capital letters immediately following the + or -, as Q in $+Q\text{-Identity}_n$.

The classification of features outlined below constitutes a theory as to the source and order in which each class is introduced into segments.

Derivational D- features represent the phrase structure derivation of the segment, in order, with the initial constituent S_n first. In the dissertation, a Categorial C- feature was included, but this class is eliminated since the last derivational feature is the categorial feature.

/2.1/



/2.111/ $S_n \rightarrow NP PdP (S_{n+1})$

$$/2.112/ \quad \left[\begin{array}{c} \dots \\ +D-S_n \end{array} \right] \rightarrow \left[\begin{array}{c} \dots \\ +D-S_n \\ +D-NP \end{array} \right] \left[\begin{array}{c} \dots \\ +D-S_n \\ +D-PdP \end{array} \right] \left[\begin{array}{c} \dots \\ +D-S_n \\ +D-S_{n+1} \end{array} \right]$$

$$/2.121/ \quad NP \rightarrow N (S_{n+1})$$

$$/2.122/ \quad \left[\begin{array}{c} \dots \\ +D-NP \end{array} \right] \rightarrow \left[\begin{array}{c} \dots \\ +D-NP \\ +D-N \end{array} \right] \left[\begin{array}{c} \dots \\ +D-NP \\ +D-S_{n+1} \end{array} \right]$$

The phrase structure derivation in /2.1/ is specified twice-- first, in the tree diagram; and second, in the segments. The derivation of phrase structure features in the segments may be realized from phrase structure rules such as /2.112/ and /2.122/ in place of /2.111/ and /2.121/. Any sequence of features may be represented by, with the understanding that such sequence on the left of the arrow is duplicated in each segment on the right.

All structural information which is represented in a tree diagram is thus representable in features in segments. Both types of representation are used to represent syntactic relations and processes. For structural descriptions in transformations, discreteness between segments is necessary. The notational variation described here may therefore have special advantage for syntactic representation generally.

Lexical L- features, drawn from the lexicon, include:

a. Semantic features of each lexical item; such as, for nouns, +L-material, +L-animate, or +L-personal; or, for verbs, +L-[+L-material]__, +L-[+L-animate]__, or +L-[+L-personal]__. These features serve in projection rules of a semantic component to interpret the sentence. The projection rules may be understood as copying the verb feature into the segment of the agent noun. To a discrepant combination may then be added according to rules a special interpretation feature such as +I-fantastic, +I-allegorical, or +I-incongruous. Into the patient segment, the rules project from the verb that it is possible for the action of the verb to apply to the patient.

b. Syntactic features of the lexical item; such as -L-plural, which could block pluralization of a non-count noun such as ?abāq 'dust'; or +L-definite, which could block prefixing the definite article to a proper noun, such as yiś:ra?el 'Israel'.

c. Features which represent special morphological properties of a lexical item, such as +L-[+P-ōwt]/+L-plural to indicate an irregular plural suffix for a -L-feminine noun such as ?ab 'father'/ ?abowt 'fathers'.

d. Differentiating features, which serve to distinguish the meaning of each lexical item from that of all other lexical items, just as phonological distinctive features serve to distinguish each phoneme from all others.

/2.2/ +D-N →S-plural.....

Segment structure S- features are added to the previously listed classes of features in each segment according to a set of segment structure rules, of which an example may be seen in /2.2/.

Segment structure rules fulfill the function of specifying, for a given language, the basis for morphological realization of each segment. In Hebrew as well as in English, such rules derive a specification as to whether, in a given sentence, a segment will appear in the singular, as in yeled 'child' or in the plural, y:lādīym 'children'.

/2.3/ +D-NP +D-N +L-..... +L-+L-plural +Q-Identity ₁ +D-NP +D-S _{n+1} +D-NP ^{p+1} +D-N +L-..... +Q-Identity ₁ +D-NP +D-S _{n+1} +D-PdP +D-VP +D-NP +D-N +L-quantity +L-plural +L-.....
	y:ladiym	(y:lādīym	š:lōšāh)
	children	(children are	three)

A reconsideration of derivation of segment structure features since the writing of the dissertation suggests that the manner in which segment structure features are derived calls for more explanation than that provided in rules such as /2.2/.

In a deep structure such as /2.3/, the feature +S-plural is apparently derived into the first segment by a transformation, from the feature +L-plural in the third segment.

It is possible that every count noun, containing the feature +L-L-plural, even when no surface structure quantifier evolves, has a deep structure relative clause including a quantifier from which the feature S-plural may be derived.

It is further possible that other segment structure features can be similarly derived, and that segment structure S-features are not needed as a class separate from lexical L-features.

Scanning features Q- are added in the deep structure in what may be understood as a scanning process in which the series of segments is examined for instances of referential identity. Thus

the feature +Q-Identity_n, n having a constant numerical value, is added to each set of segments which refer to the same object.

Such a feature is needed to serve as basis for structural description in transformational rules for pronominalization and identical constituent deletion.

/2.4/ $Vx (Mx \supset Lx)$

/2.41/ kol dabar kēn kīy ʔim hadabar ʔādām, hadabar kōzēb

/2.42/ Everything is such that if the thing is a man, the thing is a liar.

/2.43/ kol hāʔādām kōzēb 116.11

/2.44/ Every man is a liar. 116.11

The feature +Q-Identity_n can be understood in relation to x in the symbolic logic representation /2.4/.

This feature could also serve the purpose envisioned in recent works by Emmon Bach (Bach and Harms 1968:108-112) and by James D. McCawley (Bach and Harms 1968:136-140, 150-154, 160-167).

Factorial F- features set the stage for various classes of transformations as follows:

+F-attraction, the joining of co-ordinate parallel structures in conjunction reduction.

