Language

A 5-dimensional analysis of linguistic data

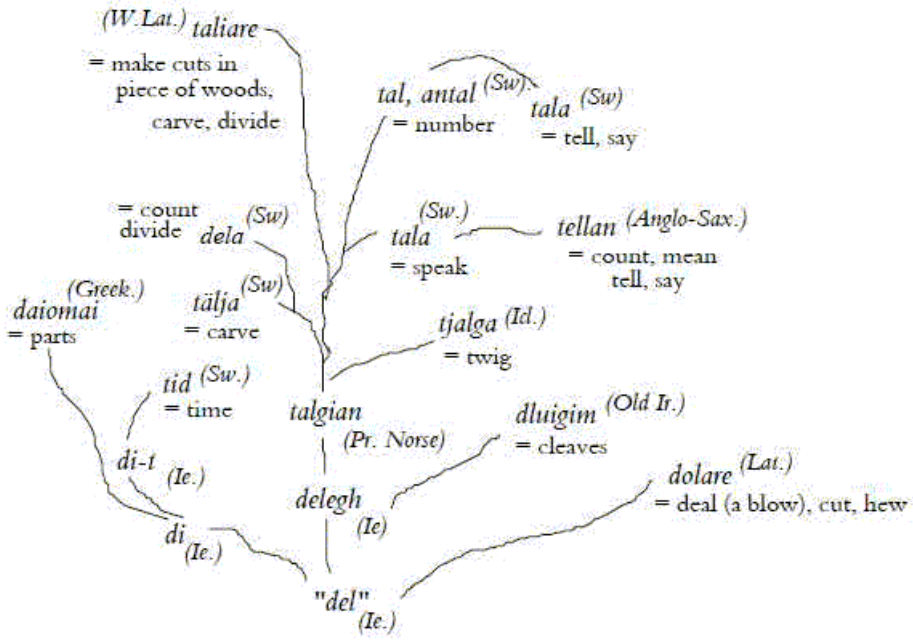
From: www.u5d.net/Language

Part I:

General Introduction

Language as a force - The situation of speech - Linguistic levels

An Indo-European word tree.



The world created through division of "the whole",
Division = del-ning in Swedish.
Words meaning count and tell something have the same root.
Tal = "number", = "speech in Swedish.
In Finnish too, belonging to the Uralic language family:
lukea = count, read, say.

(Used abbreviations in this figure, see below.)

1. The 5-dimensional model, presented in we files about physics, is here applied to the structure of language.

2. The general hypothesis is that the same fundamental patterns that govern processes on elementary physical levels also can be expected to turn up on all superposed levels in Nature - more or less recognizable.

3. If the model in one or another form shows up to be valid on underlying levels as in the **genetic code** and biology (not yet translated to the web), it would be natural if it also reappeared as a pattern on superposed linguistic level. Natural both in the motor production of language and in the speech situation, which gives the semantic sense, the relation to the surroundings from which human beings are precipitations and to which they relate through language.

4. Schools among grammarians use models similar to the dimension model here, e.g. the "tree" structures of the Chomsky school for analysis similar to polarizations, "derivations" between levels, concepts as that about a deep structure in relation to the surface level.

(The linguists' tree structures should of course be turned upside down for a more adequate tree form (!), but our bad habit in western culture to read and write downwards explains surely that this inversion has become the practice.)

5. It's proposed here that this model could make up at least one part the inborn ability of children's to grasp a grammar that Noam Chomsky launched as hypothesis, underlying the different rule systems of individual languages.

Such a built-in cognitive structure in human brains should probably be a very fundamental model to allow for the thousands of variations that exist and have existed.

6. There are at least three areas of language where the dimension model may be applied rather easily: **the structure of humans' speech organs**, the **types of phonemes** - and main **word categories** through which humans perceive themselves and the environment, categories which may be connected with main word classes or parts of sentences. Many grammatical features in different language families are also possible to analyze and interpret in terms of the dimension model.

7. About numbers, we have for instance up to 5 - 6 levels in the linguists' analyses of languages, about 5-6 *types* of phonemes, - with about thirty phonemes as an average value in different languages - as the sum of poles in a dimension chain, and we may count on about 5 to 4 elementary categories of words...

8**.** Views and applications of the model in following files may surely seem very simple - too simplified perhaps in many cases (?), and generalizations become of natural reasons more vague. Yet, even linguists by profession - as for instance **Roman Jakobson** - have made use of similar dimensional aspects in his analyses, even if it concerned a more limited area.

Language as a force:

Speech is of course a force, analogous to the forces in physics: an equivalent on this superposed level of relations between living creatures as particles.

Physicists call the boson quanta "carriers of forces". In the same sense words or speech is just such carriers of forces between people, binding or disintegrating.

As the nuclear force and the electromagnetic one sews up atoms and molecules, language functions as sewing between individuals.

Two of the physical forces are called strong or weak interaction, with quanta as π-mesons (or "gluons") and neutrinos and others. Speech is *interaction* in the same way with quanta carrying sense and energy in the communication. (Like interchange of commodities in the economy.)

Language may also be interpreted as a further development from the *chemical level* with correspondences to chemical laws: with "ionizations" to morphemes, with free valences for linguistic derivations, with charges in sentences, "radical groups", attraction and repulsion etc.

The historical development of a morpheme or word, with branching of the signification in different directions, has also similarities with the substances in glycolysis and citrate cycle for instance, where the different stages also leave the circulation to transform into other chemical molecules with other functions.

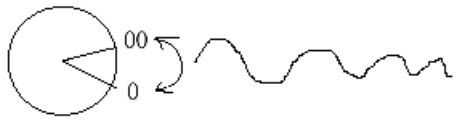
Without entering into the question how language are stored in the brain, it can be

observed that number of phonemes in basic morphemes (word stems) or syllables is circa 3-2, sometimes 4-5: the same number as number of bases in codons in the genetic code or totally (T/U-G-C-A). However, in numbers, it's the number of amino acids that resembles phonemes in the "genetic alphabet".

The probable deeper relations between the coding systems of a) the genetic code for proteins and b) language is (or would be) an interesting area of research.

In a first view there is an obvious opposition: Language as a way from the multidimensional sense and sentences to linear (sequential) motor action - in opposition to proteins as linear, through folding becoming multi-dimensional. The folding of proteins, so essential or their function, and what in the code that eventually decides this folding, is still an unanswered question.

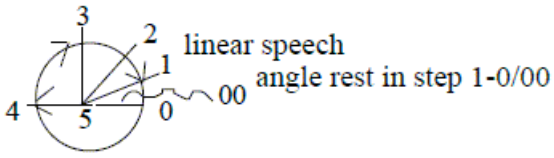
Speech as motions:



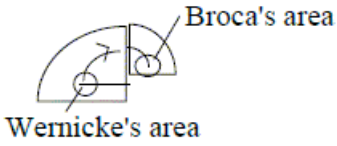
Language as motions out of the "angle rest"

Also motion as such, "dimension degree (d-degree) 0/00", is with the dimension model a force in relation to other d-degrees. "Carriers" of this force are the bodies that move.

According to one hypothesis about the dimension model, the steps in a dimension chain have also the character of angle steps through 5(0) → 4 → 3 → 2 → 1 - 0/00 (00), as e.g. halvings: 360° — 180° — 90° — 45° — 22,5° — 11,25°. Five steps give the angle rest 11,25° that could be regarded as the germ for motions as such: language as a force translated to motions as out of this angle rest, an opening for communication with the surroundings, the 00-pole.



Angle steps as halvings of angle 360°



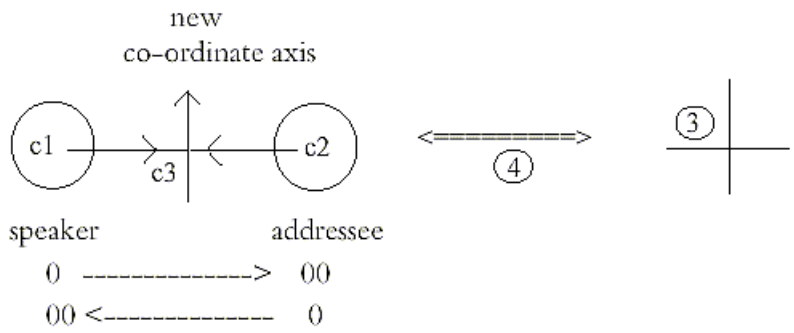
Language centra in the brain

Speech has two centra in human brains: Wernicke's area in the temporal lobe for interpretation, and Broca's area near motor primary centra for the speech. They are connected as through an arch, "*fascicutus arcuatus*" (which could illustrate angle steps). Really basic morphemes seem possible to manage and understand by Wernicke's centre, real syntactic connections first in Broca's area, according to studies of brain damages (*RB*).

The Situation of Speech and Types of sentences

1.The speech situation makes up the starting point for a development from primary to secondary sentences and types of sentences:

The speaker c1 — addressee(s) c2 — narrating centre c3:



2. In resemblance with how the cortex of cerebrum develops and spreads out as a projection surface over older parts of the brain, the communication between individuals develops from "radial" messages between speaker and addressee to descriptions as along a circumference or co-ordinate axis "in straight angle" to the line between both parts (c3); it gets a character of projection. (However, also the dance of bees has the narrative function,)

3. In terms of the dimension model:
First polarization 0 <———> 00, centre — anticentre (circumference) is given in the situation for speech in the relation speaker - addressee(s). They are as centre - anticentre poles out of a 5-dimensional unit, "the whole situation". Between these poles the 4th dimension degree (d-degree) is defined, in our model proposed as *Direction*, corresponding to a vector field. Speaker and addressee (listener) become each other's anticentra.

4. This primary relation gives types of sentences with directions, such as exclamations, exhortations, questions, ceremonial greetings and so on, types of sentences which are valid in "I <—> You" relations. (As developments from animals' greeting, calling or warning signals.)

Drawing any border between languages of animals and humans becomes difficult to justify. "Earlier" means of articulation as dance, facial expressions, body language etc. could be regarded as later built-in activities in the ballet of the tongue. (When language moves out to the growing cortex of cerebrum, the expressions move inwards the mouth.)

Homo sapiens, with the thumb opposite to other fingers and using tools, developed "auxiliary verbs".

5. A centre displacement to c3 and a new co-ordinate axis implies a d-degree step 4 → 3**,** a development from "I→You" speech to what semantically is speech in "3rd person", "he-she-this-that" speech. It implies displacements in *types* of sentences to describing, narrative speech, a perpendicular relation between speaker-addressee and what is referred to. Further centre displacements may lead to e. g. subordinate clauses.

6. Displacements in types of sentences should be compared with **moods** as differentiations in syntax and among verbs.

7. The describing, referring sentences concerns things located as along the circumference around the speaker. "3rd person" (singular, plural) gets precipitated as

through a dimensional process. And first conditions have been created for secondary directions, secondary tenses for verbs etc.

(Are there perhaps in the prehistory of languages different word stems for speech in these two senses?)

8. The centre displacement to speech in "3rd person" implies a relation where that which is referred to in a deeper semantic sense becomes an object (an object of speech). The speaker as primary subject understood. The mentioned subject becomes as object of lower d-degree.

(Cf. in Swedish that the demonstrative pronoun "den" derives from an oblique case form, that is to say concerns nouns that not are subjects in the sentences, not is in the nominative.)

9. Here it's suggested to regard the first poles 0 and 00, centre - anticentre as basis for the word category of pronouns.

Chomsky talks about "the sovereign position of the subject" in the sentence. In terms of the dimension model it would refer to the subject as the sovereign 0-pole, starting point for directions outwards.

When grammarians in a first step of their analyses describe sentences divided in subject part (NP, noun phrase) and predicate part (VP, verb phrase), the analysis is already displaced to the describing type of sentences. "The sovereign position of the subject" is perhaps foremost the necessity to mention that the speech concerns another centre than the speaker or the addressee, a consequence of the centre displacement to "3rd person" and the new co-ordinate axis.

(Secondarily the mentioned nouns may be replaced by "pro-nouns", referring back to the nouns. Then also 3rd person may be implicitly understood as subjects as these pronouns are absent in the Amerindian language ***caddo***, while 1st and 2nd person in that language have to be pointed out with pronouns in the reference back from the new position.)

10. The first three steps:

↗ 3rd d-degree — descriptions as perpendicular to the speaker
↗ 4th d-degree — direction speaker <——> addressee
↗ 5th d-degree — whole situation for speech.

Such a way through displaced centra corresponds to the way towards superposed levels and differentiations such as within word categories (cases, tenses etc.).

11. ***Psychology:***

The types of sentences could be regarded in relation to the "faculty chain" in psychology (treated in a book in Swedish, ”*Jaget kontra Egot*”, The I and the Ego, by this author):

5 ——— 4 ——— 3 ——— 2 ——— 1 ——— 0/00
aim/direction - emotions - conceptions - thoughts - words/reactions

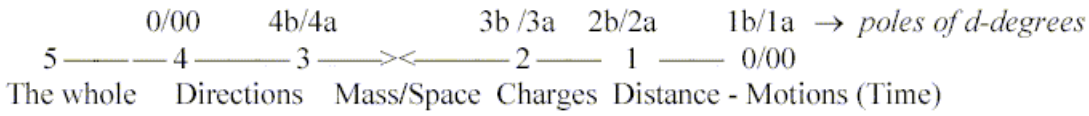
Sentences as exhortations with directions between speaker and addressee, expressions for elementary aims, "will". Exclamations as expressions for emotions in next step. Then the narrative sentences developed from the conceptions in step 3-2.

12. (Compare vowel exclamations versus consonants in d-degree steps (4)-3-2 through secondary demarcations, see files about phonemes.)

Levels in linguistic analysis

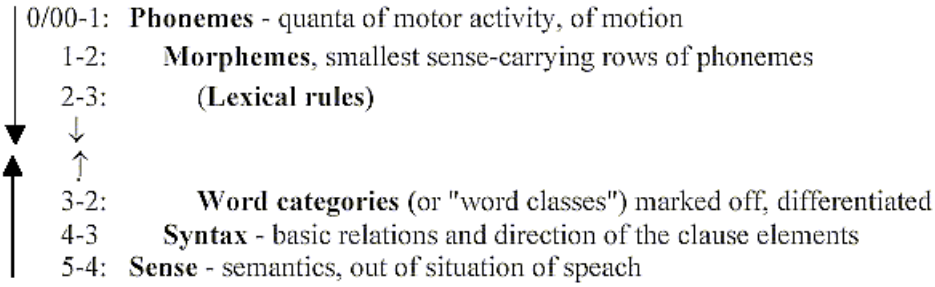
1. According to the dimension model here the *sense or* the meaning with big M should be regarded as a "5-dimensional" unit as virtual underlying reference in the situation of speech, in the meeting between speaker and the surroundings or addressee; out of the intersection between several virtual co-ordinate axes, which stepwise gets translated to linear sentences.

The physical quantities in the dimension chain , with complementary b/a-poles:



2. Linguists subdivide the process in 2-3-4-5-6 levels according to different models (*CEL*). (Number of levels should perhaps be related to number of changeover stations in the nervous system?)

