Is transformational grammar
a contribution to the theory of innate ideas?

I. THE IMPORTANCE OF THE PROBLEM OF INNATENESS OF LANGUAGE FOR THE
   TRANSFORMATIONAL GRAMMAR.

Very important points for the transformational grammar are (a) the con-
ception that structural and material aspects of the natural languages are
innate and (b) the hypothesis of what aspects are innate. That this is the
case can most clearly be seen in Chomsky's "Aspects of the theory of syn-
tax" (chapter I, Methodological preliminaries) and his "Explanatory models
in linguistics" and "Recent contributions to the theory of innate ideas" [1].

In these works Chomsky sees the problem of language acquisition by the
child — slightly simplified — as the problem of determining grammar G
with the highest value, from the set of the transformational grammars
$G_1 ... G_n$. This is — to his conception — done on the base of (A) a corpus
of grammatical and non-grammatical utterances, (B) corrections which
permit the determination of the utterances which are grammatical and the
ones which are non-grammatical, (C) information on which utterances are
repetitions and which aren't.

The set of grammars $G_1 ... G_n$ is not the set of all possible transformational
grammars, but the set of the ones which have all the innate linguistic
characteristics. As such all grammars $G_1 ... G_n$ have an identical general
form. As far as Chomsky is concerned, not only the general form but also
the functions for evaluating, the several grammars $G_1 ... G_n$ on the base
of the data (A-C) are innate [2].

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(1) Chomsky, N., "Aspects of the theory of syntax", The M.I.T. Press, Cambridge, 1965.
   "Explanatory Models in Linguistics", in Logic, Methodology and Philosophy of
Science, ed. by E. Nagel, P. Suppes and A. Tarski, 1962.
   "Recent contributions of the theory of innate ideas", D. Reidel Publishing Co., Dor-
drecht-Holland, Synthese 17, 1967, pp. 2-11.
   (2) Chomsky, N., "Recent contributions of the theory of innate ideas", o. c., pp. 7-8.
   On a discussion about innateness of the evaluating function, see our article: "Is
realisme economischer dan solipsisme? (Is realism a more economical theory than so-
lipsism?)", to appear in "Wetenschappelijke tijdingen".

The conception of language acquisition corresponds — as Chomsky says [3] — to the conception of a theory of linguistic structure that aims for explanatory adequacy.

As a result, it will be clear that, because the transformational grammar intends to reach explanatory adequacy, the innateness axiome and the hypotheses of what is innate, will have an important influence on their linguistic theory (such as it has on their acquisition theory [4]). Here, we will only mention two — but rather general — influences.

A. With the innateness axiome there will be a very strong search for characteristics which are general to all languages (general and innate). As a result, it can sometimes be possible that the more economical description of a particular language is not seen or purposely avoided, in order that the description fits better with characteristics of some other languages (more about that in III, E).

B. The set of possible grammars — in Chomsky's approach — is limited by innate characteristics (A problem is : "How to justify these limitations?"). The axiome of innateness of peculiar language characteristics has in it the germs of a development of linguistics into an isolated science (viz. a science in which the results of other sciences are not accepted on the grounds that the language has unique characteristics innate and that by these reason the results of other sciences cannot be taken into account if they deviate from an innate characteristic). This can seem very paradoxally to somebody who knows that the most fervent proponent of the innateness axiome, viz. Chomsky, has made common use of logic, modern mathematics and automata theory in linguistics. However, also in his works, we already seem to find the beginning of this isolationism. This is most clearly seen, for instance, in his discussion with Lamb and Householder about the notion of simplicity. This is how he states that : "Simplicity is a technical term of linguistic theory on a par with 'phoneme', grammatical transformations, etc..." [5].

As a result of these facts, we cannot agree with those who argue — e.g. Dik, De Mey [6] — that the problem of innateness is entirely independent

(3) Chomsky, N., "Aspects of the theory of syntax", o. c., pp. 30-31.

(4) The "innateness axiome" is in Chomsky's opinion a conclusion from empirical facts. He told us that in a personal discussion with him. Also Lennenberg in a speech entitled "Is innateness in language a hypothesis?" (Harvard, December 14, 1966) concluded (as he wrote also in a hand-out) that it was not a hypothesis, but a fact.