+F-distribution, extraposition of constituents to the end of a sentence.

+F-economy, anaphoric transformational processes of pronominalization and of deletion of identical and indefinitely specified constituents.

+F-rhetoric, transformations of re-ordering, including subject selection, topicalization, and passivization, under the influence of such considerations as emphasis and style, possibly habit and fortuity.

In the absence of any known psycholinguistic research in this area, there was a reluctance to consider the above factors in terms of motives, which could be tentatively inferred from a consideration of the nature of each transformation. The above features may be of some help in questions of 'syntactic motivation' which have been raised in recent writings of Chomsky and others.

One of the effects of feature addition processes as thus understood is, in one sense, to obliterate the distinction between optional and obligatory transformations. If the features of a candidate sentence match those of a structural description in a

transformation, the transformation takes place. If the features do not match, the transformation does not take place. This has been suggested by Chomsky (Chomsky 1965:132). In another sense, the question of whether or not a transformation takes place is focused on the presence or absence of a key feature.

/2.5/	+D-S ₁ +D-NP +D-N +L-....	+D-S ₁ +D-NP +D-S ₂ +D-NP +D-N +L-....	+D-S ₁ +D-NP +D-S ₂ +D-PdP +D-NP +D-NP +D-N +L-Possessor +L-.... +F-Rhetoric +T-Adjunc- tion Z ₁	+D-S ₁ +D-PdP +D-VP +D-NP +L-Place +L-....	
+T-Adjoin- ed Z ₁ +Z ₁ -Identity	1	2	3	4	5
y:hwāh	<u>kisēʔ</u>	<u>kisēʔ</u>	y:hwāh	bašāmayim	

As for God, the throne (the throne is of God) is in heaven.

+11:4

Transformational T- features +T-Adjunction Z_n and +T-Adjoined Z_n indicate respective segments from and to which transformational processes are carried. In /2.5/, the feature +T-Adjunction Z₁ in segment 4 indicates the adjunction of features from segment 4 to some other segment containing the corresponding feature +T-Adjoined Z₁, namely, segment 1.

Post-transformational Z- features +Z_n-Pronominalization and +Z_n-Identity then tell what features are copied into the new segment -- features such as to produce a pronoun or an antecedent, respectively. In /2.5/, the feature +Z₁-Identity indicates that the antecedent in substance is duplicated in segment 1. If the +T-Adjunction Z_n segment is not now needed, as in the case of a re-ordering transformation, it is marked +Z-Deletion. However, recoverability is retained by letting the feature indicate the disuse of the segment rather than deleting or omitting it. In representing the transformational processes, the disused segment may still serve as a reference for features realized in adjoined segments, rather than actually to copy the features into such segments. In this way, transformational processes continually add features, either into existing segments or into newly adjoined segments.

Phonological P- features are added in the second lexical pass, after all syntactic transformations are completed. An al-

(0)			+D-S ₁ +D-NP +D-N +L-..... +P-kisēʔ +Q-Ident ₁	+D-S ₁ +D-NP +D-S ₂ +D-NP +D-N +L-..... +P-kisēʔ +Q-Ident ₁		+D-S ₁ +D-NP +D-S ₂ +D-PdP +D-NP +D-N +L-..... +P-y:hwāh	+D-S ₁ +D-PdP +D-NP +D-N +L-..... +P- <u>bašāmayim</u>
(1)				+F-Econ +Z-Delete +P-∅			
(2)		+T-Ajd Z ₁ +Z ₁ -Ident +P- <u>bašāmayim</u>					+F-Rhet +T-Ajn Z ₁ +Z-Delete +P-∅
(3)	+T-Ajd Z ₂ +Z ₂ -Ident +P-y:hwāh					+F-Rhet +T-Ajn Z ₂ -Z-Delete	
(4)	+T-Ajn Z ₃				+T-Ajd Z ₃ +Z ₃ -Pronom +P-hūwʔ	+F-Econ +Z-Delete +P-∅	
(5)			+T-Ajd Z ₄ +Z ₄ -Pronom +P-kisʔōw		+F-Econ +T-Ajn Z ₄ +Z-Delete +P-∅		

/3.1/ In the above representation, (0) is the deep structure of /2.5/, (0) through (5) is the surface structure, derived by the following transformations: (1) Identity Deletion, (2) Place Adverbial Re-ordering, (3) Topicalization, (4) Pronominalization, (5) Pronominal Suffixation. Surface structure translation: "As for God, in heaven is his throne."

ternate possibility might insert them along with lexical features in a single lexical item insertion, in which case they may be superseded by later phonological features, as in pronominalization.

3. Transformations by Adjunction Only

The effects of transformations have been classified into types known as elementary transformations. Of an earlier list consisting of permutations, substitutions, deletions, and adjunctions, Chomsky has suggested elimination of permutations. (Chomsky 1965:144.) An obvious way to do this is, in two steps: (A) to adjoin a duplication of a segment in a new position, as from segment 7 to segment 2 in transformation (2) of /3.1/; and (B) to delete the original segment.

Substitution, as in pronominalization, in transformation (4) of /3.1/, may be better understood not as a replacement of one thing by something else, but as a narrowing of the selection of meaning features in the segment which are realized in the surface structure. A pronominalization feature is adjoined, but no features are replaced or deleted.

Deletion is indicated by adjunction of a deletion feature.

Thus, adjunction remains as the sole elementary transformation.

A result is the visualization of the surface structure not merely as a revised version of the deep structure, but as an expanded structure incorporating within itself the deep structure, together with a mapping of transformational processes.

Perhaps this is the concept of "structural description" of a sentence which could best fulfill that for which Chomsky requires definition and method of determination in an adequate theory of linguistic structure. (Chomsky 1965:31.)

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