3. In this model it's assumed that each steps in a first 5-dimensional chain may develop to new (cf. fractal) dimension chains. This gives what we have called a ***level chain*.** Such a level chain in transformation of meaning to sentences is here sketched in approximate agreement with the terminology of linguists:



4. *Some notes on the associations with dimension steps:*
As a level chain, a super-organization, the dimensional character becomes necessary derived in many steps and mostly faint.

- *Syntax* is here suggested as from d-degree 4 (in step 4→3), a deeper level than the following ones, regarded from the whole *in differentiating direction*. Why, when syntax differs very much between individual languages?

One reason to mention here is that syntax concerns the whole sentences and rules for the combinations of words. Another that syntax acts as or represent binding forces between the clause elements - as higher d-degrees in our model are defined as binding forces in relation to lower ones.

More aspects and reflections in file about Syntax.

- ***Word types or "categories"*** (Verbs, Nouns, Adjectives...) are regarded as the level 3-2, implying a separation in units: in a figurative sense with borders (d-degree 2) between them, a classification of their main roles on an elementary level. In the model the primary poles of d-degree 3 within physics are proposed as Mass and Vacant Space: in simple geometrical terms: circular / radial.

- ***Morphemes*****,** as word stems (or syllables): the boundary between word types are opened, the words "ionized", in this sense connected with Charge, proposed as of d-degree 2 in the model. Morphemes carry often an essential semantic *character* that can be used as parts in different word classes. Regarded in synthesizing direction they form first elementary "linear" rows of phonemes (even if sometimes only one phoneme). Hence they are here suggested as representing d-degree step 2 <—> 1.

- ***Phonemes*** as individual (although complex) quanta of motor speech derive naturally from d-degree step 1 → 0/00. (0/00 the d-degree of Motions in our model).

- And the ***Sense, Meaning*** of the sentence represents the Whole, d-degree 5.

5. ***Writing development*** shows the same development from ideographic writing and ”words” to syllable writing to phonetic writing - a way of differentiations from ”the whole”.

6. ***About transitions between the levels:***
The transitions from parts of sentences as Subjects - Predicatives - Adverbials in Syntax to Word types or “categories” as nouns - verbs - adverbs as following from the centre displacements in the speech situation in the section above.

- Parts of sentences, the clause elements, get naturally decided by the underlying level of syntax and may be assumed as the preliminary stage.

A language as Chinese lacks classes of words in our sense. There it's possible to speak about more complex semantic concepts - of higher dimension degree - where the word order and other things decide the roles of the words.

The existence of such languages is one argument for interpreting the different classes of words as stepwise precipitations through a development of the type of a dimension chain in the model here.

- The centre displacement to a co-ordinate axis perpendicular to the one between speaker and addressee, to a secondary 0-pole in the surrounding c2, gives a talked-about subject and the role of subject projected as on a surface.

This subject demands that something or somebody is pointed out, is "located", encircled, through a name: it gets "*substantivized*". In this way the displacement in the situation of speech implies a displacement also from the level of syntax and clause elements to the categories of words on superposed level.

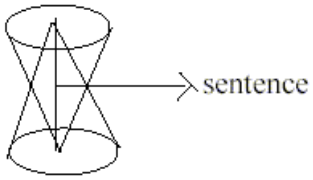
Hence, first "in 3rd person" nouns as a class of words would be defined, first with the describing/telling type of sentences.

- In a corresponding way the verbs may be imagined as released from the role of predicates of sentences through this centre displacement and become alienated to a word class for relations between different centra on the "periphery".

- Simultaneously the complex ”properties” in the sentence may be ”chemically” precipitated and get the character of adverbs and adjectives, when the verbs have been abstracted from specific situations and become generalized and that which is substantival has become designations as nouns.

("Twenty" words for snow becoming one word for snow plus twenty adjectives!)

Gradients:



In agreement with the gradients that scientists talk about in embryology but also in linguistics, two such gradients could be identified in the development of a sentence:

- One from Meaning, the germ (as centre, the point in bottom of one gradient triangle), in direction outwards, divergent toward increasing breadth, a developed sentence, differentiated in word categories and "words",
- The other in "lexical" direction from outside (anticentre, the 00-pole), from single phonemes and sequences of phonemes which can have represented a complex meaning, towards longer sentences where the separate words get an increasingly specialized sense.

The Meaning, the semantic sense, forms its code through incorporation and structuring of material from the surroundings.

We have two **gradients in the ear**: auditory cells with nerves from the interior of the brain, and the cochlea, created from outside.

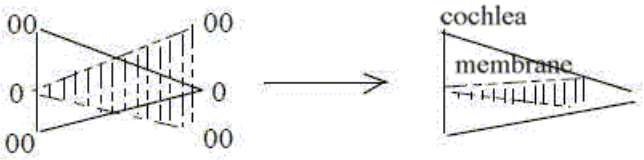
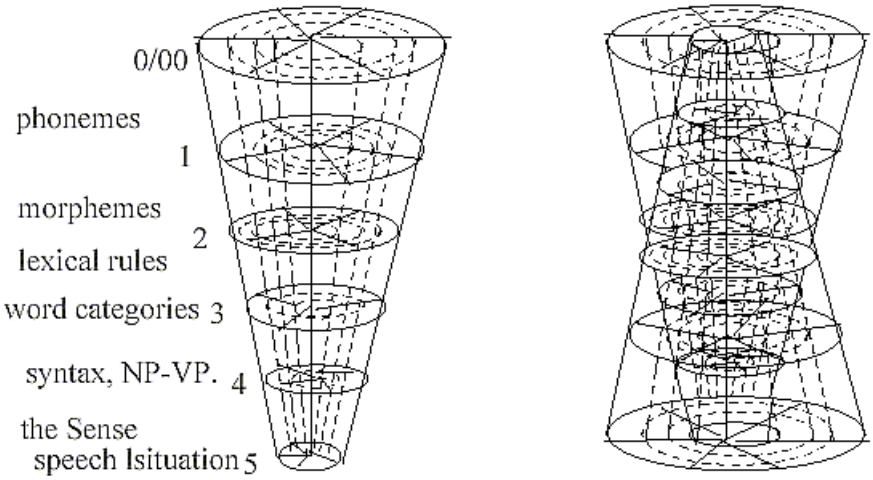


Figure from Biology (117-3)

The gradient with phonemes in the centre could eventually be compared with the evolution of the blood system: from single "island" drops - to threads of these - to pipes, which then get curved through two-way directed streams to the creation of bulbs and the heart pump. (See further the interpretation of phonemes.)



Note: Abbreviations for languages in first figure above:
IE = Indo-European
W.Lat. = West Latin
Old Ir. = Old Irish
Icl = Icelandic
Pr-Norse = Primitive Scandinavian
Anglo-Sax = Anglo-Saxon
Sw = Swedish

Geometry at bottom
Verbs - Nouns - Adjectives - Adverbs

1. The basic character of main word classes as verbs, nouns and adjectives is here traced back to the features of dimension degrees (d-degrees) 4 - 3 - 2 in the dimension model, at bottom geometrical:

- **Verbs** as originally with the character of **vectors**, d-degree 4,
- **Nouns** signifying **closed units**, "mass units" in d-degree 3,
- **Adjectives** separating nouns, possible to identify as originally indicating the **surface** of nouns, d-degree 2.
  "How"-adverbs from adjectives. About adjectives and adverbs, see below.

This view on the different word types is of the same kind as the philosopher Kant called "categories of aspects" on the world and saw as given in human brains.

2. Also linguists talk in terms of geometry**.** Closer similarities seem to exist with ***Roman Jakobson's*** analyzis of the 8 *cases* in Russian according to a description by Beard (*LB*) (*RJ, p. 60*), in concepts as "direction", "extent" (size) or "volume" and "border, periphery". How Jakobson's 4th concept "ascription" (Russian "nadelitenost") shall be interpreted, is a bit unclear in this reference, = "attributed" (?). Note that the descriptions here concern a sub-category of nouns.

Beard himself talks about "earlier word stems with mostly geometrical meaning which have been reduced to a parasitic existence".

3. It would be reasonable to believe that the analysis of both a situation which gives the Meaning and heard language from outside had similarities with how the eye and the visual centre in cerebrum analyzes visual impressions from outside into basic geometrical forms, for instance in direction (vectors), distance to centres (amplitudes), angles, straight/bent etc.

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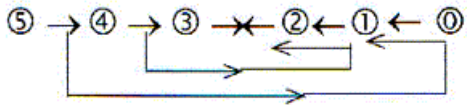
There are also sensory nerve cells that only get activated by changes, i. g. o a derivative kind.

4. This geometrical analysis could explain confusions by persons with lesions in linguistic centra of the brain. The mix of snow and salve, for instance, or man with poncho with a spruce fir, with two examples collected from a detective story.

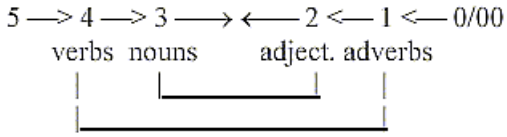
5. Compare too that Chinese is said to separates noun classes of spatial versus flat objects, of spread out versus long and narrow objects.

6**. Debranching of d-degrees:**
Our dimension model implies that lost degrees of structure in directions outwards may meet the “other way around”: from step 5 → 4 1 d-degree, from step 4 → 3 two d-degrees:

The "Loop model":



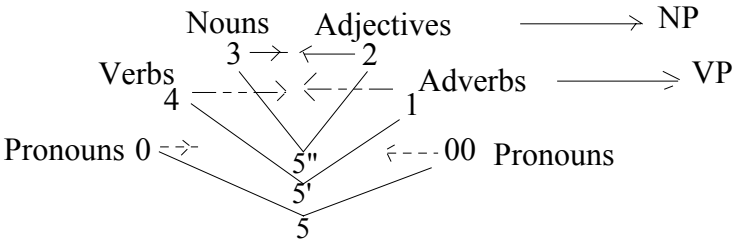
The opposite directions will meet in the middle of step 3 →← 2.



With a perpendicular view on this figure, we may rewrite it as in three polarizations of d-degree 5:

5" → 3 <—> 2
5' → 4 <—> 1
5 → 0 <—> 00

We get a figure like this, which also may give a basis (or reason for) the main division of sentences in VP, verb phrases, and NP, noun phrases, of the Chomsky school:



(In his figure we have what here is called the "haploid" version of a dimension chain with a term from biology, where start 5 and end 0/00 are replaced by pole 0, the centre and 00, the anticentre.)

D-degree 5 is in the model regarded as the ultimate, underlying binding force in lower d-degrees - and lower d-degrees are defined as polarizing forces in relation to higher ones**.**

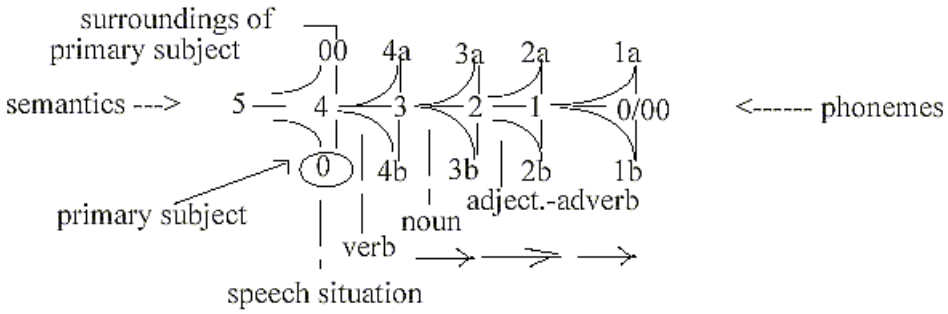
With the aspect of debranched degrees, we may imagine how components semantically included in the whole "Meaning" or Sense, may become separate expressions for outer relations between parts of the sentence.

It gives a basis for the debranching or separation of what is called "***form words***", ***particles as suffixes*** - or prefixes, infixes and prepositions, case signs... That's quanta of form words as "carriers" of the binding force in the syntax, expressed in terms of physics.

An evolution has been going on it's said towards "more and more of free form words**"** and **"*movability of the form elements***", characteristic not only for Indo-European languages but also for Semitic languages and in Chinese.

In terms of our model implies a trend towards lower d-degrees and superposed levels where more and more d-degree steps as relations get quantified and "substantivized" to separate units.

Verbs - Nouns



Bow - bow - bowed: verb - noun - adjective

. The verbs as vectors represent primarily radial structures, the relations of the subject to its surroundings, to other units; the nouns or the substantival primarily circular, demarcated units.

2. This main polarity may be founded in the nervous system, in the opposition between *frequency modulated signals* outward from the cells and the *amplitude modulated signals inwards* the cells. Cf. frequency related time in waves, connected with processes - verbs. And amplitude, a spatial quantity, related distance as height, connected with volumes - nouns. (Incoming signals have a circular spread in the cell membranes.

3. Hence, we may see the verbal character as primarily expressing directions and forces (vectors, d-degree 4 or 4→3) and the nouns as demarcated, located, "substantiated" units in d-degree 3 or step 3→ 2. The difference corresponds to the concepts of Forces in d-degree 4 versus Mass in d-degree 3 in the first identification of physical qualities in a dimension chain.

D-degree step 4 →3 implies a step towards "circular structure", a way towards differentiation and demarcation: the nouns get precipitated.

> (The essential question how pole 4a, inward direction in our model, transforms to a circular pole in d-degree 3 is also related to the question why bodies rotate, both in micro- and macrocosm. It's perhaps illustrated in a car engine and depending on the centre displacement of the inward direction, expressed in very generalized terms. This both astronomically, mechanically and in certain centre displaced personalities.)

4. **Original word stems** were mostly verbs in Indo-European and Semitic languages, which then developed into nouns (*LB*).

Grow - grass - green for instance derive from the same root with the basic meaning something like "shoot up".

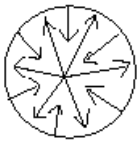
In Ural-Altaic languages mood and tense forms as first differentiation of verbs were in reality nominative stems derived from verbs (*BC*), hence followed the same direction outwards as the development verbs → nouns.

5. In Etruscan the same morphemes or phoneme combinations developed to verbs and to nouns according to the linguists (*AP*) - and presumably the same applies to many other languages.

Compare "eat" in Thai language = eat rice (*kinkhhao*), a word which has to be disintegrated into parts if other nouns - or verbs - objects should be referred to. * (See a note below.)

6. We have also that *a verb can stand alone* in a sentence as an imperative: “Run!”. A noun not. In this sense verbs get closely related to first primary types of sentences, and this in turn to moods as a first differentiation of verbs. On the psychological level connected with “aim”, “will” as inner direction.

7. The ***main relation verbs - nouns may be interpreted in three different ways*** in a dimensions chain of word categories:



- In **d-degree 4** the verbs with open structures represent **vectors** outwards/inwards in relation to nouns in d-degree 3 or step 3-2.
- In **d-degree step 3 - 2,** which in simple geometrical terms implies a polarization into radial versus circular in our model, the verbs appear as radii, the radial ”pole” versus nouns as the circular, enclosing one, As radii the verbs become relations between e.g. subjects and objects.
- In a d-degree step, as 4 → 3**,** one d-degree is debranched in the structure and translated to external **m**otion, that is **d-degree 0/00.** (A main feature of our model, if not meeting as d-degree 1 ”the other way around” inwards.)