(5) Chomsky, N., and Halle, M., "Some controversial questions in phonological theory", Journal of linguistics, 1965, Vol. I, p. 109.

(6) Dik, S. C. "Coordination", North-Holland Publishing Company, Amsterdam, 1968. De Mey M., personnal discussion.

of general linguistic theory as such. For (a) the solutions one gives to the problem have important consequences for the approach in language description, and most importantly they will influence the choices one makes between several possible solutions. We also (b) agree with Chomsky that linguistic data — in principle — can confirm or falsify partly innateness or a learning theory. This is the case, for instance, if one can prove that language has characteristics which cannot be explained by a general theory of learning....

We want, however, to stress the fact that, although the innateness axiome and the connected hypotheses are very important for Chomsky's linguistic theory, in principle a transformational grammar without the innateness axiome is possible. A possibility that some critici of the transformational grammar of Chomsky seem to forget. In this case the restrictions on possible grammars must be determined by limitations of the general learning strategy, instead of by the innate linguistic characteristics.

II. SUMMARY OF THE FACTS WHICH ACCORDING TO CHOMSKY, AFFIRM THE INNATENESS CONCLUSION ([7]).

A. Great diversity of input conditions doesn't lead to a wide diversity in resulting competence.

B. Vast differences in intelligence have only a small effect on resulting competence.

C. We observe that the tremendous intellectual accomplishment of language acquisition is carried out at a period of life when the child is capable of little else and that this task is entirely beyond the capacity of an otherwise intelligent ape.

D. The creative aspect of language use: "One can produce and understand sentences, which one has never produced or heard before."

E. By what else than by 'innateness' can the acquisition of such a complex thing as language be explained?

F. A theory of language acquisition must explain how this knowledge of abstract underlying forms and the principles that manipulate them come to be acquired and freely used. What else can it be than that it is innate?

G. The language universals:

1. the material universals: i.e. concrete nouns, etc...

2. the structural universals: i.e. the deepstructures seem very analogous in all languages.

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(7) We summarize here the arguments which Chomsky gives in his article "Recent contributions in the theory of innate ideas", o. c.

III. Inquiry into the validity of Chomsky's arguments.

A. What about the argument of the creative aspect of the language use?
From a finite set of language utterances a recursive language system is
built up by the language learner.
It is clear that it is possible to make hypotheses by induction from a set
of permitted sequences about the atomic elements and about the rules
to combine these elements, so that one gets a recursive system. Once these
rules are formed, it is evident that in most cases — this is however de-
pendent on the kind of rules which are formulated and on the content of
the original set — it will be possible to generate with the induced recursive
system combinations, which were not found in the data. As a result, this
problem of induction of rules from a set of data, which are used later on and
give outputs which are different from the data, is certainly not a problem
which is specific for a natural language.
    Is this not a problem which presents itself also in mathematics, logic
and even in action generally? For instance, who is not able to make an
addition which he has never seen or done before, such as $1 + 1 + 1 + 1 \ldots$
and so on three pages long? Also who is not able to go for a walk (a se-
quence of bodymovements) which he has never done or seen do before?
    Also M. Manis in his book "Cognitive process" [8] shows that the use
of rules and general principles for all kinds of tasks (learning physics or
mathematics, etc.) are very important because (a) they aid memory and
(b) they can be used in a whole mass of instances which were not explicitly
taught or met before. This proves that "creativity" is not a notion which
can be used only about language use.
    As a result it seems to us that the fact of the creativity in natural lan-
guage use cannot be used as an argument for the necessity that *specific
and structural characteristics of natural language are innate.* As a matter
of fact the formed principles which explain the creativity in language, play
a role in all kinds of other competences and must therefore be hypothesized
as being a principle that underlie all these. The same must be said of the
argument that the great diversity of input conditions doesn't lead to a
wide diversity in resulting competence. The reason is that it is clear that
from many different sets of data — with, of course, some restrictions — the
same rules for a recursive system can be induced.
    B. Vast differences in intelligence have only a small effect on resulting
competence.

    (8) Manis, M., "Cognitive processes", Wadsworth publishing company, Inc., Bel-
mont, California, 1966, p. 47.

This argument is a problematic one when we think of the theory (and the motivations of the theory) of the existence of a prelinguistic intelligence and the importance of this for the linguistic development. For instance in Piaget's opinion the transition from sensory-motoric intelligence to preconceptual and intuitive thinking is (this transition is the first of the three important transitions in the development of cognitive thinking) [9] a condition for language use.

We have also data of cerebral studies that the development of language is very strongly connected with a general maturity. Here we want only to quote some conclusions made by Luchsinger and Arnold [10] : "Ontogenetically, the development of language, the establishment of preferred laterality and all subsequent learning go "hand in hand" at the same pace. The same close relationship is demonstrated by pathological observations", and also "The degree of lateral differentation reflects the advance of cerebral maturation on which the process of language acquisition is dependent. Indeed, laterality, language and learning proceed "hand in hand" [11]".

All that seems to us to prove that language is not such an independent system as Chomsky tries to prove with his arguments. The contrary seems more probable. As a result the argument that intelligence has no influence on language learning cannot be used to affirm the language-innateness axiome in the form as it is stated. But we do agree that by this statement it is also by no means proved that a general learning program (a program to learn language, mathematics and bodymovements for instance to state it very crudely) exists. But the fact of the parallel development of language and his learning capacities in general seem to us to be a strong indication for this.

Also Chomsky's argument that when a child learns a language, it is capable of little else, seems to us very difficult to maintain. Perhaps it is true that a child, besides language learning makes no very spectacular achievements, but very important achievements certainly exist. For instance the development of the psychomotoric abilities (i.e. bipedal gait) and of intelligence (the important transition from sensory-motoric intelligence towards preconceptual ; the genesis of the object-concept, etc.).

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(9) Piaget, J., "Le langage et la pensée du point de vue génétique", Acta Psychologica, 1954, Vol. X, pp. 51-60.

(10) For their argumentation, we refer to their book : "Clinical communicology, voice, speech and language". Also the studies of Subirana — mentioned by them — are very important in this respect.

(11) Luchsinger & Arnold, "Voice-speech-language", Wadsworth publishing Company, Inc., Belmont, California, 1965, p. 398.

Also the argument that even intelligent apes are not able to talk, doesn't seem decisive to us. It is not at all clear if the so-called intelligent apes have made the transition from sensory-motoric intelligence towards pre-conceptual and intuitive thinking ([12]).

The argument of the easiness of language learning for the child in comparaison with the adult is also rather dubious. Stern in his study of "Foreign languages in primary education" ([13]) indicates that an adult learns a language in less time and more quickly than a child does ([14]).

It is, however, true that a child will have a better accent than the adult who learns the same language. But we can explain that with (a) an argument of H. Putnam ([15]), viz. an adult has, for speaking another language, to unlearn a whole set of customs (specific position of the breathing and digestive system). Also (b) neurological evidence can be of some importance here as an explanation : "There are suggestions from neurophysiology that the complicated patterns of neuro-muscular connexions, in particular the re-arrangment of neural pathways which are genetically determined to serve respiratory or digestive processes must be made to serve instead the speech mechanism of language... Whether one uses the concept of limited capacity or Penfield's theory of plasticity, it would seem that the earlier the start the better the grasp of the basic neuro-muscular skills involved." ([16]).

As a result, when learning another language, it is possible that it will be very difficult or even impossible for an adult to master the basic neuro-muscular skills involved in uttering some new sounds.

This second explanation is similar to the one of H. Putnam. Both indicate how without the axiome or the hypothesis of innateness of peculiar characteristics of language, but on the base of general principles of learning and unlearning, it can be explained why a child can have a better accent than the adult, although both are learning the same language.

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(12) Gehlen, A., "Der Mensch".

De Mey, M., "Het genetisch structureel mensbeeld bij J. Piaget en A. Gehlen", licentiaatsverhandeling, R.U.G., 1964.

(13) Stern, H. H., "Foreign languages in primary education", [Oxford University Press, London, 1967.

This book is a summary of the conclusions, made by specialists from several countries on a conference in the "Unesco Institute for Education", Hamburg.

(14) Stern, H. H., o.c., p. 21.

(15) Putnam, H., "The 'innateness Hypothesis' and the explanatory models in linguistics", D. Reidel Publishing Co., Dordrecht, Holland, Synthese 17, 1967, pp. 12-22.