Remember that outer poles of d-degree 4 are 0 and 00, (centre - anticentre), defining the quality Direction, which meet in last d-degree 0/00 of motions.

Hence, in a 3rd aspect verbs may represent linear "pathways" (of d-degree 1) or these polarized into expressions for Motions as such. (4→3+1, 1→ 0/00)

8. This 3rd aspect on verbs as words for motions may be regarded as a consequence when the noun (as subject or object) is singled out and named, is "substantiated". Its complement becomes a word for motions, course of events, processes**.**

9. Verbs as vectors, verbs as radii, verbs as motions: Irrespective of which of the interpretations of the relation verbal - substantival that in a certain context seems most valid, they are **all three complementary** in the sense of the model but in different ways:
- as higher d-degree versus lower (also a 0-00-relation),
- as complementary poles of the same d-degree 3, or
- as structure versus motions.

(The dimension chain for Motions become opposite directed versus the one of Structure in the basic form of the dimension model.)

10. As the field level in physics is regarded an underlying binding forces between substantiated mass particles in lower d-degree, so (transitive) verbs act as "binding forces between subjects and objects.

We may simultaneously regard the consequence of the two gradients of the big level chain: In the gradient where phonemes represent first centre, the morpheme level will represent d-degree 4 and hence may polarize into both the opposite poles of d-degree 3, nouns and verbs as radii as pointed out above.

11. **Vectors within an imagined circle give 3 aspects:**
- directions outwards - inwards
- pointing out different points ("centra", things" on the circle, in the surroundings, the reference aspect,
- the property of being radii, connecting subject — object (as centre — anticentre).

The first vector aspect could decide or be connected with type of sentence - or order of words (~ directions) in the sentence but also secondarily certain differentiations within verbs as active/passive forms, 1st or 2nd person as subject etc.

The pointing out of something in the surroundings (on the circumference) as centre c2 implies for instance demonstrative pronouns or articles - which in a simple geometrical way then may appear as suffixes as terminal points for the radii - a "suffix" with function of pronouns.

At the transition of verbs to the character of radii, the relation itself between subject and object, the vector property may have been debranched to prepositions, primary words for directions and adverbial qualifiers.

12. **Vowels — verbs:**
Verbs as open structures, as vectors from a centre, may in this respect be compared with vowels within phonetics, with one centre, one inner (vibrating) catch or "gate", and the nouns with consonants which also or only are defined by a second outer gate or demarcation.

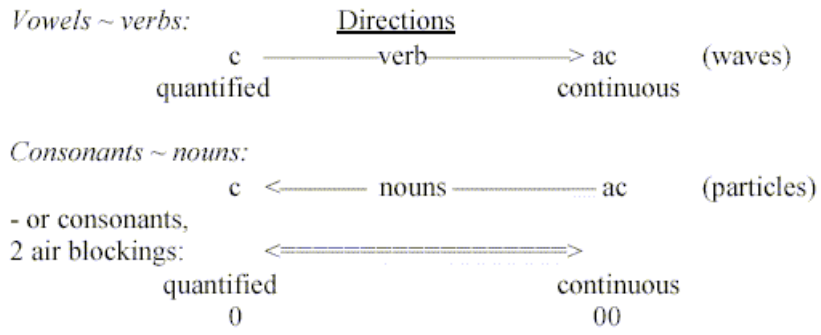
13. **Arabic triplets** of consonants are said to represent the semantically demarcated sense, not ”nouns” but the "substance" of the meaning, while the vowels are responsible for variations as in tense or persons, what can be assigned to the syntax (*LB*).

It reminds of how vowels can be implicitly understood in consonants as in Hebrew and other writing.

14. Why do we want a verb for a “full” sentence? “*It is beautiful*”. Why *is*? Of the same reason that we need vowels between consonants to get a word stem?
- Because there is pathways in our brains between stores of pronouns or nouns?
- Verbs for *transitions* among stores of other parts of sentences? Auxiliary verbs as “*is*”, “*becomes*”, “*would be*”...

The least whole sentence would be a pronoun (or noun) and a verb: *He ran*. (D-degree 0 → 4 in our model.)

15. There is also the elementary conceptual opposition and complementarity ***continuous — quantified***:



Saussure wrote about points of syllable divisions: parts of words with character of implosions and explosions respectively:
- *implosions* (~ inward direction), comparable with the way from vowel to plosive: the air stream of the vowel gets barred,

- *explosions*: the way from plosives to vowels, barred air stream gets released. c → ac, (~ outward direction).

A note:
It's possible to imagine complex word categories made up of one transitive predicate with included object as first "words". Compare the mentioned "eat" in Thai language = eat rice (*kinkhhao*). In a hypothetical morpheme aka = hunt buffalo the first two phonemes could have developed to a verb ak-, for Swedish *jaga (= hunt),* the two latter *-ka* to the word for Swedish *ko* (= cow).

Departing from morphemes with potentially both substantival and verbal sense, one could imagine two series, 1) one series with verbs including objects, 2) one series with nouns including predicates. The two series could function as two crossing co-ordinate axes or "scales", which leads to the ”discovery” that all points on one scale principally could be combined with all points on the other. Something that leads to the ramification of morphemes to verbs and nouns respectively, more "alienated" linguistic categories.

Adjectives - Adverbs

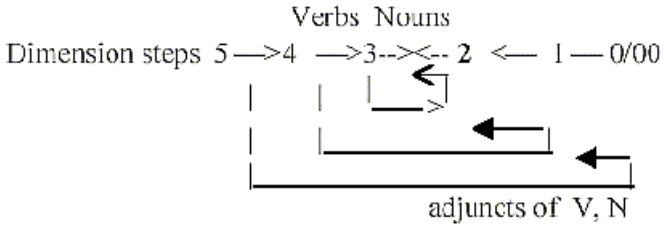
Adjectives are here suggested as at bottom, originally and sensorially of 2-dimensional character, as surfaces of nouns. (D-degree 2 or step 2 — 1 in second part of a dimension chain. (3 <—>) 2 <—> 1.)

Dimension steps (3) <—> 2 <—> 1 <—> 0/00:

Properties of nouns and some determinations of verbs are of course more or less included in the meaning of words for nouns and verbs. They may be released from these and become added as separate parts of sentences and own word categories - when nouns and verbs become more generalized.

Mountain, hill, alp are different nouns which in the words include different secondary properties of height (c. amplitude) as adjectives. *Walk, run* indicates different kinds of a person's motions in relation to velocity (cf. frequency), corresponding also to adverbs of manner.

As debranched d-degrees from higher steps according to the loop version of a dimension chain, the adverbs and adjectives get connected "the other way around" with the verbs and nouns respectively.



Adjectives:

Adjectives may be regarded as polarizations of nouns. (Compare that lower degrees in our model is defined as polarizing forces in relation to higher ones.)

Secondary ”polarizations” of nouns such as in gender and ”classes” of the type living/dead things have also a roughly adjectival character.

Quality, kind, character - such that adjectives and many adverbs represent - must be assumed as at least equally primary categories as verbs and nouns from a semantic aspect. In the beginning there was dark and light - in mythologies but probably also for newborn babies. Compare morphemes or phoneme combinations with virtual double sense of nouns and verbs.

(Morphemes, in the gradient from phonemes representing d-degree step 4 - 3 in our interpretation, in the other gradient from the whole Meaning d-degree step 2-1, that’s corresponding steps in the loop model.)

During the translation to sentences however, they seem derived from verbs and nouns, in any case in Indo-European languages according to *SEO*.

A linguist as Robert Beard (*RB***)** distinguish**es** 5 main types of adjectives expressing qualities: three out of verbs, 2 out of nouns. (In his description those derived from verbs could be translated to "which does", "which can be" or with participles, and those from nouns to "which have" (a property?), "which resemble".)

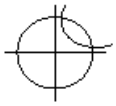
Note that adjectives as attributes cannot be followed by pronouns in our languages at least, which supports the view that pronouns don’t originate from nouns but originate from a more high-dimensional step.

The aspect of a**djectives as** the **"surface"** of nouns, should be compared with the aspect in physics where an atom may be analyzed in terms of pure shells also the nucleus) as well as in other d-degrees. In the same way a noun may be dissolved in its qualities and a "3-dimensional body" be analyzed as aggregation of surfaces.

Atoms as ”substantival” units become in a deeper analysis ”sewed up” of qualities:

Cf. that colours (and dark-light) originate from jumps between orbits in electronic shells of atoms. Perhaps such adjectives are primary ones? As electromagnetic waves emitted by atoms bear witness to their structure, the adjectives indicate the character of the nouns.

Adjectives in relation to nouns could also be interpreted in analogy with the dual property of elementary particles as electromagnetic **waves and particles:** the substantival particle structure disintegrated, broken up.



(Cf. aspects in files about physics here. The wavy property becomes one expression for the increasing degrees of motions in lower degrees of structure.)

As distinctions through comparisons by the sensory nervous system adjectives may be regarded as a derivative which describes changes in a "3-dimensional" curve; the speaker as observer of relations. Cf. that there are nerve cells that only get activated by changes, i. g. are of the derivative type.

The polar character of elementary adjectives and a lot of adverbs is obvious, the division in complementary ”poles” if expressed in terms of the dimension model: - in

words as dark — light, in words for valuation as good — bad, sick — healthy, or in opposites as fast — slow, first — last, late — early etc., (As we have "complementary" colours.)

Compare the physical concept "Charge", polarized +/-, (and quarks up and down) proposed as a physical quality in d-degree 2 in relation to Mass when analyzed as of d-degree 3 in this model.

In the dimension model the complementary "poles" (or partial structures) of d-degree 2 have been proposed as inside / outside or convex / concave as first elementary *geometrical* definitions. In one language the forms of adjectives are said to *differentiate between inner and outer properties*. (There are also languages where lexical derivations of nouns differentiate between the flesh, the inner content in animals and their surface, their skin (*RB*).)

The polar type of elementary adjectives separating nouns could eventually be said to draw up a linear derivative, comparable with Distance in d-degree 1. Outer poles in -degree 1 (=2a and 2b) include charge and could also be viewed as secondary derivations from d-degree 4 of Direction.

Comparisons:
Comparisons are a characteristic feature for adjectives and "How-adverbs" derived from them. As waves have maxima and minima in amplitudes, so have adjectives and such adverbs: they can be compared - a distinguishing quality for these word categories.

This feature could be interpreted as a consequence of the transition from vector character in d-degree 4 to scalars in lower degrees: quantitative comparisons become possible between qualities.

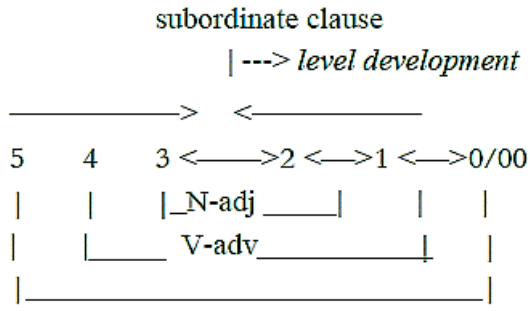
Comparisons may in some languages be replaced by repetitions (or a word like *very* in English), equivalent with plural forms - on the way to the 00-pole, which in the model also represent multiplicity.

Comparisons may sometimes also be applied to nouns (from step 3-**2**) in some languages as a further development of nouns towards the adjectival through suffixes, in greater - smaller (diminutives): in Hungarian *szamar* = donkey, *szamarbb* = a bigger donkey (example from *RB*).

Relative clauses:
Adjectives have been regarded as a category of words out of implicitly understood relative clauses (*RB*). (Compare his translations above: "*which does, which have*".) Why this interpretation of adjectives? As pointed to above there are lot of adjectives that seem as elementary as word category as verbs and nouns.

The view could eventually be explained by the loop version of our model. D-degree 2 as result of the debranched degrees in step 5 → 4 →3 will in that sense refer backwards to higher degrees of both verbs and nouns, parts of a possible relative clause.

Here its suggested that real relative clauses should be regarded as developments through the middle step 3 ←↑→ 2 (or 3 →↓← 2) towards a new or embedded level in the sentence. Compare about Adverbs blow.



(Cf. also figure of a pentagon in file Syntax.)

Adverbs:

1. Adverbs answering the questions **How - Where - When** may be referred to d-degree steps →1 → 0/00 in a dimensional interpretation:

- **How-adverbs** for manner of activities may be regarded as derivations from adjectives in d-degree 2. Note that outer poles of d-degree 1 are 2b/2a: 2b — **1** — 2a

In Swedish a simple addition of suffix *-t* transforms an adjective to n how-adverb, in English typically *-ly.*

- Where-adverbs as in "*run away"* are semantically connected with Distance, the linear dimension of d-degree 1.

Many Latin adverbs are said to be case forms of nouns which have "happened to drift apart", (*BC*). Case form as locative? Distance as one of the components in Position, connected with Space from d-degree 3. (Cf. first figure in this file.)

- When-adverbs are of course expressions for **Time,** a physical quantity that in our model is identified as result of Motions in d-degree 0/00.

Many expressions for Time are, as linguists have pointed out, originally expressions for space, such as *afterwards*, *long* (time) etc.

Perhaps these **When**- and **Where**- adverbs, coupled to the physical quantities **Time** and **Distance** should be regarded as the most original ones?

In short, these How-, Where-, When-adverbs describe the unidirection way in the dimension chain 2 → 1 → 0/00: (nouns) → adjectives → adverbs.

2. Vector type of adverbs, another category:
These adverbs should be regarded from the aspect of the *loop model,* where we had the direct polarization of 5 → d-degrees 4 — 1:

The adverbs for directions as *forward — backward, here — away, stand up — sit down...* should be identified with the debranched vector character of d-degree 4 of verbs when verbs are generalized. Cf. *come - go***:** verbs already with direction included. D-degree 4 defined as Direction, polarized outwards - inwards.

Cf. in Swedish Var (= where, ~ for area, place), *var**t?*** (= corresponding adverb, = in which direction).

3. Adverbial parts of clauses:
In our dimension model the d-degree "0/00" for motions as such is also identified **as 5'** (5 dimensions all translated to motions). This makes it a possible start for a new dimension chain.

This aspect may elucidate why adverbial expressions for time and space and other kinds easily develop to multi-word elliptic clauses or whole subordinate clauses.

In our model d-degree 1 may get polarized, then in the poles 1b and 1a = ”motions from each other”, and ”motions to each other”, implying a reappearance of direction, d-degree 4, (Vdiv/Vconv). The poles become also connected with the opposition continuous - quantified. (Cf. *Phonemes***.**) ”Motions from each other”, divergent, draws up distance, ”motions to each other”, convergent, defines a new centre.

The word category adverbs has sometimes been called **a "sink"** for all words not possible to refer to any other class of words. Compare this with the fact that that d-degree 1 is represented in each step in a dimension chain.

Additions:

The **principle of complementarity** is central in our model: each d-degree polarized into partial structures as “outer poles” of next lower degree. What would be the corresponding first complementary poles in higher d--degrees?

- For types of sentences: perhaps *statements - questions*,
- From d-degree 4 defined as outward/inward direction: possibly *active / passive* verb forms,
- From d-degree 3 defined as radial/circular: first the opposition *verbs as radii versus nouns*, secondarily perhaps the opposition *Subject / Object* (or generally oblique cases).

Secondary developments:

According to our views on ”level chains”: If the categories of words are regarded as a primary dimension chain, then each step in this chain may develop to whole (”fractal”) secondary chains and steps in these to tertiary ones...

The dimensional features may weaken and become stepwise less easily recognizable, yet account for all differentiations within categories of words - or elementary ”concepts” that human being have felt needed in their different languages.

Differentiations as 5’-4’-3’-2’-1’-0/00’

0/00 ~ 5’→ development of new or elliptic clauses

1 → **adverbs** - differentiations as above and ...(?)

2 → **adjectives -** differentiations as in Comparatives - Singular/Plural

3 → **nouns** - differentiations as in Cases - Classes - Numbers...

4 → **verbs -** differentiations as in Moods - Active/Passive- Person(s) - Duration - Tense

5 → **speech situation** - a) Types of sentences b) **Pronouns** - differentiations

Differentiations of Verbs

The number of grammatical differentiations of verbs (potentially or in Indo-European languages?) seems to be of the magnitude 5 - 6. Perhaps these different aspects on verbs could be connected with d-degrees or steps in our model, in a secondary dimension chain of verbs? Here a suggestion, where the situation for speech could be regarded as one determining factor in moods:

- Moods	5 — 4	The situation for speech, a first polarization
Intransitive - Transitive	4 — 3	Double-direction / one-way direction
Active - Passive	poles 4b / 4a	Direction outwards / inwards
Person inflections	3 — 2	Connection with nouns
Duration	2 — 1	Bounded versus continuous actions
--Tenses	1-0/00	Directions of Time

There is a connection between moods and tenses as between steps 5 - 4 and 1-0/00 in the ***loop model*** of a dimension chain:

Suffixes for moods became auxiliary verbs in the development from Latin in Indo-European languages, auxiliaries also for determination of tenses.

We can also find a semantic connection between steps 4 - 3 and 1 - 2: between intransitive - transitive character and the aspect of duration:

Intransitive verbs have the character of a state (or condition), something continuous as "duration", transitive verbs with more character of bordered, delimited actions.

Active - passive verb forms is a secondary polarization of transitive verbs, of unidirection outwards (pole 4b) towards an object versus inwards the subject (pole 4a).

In passive verbs this displacement to a change in direction inwards the subject is expressed by simply addition of the suffix *-s* in Swedish, derived from a reflexive pronoun.

Here we have a connection to next differentiation with inclinations after 1st, 2nd, 3rd person etc., as the polarization of d-degree 4 in 4b/4a gives d-degree 3 in the dimension chain: start of substantiations towards the category of nouns, deciding the inclination after person.

In certain Uralic languages the verbs have double suffixes, marking both the subject and the object (*BC,u*) of transitive verbs.

(In a language as Swedish oppositions concerning moods and intransitive - transitive verbs as in tense inclinations are stronger marked through vocal changes in word stems than in active - passive forms and person suffixes. Possibly while these differentiations represent a deeper level in the loop version of our dimension chain?)

Moods: — step 5 - 4:

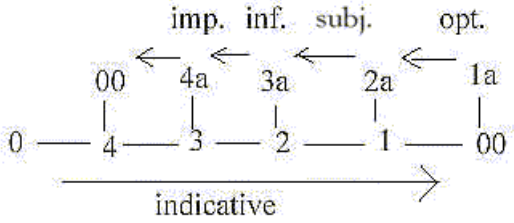
Moods are described as "a form category that indicates the speaker's apprehension of what is said". Linguists talk about 5 to 4 moods, in Greek 5, in Latin (or languages from Latin?) 4. With differentiations in moods we get a third level in the "fractal" developments within the dimension chain.

- Indicative (something *stated, related*)
- Imperative (*exhorting, urging*)
- Infinitive
- Subjunctive (something *thought, possible, conditional*)
- Optative (Greek: *what is wished*)

An Uralic language as Yurak (Nenets) is said to have 10 moods (*BC,u*). Uralic and some other languages have also negation verb forms; Turkish has a "mood negatives".

The question form should reasonably be possible to apprehend as a mood too when the imperative is a mood and it seems really to exist as a mood in certain languages (same source *BC,u*). It's said that negation particles and question particles originally have been identical in Indo-European and Semitic languages (*LB*). Hence it sounds right to connect *moods* with the whole situation for speech and the relation speaker — addressee.

With the indicative taken as the basic form of a full sentence, as developed straight "outwards" in the sense of attitude, it seems possible to interpret the other moods as representing geometries of different degrees in the direction inwards as from 00-pole and "a-poles" in the model:

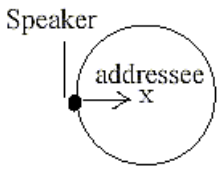


In geometrical terms:
- 4a: straight inward direction, towards 2nd person, *imperative*.
- 3a: circular geometry: the *infinitive* with character of noun.
- 2a: convex form, open curve: the *subjunctive*, the eventually possible.
- 1a: defined as "motions towards each other" in the model: the *optative*, see annotations below.
- 00: the opposite direction in the whole chain, the *indicative* turned in direction to *negation* or *question* mood.

The ***imperative*** is the purest example of the direct relation speaker - addressee, as centre - anticentre poles, the elementary direction, d-degree 4, in the situation of speech.

They include he most single-worded type of sentences as "*Run!*", one single verb (verbs in d-degree 4).

The speaker is centre-displaced as to the surface of the addressee, which implies that the sentence in a real semantic meaning lacks a subject. The direction of imperatives is essentially inwards.



(The *imperative* could also be said to represent "law" and rules, as syntax is proposed as from d-degree 4 in the big level chain of linguistic analysis.

In languages like Swedish the verb gets often reduced to the pure verb stem, without any suffixes.

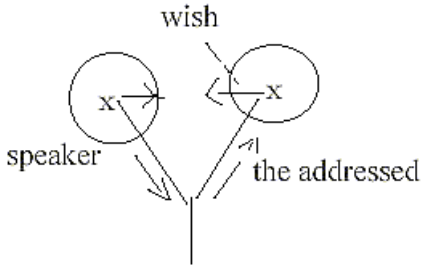
The ***infinitive*** represents linguistically the "infinite" (the 00-pole). It has a recognized subjectival character of d-degree 3 and can function both as subject and object, as an objective complement.

Uralic languages have instead of infinitives case forms of verbal nouns (*BC,u*).

The ***subjunctive***, the only imagined, possible or conditional, may perhaps be expressed as *if-* sentences. The speaker's psychological attitude is a kind of detour, or "the other way around" in relation to statements about facts, as it were connected with the loop model of the chain.

In relation to indicatives as "substantiated" actual facts, the subjunctive implies a dissolution, an opening, something unsubstantiated of more wavy character. Hence here suggested as in from step 2 ← 1.

The ***optative*** as "wished" could be interpreted as a catching motion and has in relation to the subject the inward direction. It could illustrate the definition of d-degree pole 1a as "motions towards each other" in our model, psychologically:



(It's said that an expression as the Swedish "*Leve konungen*" (English "cheer the king…!") is the rest of *present tense subjunctive in optative use*. Hence a wish as a positive possibility, connected with the subjunctive.)

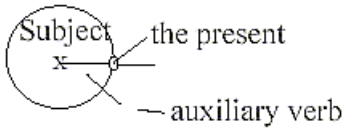
It sounds probable that *auxiliary verbs* have developed from these later moods within Indo-European languages, those moods that represent the only potential, imagined or wished - in this sense the internal of the subject? Subjunctive verb forms are in Swedish for instance alternatively expressed through auxiliary verbs for passed time, in this sense in the inward direction of time:

("O*m det vore så* = O*m det hade varit så*…" = If it were so... If it had been so...)

Tenses, auxiliary verbs: — step 1 ← 0/00:

1. Tenses are tools for the time aspect relative the present in the situation of speech. They become parts in the angle steps of time displacements through levels.

2. The subject as a centre, geometrically first as origin (the 0-pole) becomes toward higher levels a growing circle, The auxiliary verbs for past time could be regarded as internal radii within the subject. (A verb as "*be*" is a basic form as a radius without directions.)



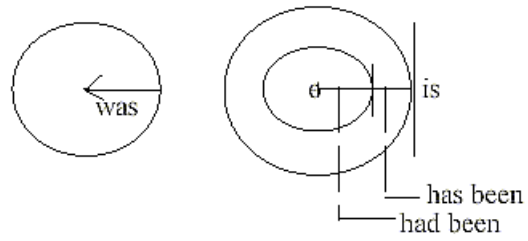
3. With the subject centre displaced to its surface, its circumference, as in possessive position, the radius gets the direction inwards the past: the auxiliary verb marks the time displacement inwards.

The possessive as the case for "ownership" (normally for nouns) is an expression for this position of the subject at its own surface, enclosing its belongings or possessions. In Lappish also verb stems may be in the genitive and in Uralic languages more generally the genitive is also used to indicate points of time and time periods.

According to one opinion possessive suffixes in Uralic and Turkish languages have originally been combined with expressions for completed actions. (*BC,u*). With the geometrical view above this seem natural.

In an Indo-European languages as Swedish (also in English) the auxiliary verb for ***past time*** is ***ha*** *(*have*)- hade...,* a verb for ownership too (Swedish "*innehav"*). An enclosing word. In opposition to this the auxiliary verb for ***the future*** is ***skall*** (= shall), a word which originates from *skuld*, (meaning *debt*), the opposition to ownership in economic terms (!).

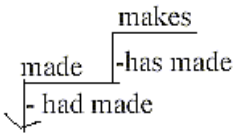
These auxiliary, "possessive" verbs imply also terminated activities. Demarcations as shells are creations of inward direction.



Perfectives of auxiliary verbs for the future as s*hall - should* become connected with e.g. subjunctive *moods* above. They get an anticipating character, as from a still larger incorporating circle (In real outward direction towards the future there are strictly speaking no such angle steps defined. *He will have finished this work tomorrow*: in such a phrase the speaker has already positioned himself at a point in the future.)

The relation between auxiliary verbs and main verbs should be possible to interpret as a relation between different co-ordinate axes, including a displacement in tense. (A language as Swedish has 5 tenses, 3 for the past, 1 for the present and 1 for the future.)

The changes between progressive and terminated activities as between continuum and quantum jumps could be compared to the steps in a ladder: horizontal resting-planes varying with level steps.



Time displacements inwards ***"inflect"*** verbs in languages as Indo-European through a change backwards in the word stem of the vowel. The "strong verbs".

This "mutation" goes often to a more inner vocal. Both seem to express the past as a "genealogical tree" inwards.

The vowel changes in word stems when the verb is substantivized is of the same kind. Swedish examples: *springa* (run) - *sprang* (ran) - *språng* (a jump) - *ligga* (lie) - *låg* (lay) - *läge* (location); *stjäla* (steal) - *stal* (stole) - *stulit* (stolen) - *stöld* (a theft).

These vowel changes for past time and nouns for the activity are both characterized in direction and enclosures respectively by inward direction. So does direction inwards, ~ past time, transform to "circular" structure, ~ nouns, in the dimension model.

Duration — step 2 ← 1:

The differentiation between progressive and terminated activities has the general character of continuous versus quantified (00 versus 0 in our model - or perhaps d-degree steps versus d-degrees). One argument here for interpreting this differentiation as an expression in d-degree step 2 — 1 is that it concerns borders for actions, "perfective", borders similar to enclosing surfaces (d-degree 2). (Inside ~ finished, enclosed; outside ~ open, not terminated.) Cf. the poles 2a / 2b of d-degree 1.

In Uralic languages there seems to be 3 polarizations as for duration aspects (*BC,u*):

a) *momentary — durative*
|
b) *durative* polarized "*rapidly*" — *terminative.*
|
c) *terminative* then polarized: *ingressive - perfective*

a) The first polarity is easily identifiable with the poles 0 and 00, quantified - continuous. They could be compared with poles 1a and 1b in our model: "motions to each other", defining a centre, quantifying, and "motions from each other", defining distances, a durative type.

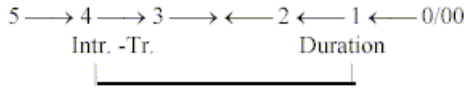
b) The second polarity could possibly be interpreted as d-degree 1 ("*rapidly*", a quantified linear series?) - with its outer poles 2b/2a.

c) The third polarity should then be these poles 2b and 2a, for start of a durative activity and the closing down of it. That implies borders (in this sense 2-dimensional, for the activity.

Intransitive /transitive verbs — step 4 → 3**:**

Intransitive activity concerns the subject itself, as a person is a whole in itself when sleeping. That means it's double-directed outwards/inwards as d-degree 4 unpolarized.

As said above it implies a state, related to the concept "condition", therewith also including a connection with the concept *duration* as in the loop model.

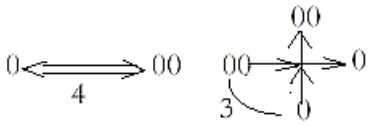


Transitive verbs are unidirected as activated working forces with explicit directions. We get the polarization into active - passive forms:

- The **active** form binding the subject with an object as 00-pole and anti-centre on the circumference.
- The **passive** making the subject an object in itself.

Hence the relation Intransitive → Transitive corresponds to a step 4 → 3.

Outer poles of d-degree 3 are 4a and 4b, in our model assumed as perpendicular to one another, the inward direction transformed to a circular geometry.



How such a geometry eventually appears in passive verb forms of languages may be left as an open question. Semantically the passive could be said to make the subject to an encircled object.

The opposition *intransitive - transitive* is in a language as Swedish often expressed through ***vowel change*** in word stems: *sova* (sleep) - *söva* (get to sleep)*, ligga* (lie) - *lägga* (lay)*,* in similarity with tense changes in strong verbs.

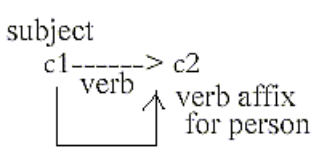
Conjugations after person singular - plural — step 3-2:

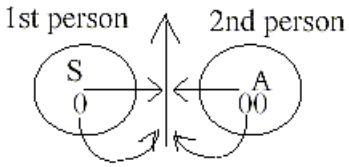
This differentiation concerns persons, that is nouns, here d-degree 3 as class of words.

Verb suffixes get the character of "pro-nouns". They may be regarded as a result of the displacement from the "I-You"-situation of speech to the describing sentence and principally 3rd person, where also the I and the You may get character of references.

While most of the verb suffixes for persons seem to originate from the word class pronouns, it's doubted now that those for 1st and 2nd person really do so in Indo-European languages. (*BC,s*). Here the original situation of speech with Speaker - Addressee as 0 - and 00-poles, before the "tangential" co-ordinate axes of relating sentences develop, could be responsible for that doubt.

In Uralic languages it seems that 3rd person not was expressed as verb suffixes but in a substantival construction, a noun derived from a verb, something which further supports the interpretation of this differentiation with d-degree 3 and the step 4→ 3 as verbs to nouns.