(16) Stern, H. H., o. c., p. 27 .

C. What else can explain language acquisition?

It seems to us that H. Putnam's argument against this argument is very conclusive [17], viz. that it is impossible to maintain that everything is innate or in other words that no learning exists. Therefore invoking 'innateness' only postpones the problem of learning; it does not solve it. Until we understand the strategies which make general learning possible, no discussion of the limits of learning can even begin.

In connection with Chomsky's argument, we want also to mention L. Apostel's article : "Epistémologie de la linguistique" [18]. There he proves that the formal characteristics of the succession of the three models of languages which are explained by Chomsky in his "Syntactic structure" and "On the notion of a rule of grammar", are also present in the genesis of the number in the child, as described in the works of Piaget : "Introduction à l'épistémologie génétique (t. I), Psychologie de l'intelligence, la Genèse du nombre chez l'enfant (avec A. Szeminska), la Genèse des structures logiques élémentaires (avec Inhelder)."

Then he shows that a similar development is present in the development of linguistics and in the genesis of language in a child.

When we take into account the conception — Chomsky is an adherent of it — that there must be an analogy between an adequate theory of language and the genesis of language in a child (Chomsky : "Aspects of the theory of language"), then, — it seems to us — on the basis of the analogy between the ontogenesis of language and the ontogenesis of 'nombre', the axiome of the innate particularity of the characteristics of language is very much weakened.

Another constatation of L. Apostel is also very important. He shows that the mechanism to recognize 'structures' corresponds with the method to analyse immediate constituents. For that he analyses on the one side the proposals of mechanisms for perception of forms by Mac Cullock, Pitts, Selfridge and Culbertson in "Recognition and Learning", and on the other side the technics of Wells S. R. [19] to find immediate constituents, and "Methods in structural linguistics" by Harris.

Motivated by this constatation he applies — with success — the theory of mechanical learning on the problems of the learning of a language system.

(17) Putnam, H., o. c., p. 21.

(18) Apostel, L., "Épistémologie de la linguistique", Encyclopédie de la Pléiade XXII,

(19) Wells, R. S., "Immediate constituents", in "Language", New York, 1947, pp. 81-117.

Harris, Z. S., "Methods in structural linguistics", University of Chicago Press, Chicago, 1951.

These results of L. Apostel weaken very much — in our opinion— the empirical validity of the axiome of innate particular characteristics of the language system.

D. How to explain the general knowledge of abstract underlying forms and the principles that manipulate them.

First of all to take 'innateness' as an explanation, with the argument "What else can it be" takes us back to C. Also the problem arises here if the general knowledge — if we can really speak of a general knowledge [20] — cannot be explained by the restrictions on the set of all possible conceptual operations and by simplicity criteria ; so that from this in the general learning process the same or analogous knowledge is reached of underlying form and of the principles that manipulate them.

E. The language universals.

Here too, we want te repeat the argument of H. Putnam against the 'language universals' as argument to affirm innateness of peculiar and specific aspects of language, viz. : "Can the language universals not be explained by common interests, needs, memory capacity and general intelligence of the people ?" [21].

A methodological problem connected with the use of the universalia as a proof of the innateness axiome is that this axiome itself can play an important act in the search for universalia and in many cases is fully responsible for the finding.

As a result, it seems to us meaningful to ask under what conditions the axiome of innateness can be based on universals.

As a matter of fact, when in the process of describing a language several deepstructures, transformations, etc.. are possible, it will be tempting to choose this structures, tranformations, etc. which are already necessary in another language ; and this will be motivated by the innateness axiome.

In this case, however, the fact of identical deepstructures, etc., cannot be used themselves as an affirmation for the innateness axiome. This could only be done — to our minds — if in all languages the same structures or transformations, etc., could be independently motivated as most economically or intuitively correct. It will be clear that in general this will be a very difficult matter. A generative grammar contains a set of rules which must be able — at least — to generate all possible structures of a language.

(20) Quine, W. v. O., "Word and Object", The M.I.T. Press, Cambridge, Mass., 1964.

Saint-Jacques, B., "Some Observations about transformational Grammar" La linguistique, 1967, N. 2, pp. 27-40. Both don't accept that the abstract underlying forms and principles that manipulate them, are identical for all users of the same language.