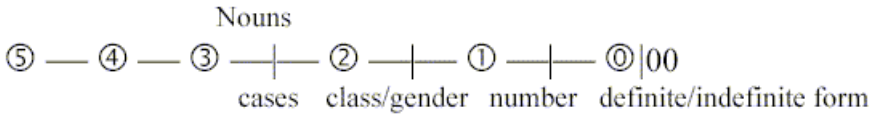
It's curious but significant that the suffixes for person originate from *possessive* pronouns, not the nominative ones.

Also this fact seems pointing to the centre displacement in the situation of speech, and pronouns as referring backwards to something mentioned, *geometrically* similar to the person at its circumference as an "owner" of his content.

Differentiations of Nouns

4 types of differentiations seem in force for nouns - at least in IE-languages as Swedish and English: *case - gender / class - number - definite/indefinite form*. (Fewer then than for verbs, perhaps possible to see as a consequence of nouns being of lower d-degree than verbs in the interpretations here?)

Can these differentiations be related to different d-degrees? From some aspects such connections could look like this:



Cases:

Gender/class - number and definite/indefinite form are categories applied to the noun in itself, already separated from the sentence as a whole. Cases on the other hand, as *nominative, accusative, genitive, dative, instrumental, locative* etc. concern the functions of nouns in the whole sentence, designing their grammatical relations as subject or object, receiver or actor, position or instrument etc.

Case forms are in this sense derivable from an underlying level or higher d-degree than the other determinations. They are expressions for “syntax” as structure of the whole sentence. Syntax as step 4 - 3* operating on next level of word classes, here the nouns.

Case marking includes relations between verbs and nouns, directions in relations as subject - object and functions within attributive and adverbial determinations.

In the case forms there is more left of a “geometrical feeling” as some linguist wrote, and cases have been called a "deep structure". It's reason here to remind of the geometrical analysis of cases by Roman Jakobson, mentioned in first file.

* For a discussion on this view, see Syntax .

Regarding the differentiation in the roles of nouns as steps of displacements in a dimension chain, a development could be sketched from subjects to nouns as objects to more and more secondary roles in the sentences:

a) Primary subjects out of the situation of speech, speaker - addressee as poles 0---00 of d-degree 4 from step 5→ 4. *Subject* as a clause element.
b) With the geometry developed through step 4 → 3 the subjects are displaced to the *nouns, a word class*.
c) Through step 3 → 2 a further degrading of the nouns to *objects* and other *oblique cases*.
d) In following steps -2 → 1 → 0/00 the roles of nouns get features of *adjectival* and *adverbial, attributive roles*, nouns as tools, means or pure material - or as nouns in *time and space determinations*.

The more and more complex geometry in the sentence expressed through cases and/or later through prepositions.

There are further differentiations within a certain category of cases - as a 3rd ”fractal” level of development - which explicit features of underlying geometries:

Uralic had originally 6 cases, divided 3 - 3 (*BC,u*): 3 for primary roles of the subject or noun as nominative, accusative or genitive, 3 for locatives. Compare in the dimension model d-degree 3 polarized 3a/3b into the complementary poles Mass and Space on the physical level.

Further, in Uralic the 3 locative cases are polarized in 3 for something inner / 3 for something outer, which simultaneously have features of the opposition Mass-Space and corresponds to poles 2b/2a of d-degree 2 in our model, one geometrical definition of these being *inside / outside*.

The 3 locative cases of *Primitive* Uralic are described as below (d-degree figures added here)

4 *Translative* - for direction…
3 *Essiv* - for location, position; lasting, presence…
2 *Partitive* (separative) - for separated part of something or removal…

It's categories that easily may be related to d-degrees 4 - 3 - 2 respectively in a semantic sense, even if the use of those cases are said to have much more varying meanings.

Number of cases:
As for the number of cases in different languages, it looks like they originated from a dimension chain in the form $2x^2$ (!) - also the number series behind electron shells of atoms in the Periodic system.

			18					6		
$2x^2$	50	-- | --	32	---	**18**	---	8	-- | -	**2**	-- 0
x ½ =	**25**		**16**							

25* in Hungarian, 16 in Finnish (from the 6 in Old Uralic),
2 in Indo-European, which became 6 in Latin, 5 in Old Greek, 4 in Old Swedish.

*(Statements about number in Hungarian vary: according to *BC* the number was 21 of which 18 were newer.)

Gender and Class adjuncts:

Class and gender determinations have a roughly adjectival character or function but of more fundamental kind than other adjectives, still built-in, not debranched. Hence here regarded as following from step d-degree 3 → 2 → in this secondary dimension chain of nouns.

They imply segmentation within nouns as such and may leave their marks on the word class adjectives as well. It's said that they also may affect verbs in some languages. Cf. verbs as radii, representing one pole of d-degree 3.

Bantu languages are said to have 12 class prefixes for living / not living nouns, different categories of animals etc. etc.

The division of nouns according to geometrical forms in Chinese has been mentioned before: as in spatial, flat, spread out, long and narrow things etc., as of d-degree 3 - 2 - 1... respectively (!).

Number: Singular - Dual - Trial - Plural:

This kind of differentiation can mark both Pronouns, Verbs, Nouns and Adjectives.

D-degree 1 makes up the foundation for numbers, one reason to regard them as a differentiation in last step of the dimension chain.

On the other hand they reflect the fundamental principle between first poles 0 and 00 as the polarity *units — multitudes* in the model, which give its character to poles of all d-degrees. Further, d-degree 1 is represented by each step in the dimension chain, which may be a cause for numbers differentiating forms of all the four mentioned word classes.

The ***dual*** may be regarded as an expression for the polarization principle as such, into two poles in the model.

In inflecting languages there are ***vowel exchanges*** in some words between singular and plural forms of nouns, as English *foot - feet*, Swedish *bok - böcker*, in similarity with tense changes in verbs.

The common geometry could be identified as inward ~ backward direction towards past tense in verbs, and inward, convergent direction towards one unit (a 0-pole) in numbers; outward direction for present tense in verbs and outward, divergent direction towards multitudes (the 00-pole) in plural forms. (In the mentioned two examples the vowel for the unit is also an inner one, with tongue drawn inwards, the plural form an outer vowel.)

Repetition as expression for plurals replaces inflections or affixes in some languages, also sometimes acting as substitute for the conjunction *and.* In our model its hypothezised that the straight way 5 →4 → 3 → 2 → 1 → 0/00 could lead to *repetitions* (poles 1a/1b of d-degree 0/00 as oscillating motions "to and from each other"), while the loop model with opposite directions meeting in step 3-2 could be regarded as the way leading to development of *new levels*.

Ordinal numbers as *first, secondary…*are numbers appearing as adjectival attributes or in adverbials. This connects also numbers with the step 2 — 1 in the underlying dimension chain of word classes. (D-degree 2 leading to d-degree 1 is the only step in the dimension chain implying a mathematical halving.)

Dual forms disappear "*with increasing soul cultivation*" (sic!) according to Björn Collinder. Why not rather with a decreasing one?

Articles, definite - indefinite forms:

This differentiation can be regarded as another aspect on the polarity between 0- and 00-poles, the singular, individual thing or noun pointed out and the more diffuse, generalized concept as connected with multitudes. In terms of our model: "motions towards each other" (pole 1a) define a new centre or 0'-pole, "motions from each other" (pole 1b) define a new anticentre, a 00'-pole.

In Uralic for instance the plural can in certain contexts be replaced by a kind of *collective singular*: a multitude and indefinite collective (as a circular enclosing concept; a circle as circumference and 00-pole in relation to the origin).

In a language as Swedish both article and definite form (coupled) express at the same time class (2 in Swedish) in singular. Hence, all the last three differentiation steps of nouns, *class - number - definite / indefinite form*, are combined, but only in singular and definite form (and article). Why? Probably because class represents a deeper level, a higher d-degree, and as such a differentiation in direction from the 0-pole and

therefore gets applied to units only in singular and definite form in direction outwards the 00-pole.

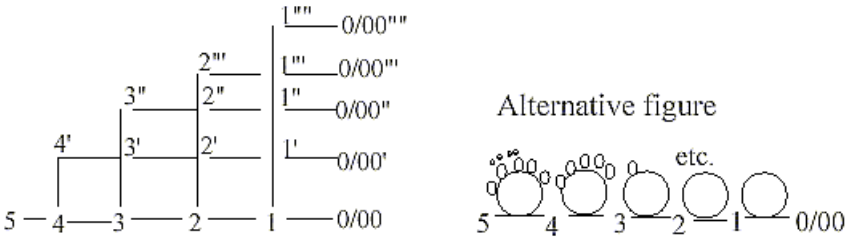
The articles or affixes for definite - indefinite originate always from *demonstrative* pronouns, implying something individual pointed out, in the development from inflecting towards analytical languages (*PW*). Hence the are coupled to pronouns as word class. (See about pronouns below.)

There is implicitly a vector character in definite articles or affixes, and we have the 0- and 00-poles as "outer poles" or partial structures from the polarization 5 → 4, defining d-degree 4 and physically vectors in the model.

To unite all these aspects on the word classes with application of the dimension model, each step in a primary dimension chain is assumed as developed to secondary dimension chains - in similarity with *fractals* - and the result becomes a *level* chain. Word classes become levels in this chain.

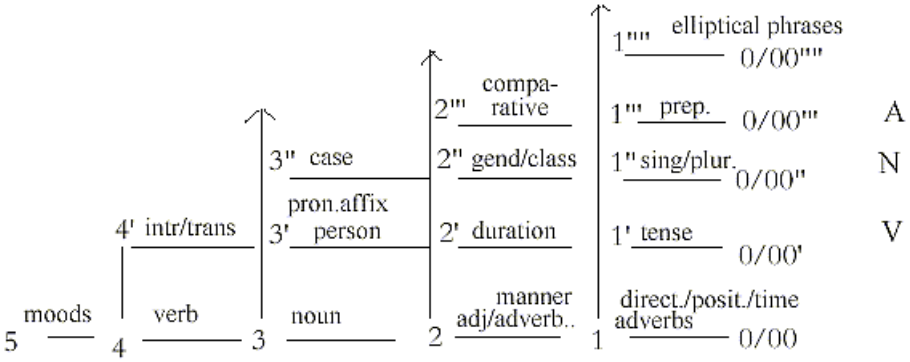
An outline of such a level chain, with many exclusions:

The principle:



(Surely 3 and perhaps more co-ordinate axes would be needed to illustrate all the differentiations.)

With differentiations abbreviated:



The scheme could also elucidate why many differentiations that seem to be connected with only a certain word class, also influence others - as vertically connected, as gender also may influence verbs and adjectives, cases both pronouns, nouns and adjectives and such things.

Pronouns - Prepositions:

1. The development from affixes to separate word classes in languages referred to here seems as a clear illustration of the main feature in the applied model: the debranching degrees in steps outwards toward lower d-degrees.

In simple terms of our dimension model:

Prepositions are
a) the vector character of d-degree 4 debranched to a position before nouns in the step 4 $\rightarrow$ 3, where the verb also transforms to radius, a pole of d-degree 3,
(4 = 1 + 3),

b) the same vector character, debranched to d-degree 1 in the loop model (”the other way around”) become vector-adverbs, closely related to prepositions.
4 $\rightarrow$ 3 ... +1.

(Through step 1 $\rightarrow$ 0/00, when verbs become equivalent with Motions, d-degree 0/00, the prepositions express the vector character in our concepts ”motions to and from each other”.)

Pronouns may, as proposed before, be regarded as originating from outer poles 0 and 00 of d-degree 4 of verbs in the primary speech situation speaker - addressee(s).

In secondary types of sentences they become ”*references*”. In this sense they too reveal the vector character of ”Direction”, d-degree 4 in our model. Verb affixes get debranched to secondary “pro-nouns”, replacing nouns as the ”circular”, enclosing pole of d-degree 3.

Both pronouns and prepositions appear as quanta of *the binding force* in sentences: pronouns expressing relations in the whole speech situation and displacements in types of sentences, prepositions expressing the very transformational relation in word classes V-N, verbs-nouns.

Prepositions could perhaps be compared with “group-transporting enzymes” on the biochemical level: prepositions as expressions for the transporting mechanism itself. As such they may be compared with ***lexical derivations*** on a superposed level.

”**Form-words**” or ”functional words” are the linguists’ name for this kind of released elements.

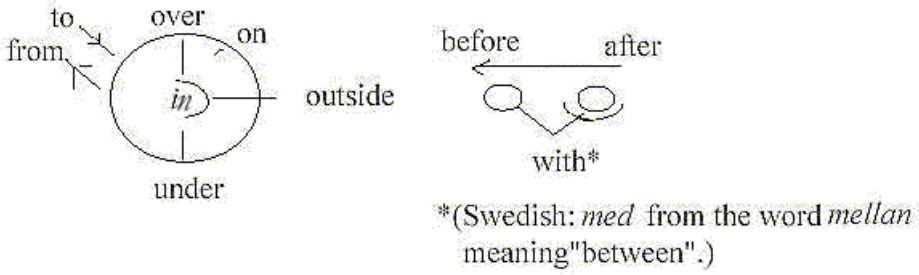
A development towards such free form words has been going on not only in Indo-European languages but also in other ones. A couple of statements:

Only about 50 % of pronouns were developed in the daughter languages of Latin in the 12th century. Etruscan had pronouns but not many traces of prepositions.

Prepositions

1. To sum up they express a) *directions*, b) *positions* and can in application of our dimension model be regarded as essential elements of d-degree 4 (Directions) and d-degree 3a (Space, “pre-position”): elements which debranched give prepositions as a separate word class.

They represent the most pure *geometrical* elements of word classes. Many of them also with the most obvious polar character, divided in pairs of opposites as *to - from, in - outside, above - below, over - under*...



Prepositions as displacements of elements in higher d-degrees 4 and 3 becomes also expressions for the displacement of nouns as subjects to nouns of secondary (oblique) and tertiary roles in the sentences, as to dative, locative, instrumental function…

Compare for instance "*he saw her*" with "*he looked on/at her*": in first expression "*her*" is only linguistically an "object", in the second expression also semantically more of an object, a locative or ...

2. Some statements by linguists about origin of prepositions, probably (?) limited to certain languages as those from Latin:

a. Case forms are described as derivations from noun stems. (*BC,s*)
b. A case form of a noun becomes prepositions, e.g. in Hungarian *benn* → *bél*.*
c. Prepositions have developed from case forms of nouns and pronouns - and from comparison forms of adjectives and adverbs.
d. Prepositions may in general be traced back to adverbs. (*BC*).
   [Cf. that that many Latin adverbs were said to be case forms of nouns that "have gone astray".]
e. One example: A unit *kata* (meaning "in the descension") with adverbial sense, moved to a position before the noun or before a verb, transforms it to a preposition, and creates these as a word class (*PW*).

*b. Compare in this example *n* and *l* with interpretation of *phonemes* and *their semantic roles* in chapters below..

Hence, one main statement or proposition here implies that prepositions first appeared as ***cases*** in what we here have regarded as the secondarily developed dimension chain within nouns, before they got released to form-words. The second that prepositions would have their origin in adverbs, more in agreement with our view on the loop model above.

It's curious that prepositions with an obvious vector meaning don't seem to have been parts of verbs. In Swedish for instance the verb *tillhöra* (belong to) may just as well be expressed as *höra till*, the preposition *till* (to) separated to position after the verb: 4 → 3 + 1 in terms of d-degrees. It would imply that most verbs early were transformed to radii in d-degree 3 in relation to nouns in roles of subject and objects - according to views on verbs above. Only in verbs as *come - go* does the higher d-degree of speech situation remain.

However, the near connection between many kinds of *adverbs* for directions and *prepositions* reveal such relations between verbs and prepositions.

The only difference here is that in the adverbs (the type "vector-adverbs") the direction is the main topic, while preposition need a following noun (per definition!), a definite localisation, representing the step 4 → 3 in our terms.

This differences seems as originally connected with the one between *intransitive* and *transitive* verbs, the step from d-degree 4 unpolarized, "double-direction", to its polarization, implying transitive verbs:

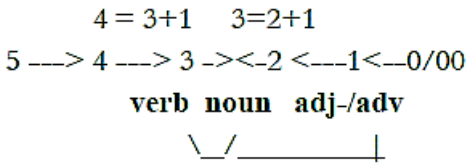
- the vector-adverbs derived from *intransitive* verbs originally,
- the prepositions from *transitive* verbs, radii directly connected nouns.

Cf. the difference in the preposition *på* (= on) in Swedish: "*köra på* (stressed) *någon*" (= drive into somebody) and "*köra på vägen*" (= drive on the road). In the first phrase *på* belongs to the verb as "ad-verb" on its way to a preposition, in the second phrase, unstressed clearly pointing out a position as "pre-position".

It was said that case forms of nouns also influenced attached adjectives, hence perhaps also the comparable "How"-adverbs (?), so to speak the straight way outwards in the dimension chain.

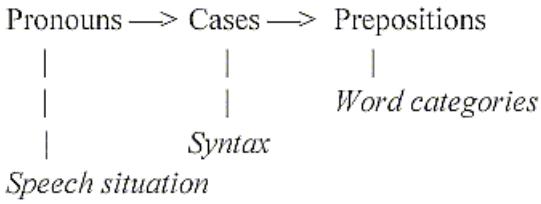
It was a third point in the linguists' statements above that prepositions also would derive from comparatives of adjectives and adverbs. Why precisely comparatives?

One answer could eventually be that these comparatives represent *steps* in gradients towards higher or lower d-degrees - as in fact the whole dimension chains in the interpretations here? In a deeper sense the comparatives may be regarded as derivations (or integrations) as such?

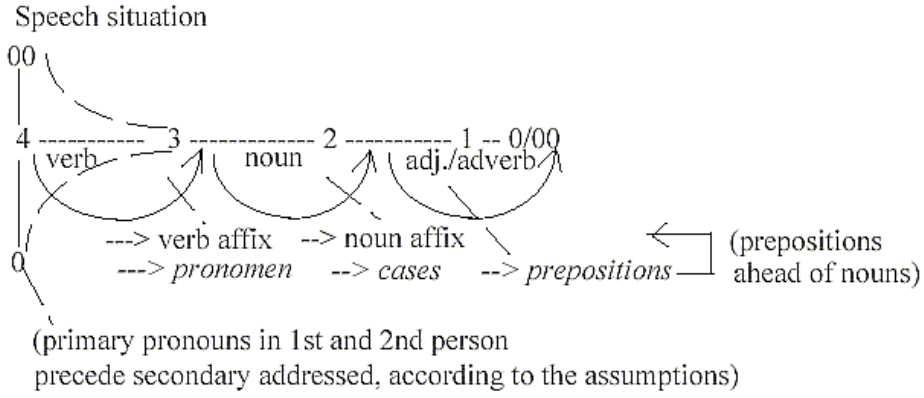


About pronouns it has been assumed that certain **case** forms (syllabic ones) originally have been **pronouns**. (*BC,u*).

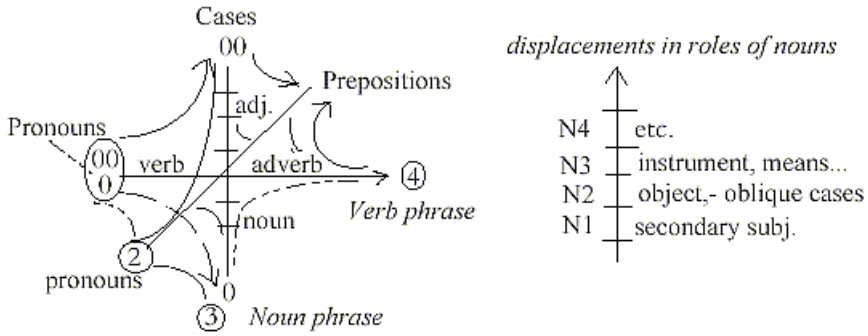
Together with the statements about propositions we could get a picture of a trend as this below, with pronouns, case affixes and prepositions representing first three levels in the *level chain* of linguistic analysis:



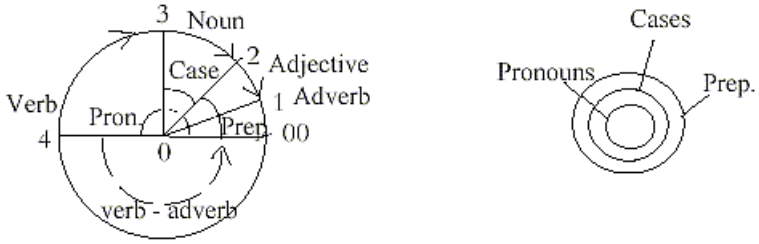
- Pronouns suggested as derived from the situation of speech as most underlying level, originally the relation speaker - addressee and references from there to 3rd parts.
- Cases regarded as expressions for next level, the Syntax, representing the differentiated geometries between parts of speech.
- Prepositions more restricted to word classes as verbs and nouns.



A rough outline of the relations if imagined as 3 crossing co-ordinate axes?



Or as angle steps (projected in the plane):



Pronouns

Pronouns are a very differentiated word class, by linguists divided in a bit different ways.

Here suggestions on how to look at these different categories of pronouns in agreement with the dimension chain:

(5) → 4

Demonstrative <—> ***Interrogative***:

- These types seem directly dependent on the situation of speech, connected with directions of the whole sentence. Demonstratives have a typical vector character of d-degree 4 and simultaneously define a centre, as in first place a 0-pole.

- The interrogatives represent the undefined anticentre, the 0-pole, and also inward direction of sentences in opposition to statements as outwards, marking the "definitive". The pointing out versus questioning becomes related to moods of verbs.

(English has two demonstrative pronouns, *this* and *that.* Eskimo has about 30 such demonstrative pronouns (!). (*CEL*). (30 = sum of poles in a dimension chain.)

4 → 3:
Personal: nominative, accusative, dative... :
- Personal pronouns in nominative as *he, she,* are believed to originate from demonstrative pronouns, if so from the preceding step above.

(1st and 2nd person are here regarded as related to first poles in the situation of speech (0 — 00), speaker - addressee.)

The angle change to describing sentences and subject - object relations implies also a displacement of personal pronouns to secondary relations as objects, accusative and dative forms...
The fact that these steps to object, dative etc. include *vowel changes* in the word stems of our IE-languages, indicates their very central function (of high degree) in speech and their close relations to verbs that have the same change.

With verbs originally characterized by d-degree 4, as vectors, it's logical that verb endings developed to separate pronouns (in Latin) preceding the word class nouns of d-degree 3 as "pro-nouns".

4a —>3 <— 4b:
Reflexive pronouns (*yourself, oneself*) may be compared with *secondary forms of personal pronouns* in e. g. accusative or dative but refer back to the subject itself. They may be related to the polarization of verbs into active - passive forms (poles 4b = outward direction, pole 4a = inward direction)

About Swedish, it's said that the *s* as in the passive verb suffix, e.g. *kallas* (= is called) has developed from the reflexive pronoun *sig* (= himself, herself...).

There is the clear difference between *kallar sig* (he calls himself) and *kallas (*is called): In the reflexive pronoun he is the Subject, while *he* in the passive verb form is only, in reality, an object. Hence, the development from reflexive pronouns to passive verbs agrees with the displacement Subject → Object of nouns and pronouns.

The reflexive pronoun *sig* originates in its turn from words for *self* or *own*, words for the "I" that has been certified and confirmed, substantiated. Cf. possessive pronouns in next step.

To reflexive pronouns the *reciprocal* may be added, as *each other,* a dual or plural version.

3 — 2:
Possessive, as *his, her or hers,* implies a referring inwards, the owner at his anticentre, at the surface of what is possessed, the real noun or topic as enclosed within. (Cf. about the auxiliary verb "*have"* in the verb-file.

Possessive pronouns originate from case forms of "*reflexive* verbs", that's passive verb forms, so it's said about Swedish (*SEO*). They are also expressed through the verb ending -*s* in Swedish, the same as in passive verbs.

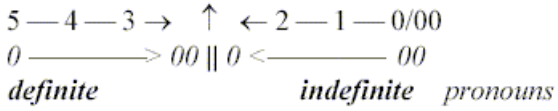
We should thus observe that semantically the *owner* in fact becomes displaced as to the role of an object at anticentre semantically, while that which is owned has raised to the Subject, more or less owing its owner. A turn in the relation in this middle step 3 - 2 when regarded in the loop model.

3 —> ↑ < — 2: *Subordinate clauses:*
Relative *pronouns* as "*which"*, refer forwards (or "upwards") to something coming, introduces subordinate clauses.

It has been proposed above that subordinate clauses could be regarded as level developments in step 3 →↑← 2 through the opposite directions in the loop model of a dimension chain. These clauses (more or less elliptic.) make something mentioned to a new start as subject, a centre.

All the mentioned types of pronouns above but for the interrogatives are called "*definite*" or "*determinative*" as references to certain things, in opposition to more generalizing things, the "*indefinite*" pronouns. Compare the opposition between centres and primarily undefined anticentres, the underlying polarity 0 <==> 00.

In the loop version of the dimension model we get secondarily as in a haploid chain degree 00/0 in the middle step:



The ***indefinite*** pronouns have been divided into "*quantitative*" and "*relational*" ones*,

- *Quantitative* as *all, each, many, few, much, one somebody, nobody...*
- *Relational* as *another, same, such, first - last, inner- outer, upper - lower, east - west*

Most of them can appear as in an adjectival function before nouns (and may as adjectives become inflected in agreement with the nouns). Some are also substantival and can stand alone as nouns in sentences.

* (Source here: *Swedish Wikipedia, from Hultman, Tor G.: Svenska Akademiens språklära*, Stockholm 2003.)

2 - 1:
The "quantitative" pronouns could thus at first be regarded as connected with the word class in step **2 - 1** for adjectives. Note that outer poles of d-degree 2 is 3a and 3b, (3b — 2 — 3a) poles which represents a dissolution of d-degree 3 as nouns but can replace these as substantival.

Swedish *någon* (*somebody*) is said to be an abbreviation of a subordinate clause *jag vet inte vem* (I don't know who...), which also connects this pronoun with the mood type of questions and *interrogative* pronouns.

Swedish Ingen (= nobody) comes from *en* (one) and a suffix *-ghi(n)* that first represented a generalizing sense, (cf. the 00-pole), later a denying sense. Compare the opposite direction to the mood *indicative*: pole 00 representing inward direction in types of sentence, associated with negations or questions.

Many quantitative pronouns are naturally also closely related to the "word class" of numbers, here earlier regarded as basically built on d-degree 1.

1 - 00:
The "relational" pronouns mentioned in this grouping include relations in positions as *upper - lower* and for instance points of the compass... The are all "adjectival" in possible position before nouns like the quantitative. Yet, many of them appear as parts of *adverbial* expressions and are related to vector-adverbs and corresponding prepositions. Most of them have the typical vector character of directions of the type *right - left* and express polarizations between complementary poles.

In these respects they could be may be regarded as pronouns originating from the word class step of adverbs 1- 0/00.

It should be observed that with the loop model we have inward direction in the chain from 00: 3 → ←2 <— 1 <— 00, which would imply that adverbs can develop to adjectival function and these to substantival positions in sentences as often is the case.*

Both the *quantitative* and the *relational* pronouns include many of comparing type. This character is also a typical feature for adjectives and "how"-adverbs, which supports the interpretations here.

* In the elementary geometries of the dimension model inward direction from the 00-pole in d-degree 4 transforms to circular (enclosing) structure in the step d-degree 4 → 3, in languages the nouns.

In the inward, synthezising direction of the whole chain as "haploid" the same implies an aggregating, enclosing force, which stepwise may transform adjectival an adjectival properties into encircled noun character, that is in a more generalized way.

We could compare with the formation of an atom as created so to speak from inside the 0-pole, with the aggregation of big celestial masses (one multitude) through the gravitational force from the 00-pole.

Compare also the spontaneous creation of e. g. the nucleic acid Adenine in adequate solutions when energy is supplied, with the very circumstantial way of its synthesis in our bodies: Note *circum*-stantial, as "the other way around" in our loop model, a turn to the synthetic direction inwards.

Conjunctions:

About two other so-called word classes: *Interjections* should perhaps more adequately be interpreted as one kind of mood (?), a very elementary first one, and not a word class.

Conjunctions such as *and, or, if, because etc.* representing additions or alternatives or relations to subordinate clauses, are here hypothetically proposed as elements of syntax

In the middle step 3 → *conjunctions* ←2 of the loop model, leading to subordinate clauses (*if, because...*) as a new level - or (words as *and, or*) just repetitions or alternations ("straight outwards towards 0/00 in the chain) between words of the same class.

Lexical Derivations

Linguists talk about lexical derivations when word stems through addition of derivative endings changes the word class.

Such transitions become very natural with application of the dimension model and word classes identified as have been done above.

Derivation in mathematics implies a stepwise decrease in degrees of a function as in the dimension model. In the enlarged context here the ”derivations” go in both directions - and also within the same word class, for variation of sense: e.g. the verbs *form - formalize*. (See a Swedish example at end of this file.)

The derived word is ”subject to” the special differentiations belonging to that word class which is created: tenses, cases, comparisons...

The general principle reminds of ionizations in chemistry when a molecule as for instance CH4 is ionized and the H-atoms are replaced by other elements.

The derivative endings seem to have a certain similarity with "**determinants**" in early ideograph writing, the special signs in hieroglyphic writing that were added for the meaning to get closer specified, for narrowing down the class of meanings.

The origins of lexical, derivative endings can be traced back to other verbs, nouns (also adjectives?) or rests of such morphemes. One Swedish example: the ending *-lig* transforms many noun stems to adjectives: *form* → *formlig*.* This ending originates from a word *lik* = body, figure or shape.

Here we can remind of the 5 types of quality adjectives (*RB*) mentioned about adjectives before: 3 from verbs including participles, 2 from nouns. One example: *form* → form<u>ing</u>

The **"noun disease",** tendency to use substantivized verbs instead of verbs in formulations in our languages as Swedish and perhaps related ones, is e.g. *apply - applying - the application of* could lie inherent in the linguistic laws: the natural step of development from d-degree 4 to d-degree 3? . This on the level of word classes, in outward direction. (Perhaps limited to some types of languages, as the inflecting ones?)