(21) Putnam, H., o. c., pp. 15-18.

However, many sets of rules may generate the same set of structures, but only one set may be choosen. It seems to us that in choosing it, it is necessary not to use the innateness axiome (i.e. by using this set for a language, which is most similar to a set of most other languages ; or which has most characteristics common with a set of each other language, or which rules mostly can be deduced of from more general principles as it is the case for a set of other languages, etc...), if one wants to use the result as a proof for this axiome ([22]).

We want, however to stress that hypotheses about a common learning strategy can also be used as a criteria between several possible grammars — as the innateness axiome can be — but the results can of course not be used as a proof for a common learningstrategy either.

We also want to take the opportunity to discuss two other arguments in favor of the innateness theory of language as stated by David McNeill ([23]). He argues ([24]) that language acquisition occurs in a surprisingly short time, and that grammatical speech does not begin before one-and-one-half years of age and that the basic process is complete by three-and-one-half years, while cognitive growth develops much more slowly.

First of all, we will mention that he says ([25]) the following too : "... from the first birthday, children utter single words." Does he intend to tell us that we may not interpret the acquisition of all kinds of phonological rules as language acquisition? Besides, doesn't there exist a possibility of latent learning of grammatical speech before one-and-one half years of age? Latent learning becomes a probably important factor when we think of the fact that certainly for most adult language learners the learning of the production competence is partly preceeded by the learning of the recognition competence ([26]). Consequently it becomes possible that some categories of the production system are originated in the recognition sys-

(22) If it is possible to find such a set for each language, we agree that, although this is certainly not a proof for the innateness axiome, one necessary condition, but not a sufficient one, is fulfilled. It is a necessary condition, if one accepts that it is not possible that a group systematically inhibits (or deviates from) some innate characteristics.

(23) McNeill, David, "Developmental Psycholinguistics", in "The genesis of language", ed. by Frank Smith and George A. Miller, The M.I.T. Press, Cambridge, Mass., 1966.

We are indebted to M. De Mey for a discussion about McNeill's argumentation.

(24) McNeill, David, o. c., p. 15.

(25) McNeill, David, o. c., p. 18.

(26) For more about this notion, see F. Vandamme's doctoral thesis: "Partiële simulatie van enkele aspekten van de natuurlijke taal", 1968, R. U. G.

tem. Even Chomsky ([27]) defends the point of a possible primary develop-
ment — at least partly — of the recognition system. So, he argues that
a child, producing speech in a "telegraphic style" can be shown to have
an underlying, fuller conception of sentence structure (*unrealised in his
speech but actively involved in comprehension*) if misplacement of the ele-
ments, he does not produce, leads to difficulties of comprehension, etc...

About the argument that cognitive growth develops much more slowly,
we refer to III, B.

A second argument McNeill proposes, is that the development of the
word categories by the child follows a rather specific and constructive
scheme. What makes us say that this scheme has to be innate like McNeill
does? Is it not possible to explain such a scheme by growing complexity
of the rules which implicitly defines the categories?

By introducing small complexities, which are easiest to grasp, new
categories are found and subdivided in other ones in a specific manner,
etc... In this case, because of the fact that the new categories will be de-
pendent on the further introduced complexities within the original ones,
the first made distinction — and as a consequence also the categories
depending on these — can be preserved.

In the supposition that a cognitive development is in principle similar
to all men, it will be clear that all persons finally will have a same scheme
of categories, because the same complexities will be the easiest ones to
grasp, the same most economical etc... Temporal divergenties, i.e. on
the basis of wrong generalisations, and reconstruction of the scheme by
noting the mistakes, can of course be possible.

A more concrete approach here would be preferable. Let us have a
look at the distinction for a child between 'pivot' and 'open class' and
the differentiation of 'pivot' as described by McNeill. The differentiation
between 'pivot' and 'open class' can be very good described in the re-
cognition competence systeem of F. Vandamme ([26]). 'Pivots' are words
which have a meaning program II. The words without meaning program II
are 'open classes'. Meaning program II has to be interpreted as a program
which determines in what way the significatum of a word, of which it is
a meaning program, is connected with the significata of other words. As
such, it is very clear that a meaning program II is an operator.