The many transitions from nouns to adjectives and ”How-adverbs” another: stone → ston<u>y</u>, heaven → heaven<u>ly</u>…

Number of derivative endings, used for the transitions between word classes (V-N-A...) in our related languages of today, are limited, which indicates that these derivations are part of a principle in a system, not only lexical.

They could in numbers and function be compared with the limited number of coenzymes in relation to protein enzymes in cell biology: *c*oenzymes subdivided according to what they transfer: protons, electrons or small molecules, the ”group-transporting” ones...

One reason for the limited number of these derivative endings could be that they at first and separately only represent the abstract structure of a word class, the steps between categories of words.

Calculating with both the primary and secondary dimension chains (the lsatter for differentiation within a word category) in a 2-dimensional co-ordinate system, we could

get 5 x 5 derivative endings (in a first round?). 25 is also the number of coenzymes in the file referred to above.

Compare the 25 case affixes in Hungarian?

It seems to be an old linguistic question how lexical derivations relate to inflectional patterns (*RB*), to syntactic affixes, case endings etc.

Linguists have found many similarities between subcategories of case endings and lexical derivations **(***RB***)**. Hence, it would be possible to regard these as results of corresponding principles on different levels of language.

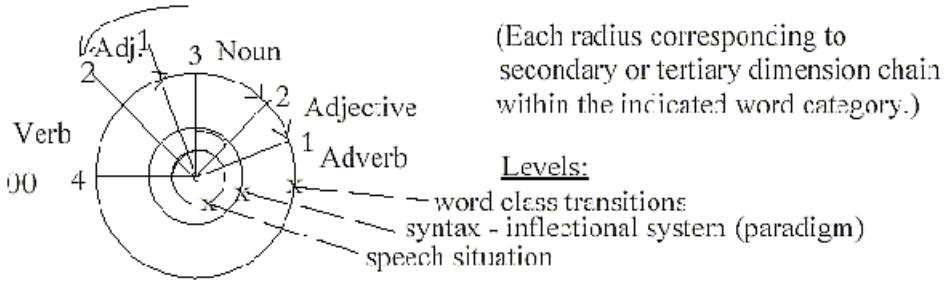
The correspondences, which give the similarities, are here suggested to be dimensional differentiations according to the model here.

Cases are a differentiation within the word category of nouns.

- Cases -represent a secondary developed ("fractal") level, however with many syntactical implications, as the difference Subject - Object with impact on word order and with endings having adjectival sense as instrumental case etc.

Hence, cases have a relation to ***syntax***, which the lexical derivative endings haven't.

A suspect figure:



- Both nouns as such and cases in the chain of differentiations within nouns are here identified as in d-degree steps 3--2 - in different dimension chains related x → x'.

(The geometrical character becomes naturally of a more secondary derived type on the level of cases.)

- Compare too that in the super-chain of levels here the word categories as such are assumed identified in d-degree step 3-2 (in relation to Syntax in step 4-3) and Morphemes in step 2-1:

5 ——— 4 ——— 3 ——— 2 ——— 1 ——— 0/00

Speech situation --> syntax --> word categories <-morphemes <-phonemes

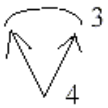
A third fact to mention here is that verbs, nouns - and adjectives often originate from the same morpheme (*LB*) or originate from verbs (in Indo-European and Semitic languages), e.g. *grow - grass*… This branching of morphemes could represent a third level, a deeper one in the gradient from phonemes towards whole sentences (in synthesizing direction).

Should these three things, *morpheme branching*, *case endings* and *lexical derivations* be regarded as three historical phases in development of IE- and Semitic languages, creations of the same principle? And/or as referring to three different levels of language:

the *morpheme level* - the *word class level* and *syntax level* in our scheme level 2 - 3 - 4 ? (Both the levels of word classes and of morphemes, 3 and 2, are more or less lexical.)

Syntax 4 → 3 → Word classes ← 2 ← Morphemes 1
cases lex. derivations branching

The geometrical poles out of step 3-2 are in our model elementary proposed as *radial* versus *circular*:



The lexical derivations may be regarded as the circular component, bridging over between word classes, while the branching of phonemes implies a radial component.

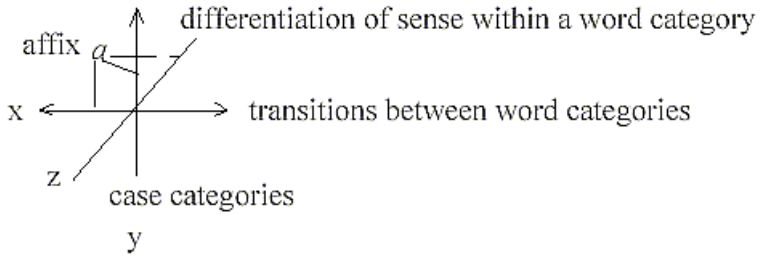
Or: from Syntax - in *outward direction* - from the whole sentence to phonemes: the radial component giving the word class differentiations. While, from the level of Morphemes - in *inward direction* - additions of morphemes (from reduced word class words) give the "circular" component, the bridges between word classes.

Note the two opposite gradients of the big level chain of linguistic analysis.

Compare also the two kinds of generality connected with 0- and 00-poles respectively, the deeper integrating one from a common centre, the 0-pole, and the superficial aggregating, surrounding one from outside, 00-pole, in terms of the dimension model.

The lexical character of derivations (something learned from outside) seems also emphasized in the statement (*RB*) that many such derivative endings are **loans** from other languages. (In accordance with *RB's* distinction between individual affixes and abstract lexical rules.)

Much in accordance with our model is the view (*RB*) on the relation *cases* - *derivative endings* as along 2 co-ordinate axes:



We should naturally regard each axis as representing a whole dimension chain and count on more than two.

Affixes are seen as points on one axis with 1 co-ordinate, or in one of the plane quadrants with 2 co-ordinates, or in a space quadrant with 3 co-ordinates? The same affix can be used in more than one of the roles.

Each co-ordinate axis can be moved along another one, which provides a basis for the many parallels between case forms and sub-categories of "lexical derivations" that *RB* and others have pointed out.

Perhaps the chain for differentiation of verbs should represent the 3rd axis with such aspects for instance as active-passive form, unlimited/limited action or in tense as completed or future / possible action. A relation between an axis for morphemes, one for word classes and this verb axis could relate the words *drink* (V) and *drunk* (Adj.) and *drinkable* (Adj.).

---

* English examples: *form* →*form-a,* →*form-alist.*

Swedish examples:

*

- form	*- form/a*	*- form/ning*	*- form/bar-t*	*- form/bar/het*
- form/at	*- form/era*	*- form/ering*	*- form/lig-t*	*- o/form/lig/het*
- form/el	*- form/ulera*	*- form/ulering*	*- form/al/ist/isk-t*	*- form/ai/ist*
- form/ulär	*- form/elisera*	*- re/form/ator*	*- form/ell-t*	*- kon/form/ist*
Nouns	Verb	Nouns from verbs	Adj. Adv. from verbs, nouns	Nouns from adj. etc.

Syntax

- some reflections -

What is Syntax - or "Grammar"?

It could be repeated here:
- It works as the *binding force* between parts of a sentence as "the whole".
As a binding force it represents a higher d-degree than the separate "words" in our model.

- It is a *testimony of the multidimensional* network in the brain connecting sense in sentences.

- It is the *translation to linear order* of motor articulation from a multidimensional sense.

> This transformation is no easy task. In peoples' oral speech there may be many breaks, deviations, new starts of a sentence etc. To transform thought-nets to linear, written sentences may be one of the obstacles for many to express themselves literary.

Syntax concerns many levels as in a level chain, both the primary word class categories, in itself a whole dimension chain as proposed here, and the secondary and tertiary... ("fractional") developments within these word classes. An embracing many levels it gets a character of depth. Or sooner of height?

Such structures could be resembled with main roots and side roots of plants as "word-bushes" or word-trees with ramifications in mould of memory... - or the same above the ground: syntax then as a "high" level. What is got from the sky is of course equally necessary for the development of plants!

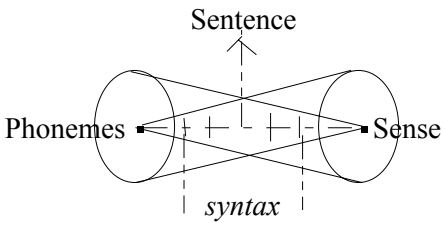
As a geometric illustration of complex structures we could perhaps use the pentagon: the 5-sided regular figure, which if all corners get connected with each other give new pentagons in the middle etc. (See figures at end of chapter.)

From all these aspects Syntax appears as a high-dimensional level as it was supposed to be, representing d-degree 4 in the big *level* chain.

However, syntax varies very much between different languages - also between closely related ones, and it changes over time, sometimes over few decades.

We expect a deeper level of speech production to be more universal, showing more similarities, being closer to the unity of mankind. It obviously isn't. (At least in any simple sense.)

The opposites could perhaps be united if we look at the two gradients of the big level chain in analyzing speech: D-degree 4 of syntax will correspond to d-degree 1 of phonemes, and d-degree 4 in the gradient from phonemes will correspond to d-degree 1 of syntax:



Sentences developed along a z-axis in the figure?

Phonemes and rows of phonemes are referred to "lexicon" and the most differentiating level between languages.

Orders of phonemes are more closely coupled to semantic sense, much closer than word order and syntax: in Swedish: *sak-ask-ska* means "thing" - "box" - "shall". A "wrong" linear order of words in the syntax in a certain language may still be passably understood.

Sense as centre in one gradient develops to order of phonemes, here illustrated by the circles, which also may represent differentiations among languages.

Phonemes as centres in the other gradient develop to semantic sense in opposite direction.

Hence, syntax as a deep binding force among word categories in the middle step, represents simultaneously very developed linear rows of phonemes. Syntax as more superficial, developed to linear structure, represents a deep, high-dimensional level of phonemes.

The gradients could be identified with the two opposite dimension chains of Structure and Motions (motions also geometrical characterized) in the dimension model applied here. Motions from phonemes (individual sounds). Structure from the whole sense:

0/00 — 1 — 2 — 3 — 4 — 5 ← Motions
Structure: → 5 — 4 — 3 — 2 — 1 — 0/00

A related aspect is that outer poles of d-degree 4 in our model are 0 and 00 of d-degree 5 (the "whole"). They define Direction. These poles meet in d-degree 0/00 of Motions (with poles out of d-degree 1 called "motions to and from each other").

This could imply a direct jump (?) to speech from 0/00 (equivalent 5'), viewed in synthezising direction?

Compare that the cranial motor nerve to the tongue departs from "medulla oblongata", a very deep level in the brain (in many aspects representing d-degree 4 in analysis of levels of the brain.)

In the two gradients the debranched degrees in the dimension chain of *structure* outwards will represent the phoneme sequences of m*otions* in inward direction: 0-*1-2-3-4-5*.

We have one(1) d-degree of motion in d-degree 4. (Proposed identified as L-waves on the physical level. Cf. the opposite directions in individual phonemes as implosive / explosive phases in Saussure's analysis.)

This motion, proposed as linear in d-degree 4, may be interpreted as the start of sound rows in the opposite gradient from phonemes.

Hence, *sequences of phonemes* in speech and *development of the syntax* in the other gradient and direction, could be expected as more or less simultaneous, parallel processes.

There is of course nothing universal in *which* phonemes or word order of grouped ones that are picked from the stockpile. Yet, these views are perhaps part of the reasons why we could look at syntax as of high d-degree.

Syntactic elements as lexical pieces:
It has been suggested in an earlier file that the way a certain language expresses such things as genitive, plural, passive form, past tense etc. are captured geometrically and stored in the brain *as lexical pieces*, this then making up a secondary level above the stores of nouns, verbs, adjectives.

Note that the "lexical" *gradient* from phonemes and morphemes stretches along the whole gradient of levels to the developed sense, to the opposite gradient from Sense.

It's an assumption here that children immediately apprehend whole situations and their immanent grammar in the semantic interpretation of this word.

Compare also some children's ability to talk backwards (*CEL*) - revealing a sense for an immanent or underlying duality in directions.

Thus, what may be universal in "grammar" would be that which is common in human minds: the geometrical sense in such categories as genitive, plural, passive form, past tense etc. - together with the conceptions corresponding to the more elementary word classes. Fundamental geometries expressing Direction - Mass, forms - Space, Locations - Time, Distances-Singular/plural and other such properties.

(Different aspect from secondary and third levels of differentiations may be more or less developed by different groups.)

Hence, a genitive - or a plural - or a locative may be identified as universal pieces of grammar, corresponding to geometries which are interpretable in terms of the dimension model as proposed here. While the different ways to express genitives etc. in a language seems mainly "lexical" - having a deep history of developments behind it.

Chomsky has (earlier) seen syntax as a property of a certain language, independent of sense, as pure grammar. We can judge the construction of a sentence as grammatically wrong even it doesn't make sense.

That's right to a certain degree. However, it obviously depends on our possibility to recognize what is meant to be nouns, verbs, adjectives etc. It's relying on the level of what we call primary word class differentiations. A simple row of not interpretable morphemes or "words" cannot be judged as ungrammatical.

It's necessary to recognize geometries as such as having semantic sense.

The ***structure of our brains*** shows the same organization as the main "categories of aspects": in its radial ARAS system upwards towards cortex and a corresponding system downwards the body, in the "circular" cortex with transversal connections, in columns of nerve sells in cortex for special sensory/motor areas etc.

One universal feature seems to be ***the need of a verb*** for a relating "full" sentence. "*It is beautiful*." Why "*is"?* Compare cries - first unbarred sounds. The need of a verb could be compared with *the need of vowels* among consonants for a single word. It has also a parallel in the pathways of signals in the brain through nerve fibres versus nerve cells as enclosed units.

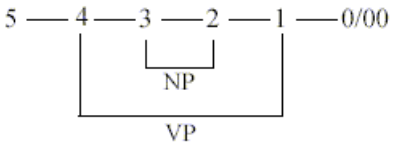
In Arabic much of the grammatical differentiations - belonging to Syntax - are said to be expressed in the vowels, while the substance of sense lies in the consonants (*LB*). Vowel changes in word stems of IE have the similar function.

This aspect: *vowels - verbs - syntax* looks like an example of how d-degree 4 could be expressed in different steps of the big level chain, along the main axis of the two gradients. (About differentiation of phonemes below.)

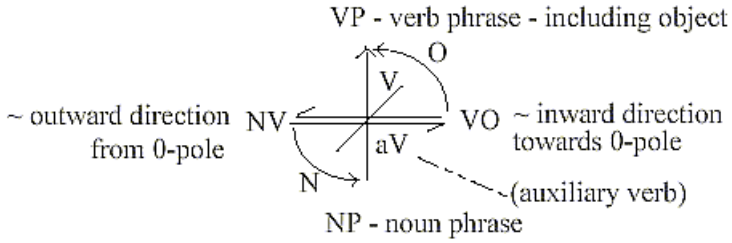
Features in the dimension model: what could be universal:

a) That which is said above: the concepts behind "word categories" as fundamental aspects on the world.

b) The *truism* that verbs are connected with adverbs, nouns with their properties - per definition: in interpretations here:
d-degree 4 with 1,
d-degree 3 with 2.