The classification of words in 'pivots' and 'open classes' is therefore
a classification of (a) words being operators and of (b) words which are
not operators, but which only can be arguments of the operators.

(27) Chomsky, N., "Formal Discussion", in "The acquisition of language", ed. by Ursula
Bellugi and Roger Brown, Monographs of the S.R.C.D., serial No. 92, 1964, Vol. 29, No. 1.

The terminologies used by others to describe the 'pivot' suggest this too. As McNeill pointed out, Brown uses 'modifier' and Ervin 'operator' instead of 'pivot'. Therefore, one thing the child has to learn, is the differentiation between 'operator' and 'argument of the operator'. In this way he differentiates the set of words in the words (not their significata) which are operators and the ones which aren't. Such differentiation is clearly difficult to maintain as a pure linguistic one. It is surely closly connected with general cognitive processes.

McNeill describes the development of the 'pivot' as follows:

Time
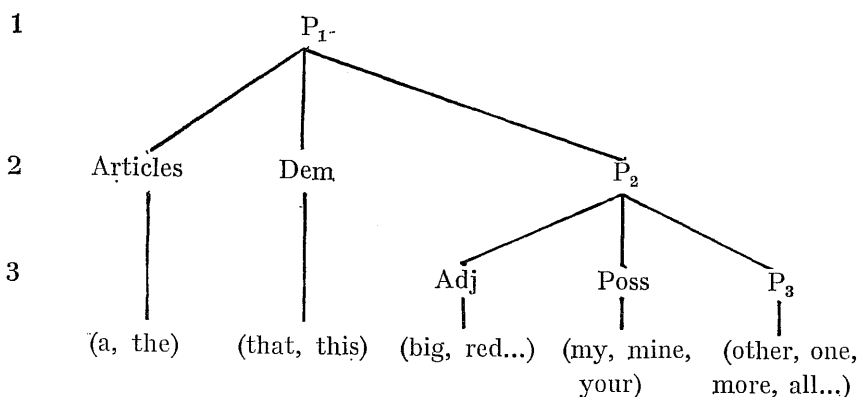
We see he divides the pivot in the articles and the demonstratives and in a group P_2, which includes adjectives, possessives and all kinds of numerals. In our recognition competence system, there is clearly a fundamental difference between the articles and the demonstratives and the group P_2. All words of group P_2 possess besides their meaningprogram II also a meaningprogram I, while the other ones don't (certainly not in normal simple speech).

A meaningprogram I is a program which can execute operations on the meaningprogram II of other words. Let us for instance take the expression "the boy". Meaningprogram II of "the" determines that this article modifies the immediate successor. This is certainly not the case in the utterance "the big boy". Meaningprogram I of 'big' executes an operation on meaningprogram II of 'the', with the result that 'the' will determine 'boy' ([28]).

In our approach, the articles and the demonstratives are grouped together. In McNeill's proposal they are divided into two groups. When

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(28) For more extensive motivation, see F. Vandamme's doctoral thesis, o. c.

we take the instances, used by McNeill for this differentiation, we see
that it is made on the basis of still another fact, viz. that the demonstratives
can also be used as an 'open class', when they are nominalized for instance.
Take a sentence as "That a horsie" (1). In adult speech it would be — we
think — "that is a horse" (2). In the surface structure of (1) we have
in the terminal string a sequence of categories :

$$
\begin{array}{ccccc}
O & - & P & - & O \\
| & & | & & | \\
\text{that} & & \text{a} & & \text{horsie}
\end{array}
$$

It would perhaps be permitted to hypothesize a zero-operator, with two
arguments. In this case we will have :

$$
\begin{array}{ccccccc}
O & - & P & - & P & - & O \\
| & & | & & | & & | \\
\text{that} & & \emptyset & & \text{a} & & \text{horsie}
\end{array}
$$

A justification for this idea can be found in the following quotation [29] :
"... would suggest that the auxiliary system had been built up internally
before being utilized in production. In addition, there is some evidence
from common observation that children understand the use of auxiliaries
even when they do not produce them."

An interesting question to ask here is : "Must nominalized and non-
nominalized 'that' be seen as the same single lexical element or might
it be better to consider them as two distinct morphemes, one with a 'pivot'-
role and one an open, that happened to share the same phonological form."
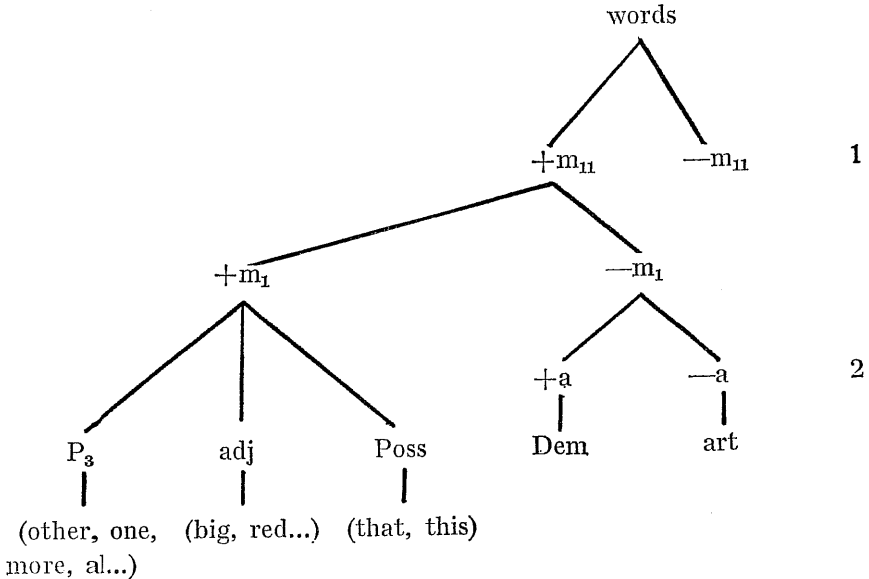The analogous problem happens with 'do' [30].

We are inclined to take them as the same single lexical element. In
our recognition system the differentiation between articles and demonstra-
tives (viz. group P_4 of which meaningprograms II can be arguments of
meaningprograms I of other words) can be taken as a differentiation between
words of group P_4 which can be arguments of the meaningprograms II
of other words (viz. the demonstratives can be arguments of the zero-
operator II for the child and of the verb-operator II for the adult) and
the words of P_4 which cannot.

We would like to reproduce the facts, given by McNeill about the dif-
ferentiation between words, as follows :

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(29) "Open discussion", in "The acquisition of language", o. c., p. 40.
(30) For more elaborated discussion about that, see "The genesis of language", ed.
by Frank Smith and George A. Miller, o. c., p. 94.

Time

```
                        words
                       /    \
                 +m₁₁        —m₁₁        1
                /     \
         +m₁          —m₁                2
        / | \         /  \
      /   |   \     +a    —a
     P₃  adj  Poss  Dem   art
```

$+m_{11}$ $—m_{11}$

$+m_1$ $—m_1$

$+a$ $—a$

P₃   adj   Poss   Dem   art

(other, one,   (big, red...)   (that, this)
more, al...)

m_{11} = having meaningprogram II ($+m_{11}$ = pivot—m_{11} = open class)
m_1 = having meaningprogram I
a = can be arguments of meaningprogram II of other words.

To recapitulate, a differentiation between words gives us (a) the words (not their significatum) which are operators, viz. the 'pivots', and (b) the ones which aren't, viz. the 'open class'. The 'pivots' can be differentiated in (1) the set of operators which possess with programs of other operators as arguments (which are therefore operators on operators) and (2) the set of operators which doesn't. This last group can also be divided into operators of which the significata (content) can be arguments of other operators. *These differentiations are, of course, of great importance for the cognitive possibilities in general.*

It is important to note that these differentiations are based on the features of recognition competence. Here, we can already hint the kind of influence the recognition competence has on the production competence, viz. by giving the production competence some of its categories. However, this doesn't weaken at all the hypothesis of the relative independence of each of these competences. It only garantees the necessary interrelation between both, so that all what can be produced can be understood and vice versa ([31]).

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(31) More about this is to be found in F. Vandamme's recension of S. C. Dik's book "Coordination", in 'Communicatie en cognitie', Rijksuniversiteit Gent, 1968, nr. 2, II p. 5-23

Conclusion : From all this, it seems to us rather premature to conclude that the theory of innate ideas has found a new solid contribution in the results of transformational grammar. One could perhaps also argue that it is rather dangerous to use an innateness axiome, in the form quoted above, while constructing a linguistic theory. The reason is that a conclusive argumentation for the necessity of the innateness axiome does not yet seem to exist in this specific form. The problem even rises whether a theory of innateness which hypothesized specific innate 'ideas' for each competence and which doesn't arbitrarily determine some principles as innate, is not yet much more difficult to construct and to motivate than a general theory of learning.

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ADDENDUM

Another argument which weakens the interpretation of language universals as an affirmation for the innateness of peculiar and specific aspects of language, is without doubt the existence of language- performance-universals.

Let us for instance take a look at the general aspects of the probability distribution of words. Experiments show that 'Yule graphs [32]', drawn from material on any language, have common features [33].

1. The curve showing word frequency as a function of occurence frequency has one peak (the maximum point), located at $\xi = 1$. This obviously means that in any sufficiently large text there are more words having frequency 1 than words having frequencies of 2 or 20.

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(32) A Yule graph is a graph formed as follows : "We take a system of rectilinear coordinates, and plot on the x-axis the scale of values for the frequency ξ of a word. On the y-axis, we plot the probability P with which a word's frequency takes a certain value (Working with one text, we need not always divide the number of words with a particular frequency by the length of the text, but can merely plot the number of words with a given frequency directly along the y-axis.) Joining these points, we obtain a curve."

(33) O. S. Akhmanova, I. A. Mel'chuk, R. M. Frumkina, E. V. Paducheva. "Exact methods in linguistic research." University of California Press, Berkeley, 1963, pp. 91-106.

2. After $\xi = 1$, a sharp decrease in probability occurs, causing the highest possible value for ξ to correspond usually to $y = 1$; this means that in any one text there is only one most frequent word. We can conclude from this that not every theoretically constructed statistical structure for text corresponds to real texts. For example, no texst have been observed up to now for which the probability distribution curve has more than one peak, or a peak such that $\xi > 1$, etc.

Another interesting universal, found by the application of statistical methods in linguistic research, is Fuchs' law ([34]). Fuchs investigated that in languages the distribution of words by the number of syllabes is subject to a certain general regularity. The character of the experimentally obtained curves of this distribution has allowed Fuchs, building on certain statements in probability theory, to present the hypothesis that in languages, word distribution by syllabes even follows a definite general law. On this basis Fuchs obtained an analytic expression by which one can calculate, knowing only the average number of syllabes in words in a given language, what percentage of a text is monosyllabic, bisyllabic, etc.

Akhmanova et alii ([35]) argue that this analytic expression is of a very high practical value. Following Fuchs, an universal proportion exists between the average number of syllabes in a word in a certain language and the percentage of each kind of words (monosyllabic, bisyllabic words, etc.).

It seems clear to us that both mentioned universals are based not on properties of competence system(s), but rather on characteristics of the performance system(s). Here we have characteristics of the factual realisations of the possibilities of a language-competence-system. As far as the language-competence-system is concerned, opposite characteristics of the word distribution in texts or of the word distribution by the number of syllabes could be possible. For competence does not specify properties of frequency of actualisation of certain language possibilities.

How can we explain these language-performance-universals? By innateness of peculiar and specific aspects of language-performance? Or rather by limitations and characteristics of the human memory, workunit, general economic principles, general cognitive possibilities, etc.? The last approach is perhaps preferable, because for 'the use of language-competence' (performance) all these mentioned components (memory, etc.) certainly play as a matter of fact an important role (which is easy to demonstrate).

(34) Fuchs, W., "A mathematical theory of word formation," in 'Information Theory,' Colin Cherry, ed., Academic Press, Inc., New York, 1956, pp. 154-170.

O. S. Akhmanova, et alii, o.c., pp. 106-109.

(35) O. S. Akhmanova, et alii, o.c., pp. 109.

If, however, such an approach has to be prefered for language-perform-ance-universals, is an analogous approach also not preferable—or at least possible—for language-competence-universals? For, without doubt, some of the already mentioned principles certainly play a role in competence learning, i.e. the workunit and memory for evaluation of possible com-petences. As a consequence, one can at least say that the existence of language universals has not to be interpreted as unquestionable proofs of innateness of specific aspects of languages.