(They may also be regarded as two different "levels": polarization 5 → 4 + 1 the deeper step.)
It corresponds partly with division of sentences in noun phrases and verb phrases, the NP-VP-division. (One part of it the transformation from anti-parallel direction in d-degree 4 to a perpendicular relation in d-degree 3:



Two first things in the model allow obviously for differentiated syntax and word order:

- **Verbs** may be apprehended as said above in d-degree 4 of Direction, or polarized into active, passive as poles of d-degree 3, or as radial connections subject - object in d-degree step 3-2 or as motions in d-degree 0/00 - or even as just linear in d-degree 1.

- **Nouns** may be apprehended as 0-poles, first centres, or as encircled enclosed units in d-degree 3 (pole 3a) - or perhaps as "nounified" properties...

To these ambiguities come the 3 main directions in the chain: outwards - inwards - or vertical as in the loop model.

Linear order:

The "correct" linear, 1-dimensional order of a sentence should be the last factor established in Syntax, seen from the gradient of Sense.

For instance: Starting with an adverbial: is the right order of noun and verb then V→-N or N→V in a certain language?

A phrase like "*Fortunately he didn't take that job"* starts with an adverbial. The same phrase in Swedish grammar would be "*Fortunately took he not that job".*

The division of sentences in noun and verb phrases (NP-VP) may tell us about underlying connections between parts of sentences but not about linear word order. A strong wish of an object may give the object first place.

Start of a sentence *- what is needed?*
- It needs some kind of purpose or aim, in this sense direction semantically.
- It needs verbs as it needs vowels, as written above.
- It demands surely too a "topic" as a kind of centre but not necessary as first word. Chomsky talks about the sovereign position of the Subject in a sentence, maybe pronouns developed to subjects, with nouns as centres. We could translate it here to the need of a 0-pole (with reference to Big Bang!). A 0-pole from which follows direction outwards. (It's implied also in the very act of speaking, opening the mouth for an utterance.) Some may however regard the direction outwards as the most essential happening.
- The start is obviously also depending on the speech situation, context, references speech as answers, as re-actions.

Word order SVO*... and attributes* (*LL*):
Linguists have tried to group languages according to dominant use of word order for Subject - Verb - Object in main phrases. The order varies much within the same language family:

VSO: e. g. Celtic, Arabic, Maori)
SOV: e. g. Persian, Turkish, Japanese)
SVO: e. g. most IE languages, Finnish-ugr., Chinese)

Hence alternatives:

Alternatives	V: 1:a - 2:a - 3:e	position	(~ V as directions -radii - motions?)
	N: 1:a - 2:a	position	
	O: 2:a - 3:e	position	

It seems to agree approximately with what could follow as possibilities from our dimension chain of word classes above - and may also depend on the ambiguities mentioned above in interpretations of verbs and nouns in the model here.

Something of a trend has been found in the position of *attributes* (A) in these 3 word orders (*LL*): In VSO: A after, in SOV: A before, in SVO: A before or after. It just seems as a natural trend to place attributes close to the noun classes S and O, if possible away from the verbs. (?)

Such a dominating order (among V, S, O) may perhaps be regarded as the typical one in a certain language for construction of a "telling" phrase, a statement. Then through "transformational rules" (*NC*) give all other possible phrases in that language? This approach however concerns obviously a certain language, not universal features.

Are there any "universals" in the very principle for these transformations? As a stepwise rearrangement?

Order of steps in the proposed dimension chain for word classes has of course no simple connection with word order in *typical* sentences, if such are recognized.

Yet, a stepwise development should in some sense be implicated in our model, as polarization steps. The place of debranched degrees however, according to the loop model, makes it ambiguous: e.g. where to position adverbials and where attributes, - in the first steps $5 \rightarrow 4 \rightarrow 3$ or "the other way around'.

Together with the mentioned other ambiguities in dimensional interpretation of verbs and (Pro)-nouns in the chain, it multiplies the differentiating possibilities.

Polarizations as a main property in our dimension model imply that a higher d-degree

get polarized into complementary “outer” poles or “partial structures” of next lower d-degree of structure:

4a — 3 — 4b 3a — 2 — 3b
00 — 4 — 0 2a — 1 — 2b

Counting with these pole relations also, together with the connections 4-1 and 3-2 of the loop model - and the view on central chain steps as 4 = 3 + 1, → 3 = 2 + 1, → 2 = 1 + 1..., gives a lot of possible connecting steps between the word categories: as for instance from 0 via 4 and 1 to 2a, via 2 to 3a and back to 4b, and via 4b to 4 to 00 etc.

Poles in the d-degrees may decide such things as relations active-passive, hence subject and semantically this as object, a step to real objects from transitive verb, poles as 3a-3b deciding both relation nouns /verbs as radii and as outer poles of d-degree 2 for instance inner/outer properties of nouns, positions or opposite forms of nouns as things... etc.

We may ask if word order is a testimony of how embryonic whole situations as unity structures on a "field level" once were polarized into words - historically and / or in development of the sentences as process in the brain.

Protein folding:

Do there exist similarities with the folding of proteins?

Scientists occupied with the genetic code, use a linguistic terminology in their research. It’s natural, since this code has the function of a language.

The synthesis of proteins at the ribosomes is **linear,** an **additive** development. The folding to secondary and globular structures follows afterwards.

We could regard developed “linear” sentences as in fact more or lees intrinsically “inflected” through the “3”-dimenional space... with our aspects here on geometries of different dimension degrees. An inflection of whole sentences, corresponding to the one on the *word level* in inflecting languages.

From the aspect of the phoneme gradient this order would be true: first linear, then “folding”. From the semantic point of view, in that gradient, such a folded sentence comes first.

Hence, we could ask - as researchers do - how the future folding of proteins is embedded in the RNA-code for the separate proteins.

We had as written before that syntax, regarded as d-degree 4 in the level chain, had its complement in d-degree 1, the linear dimension, in he gradient from phonemes.

A suggestion is to imagine that a virtual reading of e.g. 4 bases in the mRNA chain could correspond to an internal code for folding and in this sense be embedded. In similarity with reading poles 4a or 4b in d-degree 3 in our model.

There are 5 bases (nucleotides): 1 (T) inwards DNA, 4 outwards in mRNA, U-G-C-A. They become 3 in codons in decoding at ribosomes, or 2 where 3rd base is indifferent, and become 1 in nucleotides when acting as coenzymes (in -MP, -DP, -TP-form). Could there exist an implicit “4-base phase” of “reading” preceding the 3-base reading?

Compare how enzymatic cuttings of DNA sometimes are illustrated, giving sticky ends, which may be 4, in every case not coinciding with divisions in 3. Compare also tRNA-ends A-C-C- where the 4th base after last C seems to have an important role for recognition of the tRNA. And, at the ribosomes, the importance some findings attribute to which bases precede the codon for a special amino acid.

As there are "jumping genes" and recurrent pieces of genes and proteins as "words" or "motives" appearing in different proteins, multi-wordy parts of linguistic whole *phrases* should be expected to turn up in different contexts, selected, repeated and established as "*for instance*", "*it is*"; a multitude of ready-made expressions to use in forming whole sentences; as a third, forth or fifth...level for specialized jumps between poles in the dimension chain.

***About storage in the brain**:*
It's proposed above that forms of grammatical relations as genitives, plural, past time etc. are lexically stored, not only separate words.

A similarity is assumed with how our eyes analyze elementary geometrical forms, which then are combined to more complex structures in the associative area of visual cortex:

| , − , / , \ , O ,) , (, (This could explain confusions by persons with lesions in linguistic centra of the brain. The mix of snow and salve, for instance, or man with poncho with spruce fir, with two examples collected from a detective story.)

Together with experiences it leads to a conclusion that e.g. this is a window. There are two essential differences. Speech includes the symbolic reference to a word for it, the word *window*. And speech or language engages all senses, including the inner kinetic ones. It's a question to think with the whole body as Einstein said and as children surely do.

Could the stores for pieces of language resemble Lego pieces - with knobs for connections to other possible Lego pieces in different angles? Could we imagine word class groups as cells with their more or less specialized receptors?

The fact that nerve fibres connecting nerve cells in the brain develop during early childhood (as they continue to do on demand) is of course one part of the answer to why children so easily apprehend the grammatical structure of a heard language.

End note:
The pentagon figure:
Syntax illustrated by such a pentagon, a 5-corner figure, with a risk to mislead the imagination**:**

a. Combining sides in a figure showing the polarizations of 5 in 4/1 and 3/2 gives a pentagon - or a pentose ring in biochemistry, figure a.

> (A digression: Adding the polarization 5 → 0/00 gives 9 positions as atoms in a purine base. e. g. Adenine. With the broken lines a hexagon. However, the 6- and 5-rings in a purine base only shares 1 side. The way to get only a hexagon is of course to regard 5' in the figure polarized into 0 —— 00-poles, giving a 6th side...)

Fig. a. A "pentose":

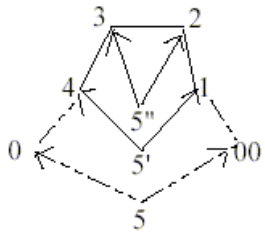
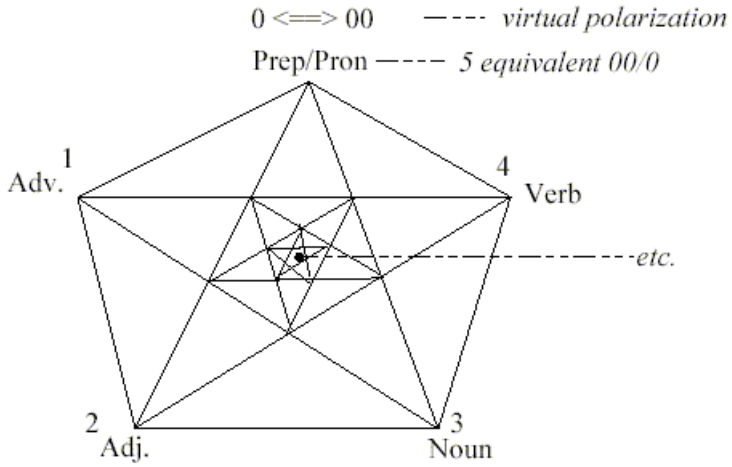


Fig. b. The pentagon:
Connecting all corners in a pentagon creates a new inner pentagon, drawing all diagonals in this gives a third "deeper" pentasgon etc. It could perhaps illustrate the *principle* of levels in the grammatical, geometrical differentiations within word classes, even if some diagonals seem inadequate.

(A hexagon with all corners connected gives an inner hexagon, the same principle.)



Number of connections
if all corners were connected with one another:
1 level: 5 x 4 / 2 = 10
2 levels: 5^2 x 24 / 2 = 300
3 levels: 5^3 x 124 / 2 = 7750

(Cf. circa 5 types of consonants and average value of numbers of phonemes in a language about the magnitude of 25 etc.)

Language Families

Different types of languages

In topological classification of languages linguists use to divide them in about 5 main types. It must be added however that hardly any language or family is purely of one variant. The five types are designated:

- **Isolating** languages (analytical or root languages)

- **Agglutinating** languages

- **Inflecting** languages

- **Polysynthetic** or incorporating languages

- **Analytic** languages

Could these different types be interpreted with help of aspects in a dimension chain?

Isolating languages:
One typical example: Chinese:
Some features according to the literature:
- Isolated, rigid morphemes as words, no endings. (Much of monosyllabic morphemes.)
- "Word classes" not defined by the shape, instead through word order and use of "auxiliary words", e.g. "wisdom" = “thing” + “wise”, (*LL*).
- Movements in intonation are significant factors in separating sense.
- A current development towards more form words and more mobility of these form elements.

The feature that parts of speech not are designed as such, that the morphemes to a great degree correspond to complex concepts that can be both nouns, verbs and adjectives, etc., allow us to regard the type of language as high-dimensional relative to other types on the level of word classes. Note, however, that pronouns exist; cf. the interpretation of pronouns as derived from primary poles 0 — 00 from step 5→4.

The interpretation may also be justified by the scripture, with much preserved from a historically early stage of ideograms and signs that have indicated concepts through depicting entire situations.

A simple “grammar”, where the class of words gets defined through the complex whole and word order as direction of the sentence and intonation, seems to imply that much of “syntax” or the listener’s interpretation have to rely on the speech situation, here suggested as from step 5→4 in the level chain. It seems to be the case for such items as tense for instance, judging from given examples. ("Direction" as d-degree 4 first from situation of speech.)

The trend towards more "form words" as debranched quanta could be taken as a general indication of steps from higher dimension degrees to lower ones.

However, in opposition to these “high-dimensional” views, some linguists believe that simple words in Chinese are reduced ones and at an earlier stage were two- or multi-

syllable words. This means that many different words with different meanings coincided when reduced, converging to the same morpheme. Bjorn Collinder (*BC, s*) for instance suggests a trend towards an isolating language as towards a late stage of simplification. It is pointed out as one example that Modern English has developed many features of an "isolating" language type.

The simple grammar can also be described as 1-dimensional, a quantification where sense of the message is designed in the *additive, linear word order* (O--O--O--O...).

Since intonation also is crucial for the semantic meaning, we could find a connection with step 1→00 in the dimension chain, the step towards the d-degree of motions as motion of tone.

The two opposite views imply
a) a complex semantic sense of morphemes, not yet differentiated in word classes and with intonation, in itself probably a very deep level of ”language,”
b) the complexity as a reduction to simple often monosyllabic morphemes where only a linear (as 1-dimensional) grammar decides the sense and word classes. (Cf. morphemes in the big level chain assumed as level characterized in step 2 —1.)

Hence, it’s suggested here to regard this family type with features of both 1st and last step in the dimension chain, steps corresponding in the loop model:

Agglutinating and Inflecting languages:

Agglutinating languages, *(sometimes also called inflectional)**:***
Typical examples: Uralic languages, Turkish, Japanese, Swahili, Etruscan. (Etruscan is said to have strong features of an agglutinating language. It had pronouns, but mostly suffixes instead of prepositions.) Some features according to the literature, most of them existing in Uralic languages:
- Rigid word stems (radicals), rich in inflectional endings, i.e. with many suffixes. (Or many prefixes as in Swahili.)
- Suffixes (or prefixes) get lined one after the other.
- Each suffix has one grammatical function.
- Often *vowel harmony*, vowel of suffixes resembles the word stem.
- Many cases develop. (Uralic 6, became 15-16 in Finnish, about 25 in Hungarian.)

(As in Finnish, the Etruscan didn’t differentiate genders *he / she*, only personal versus non-living things, hence in gender less differentiations than in Indo-European.)

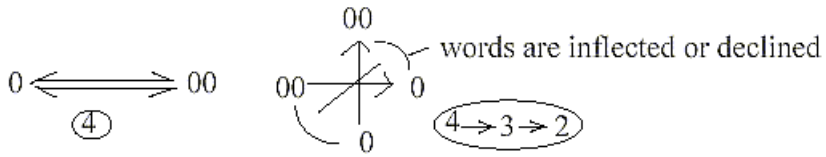
Inflectional languages:
Typical examples: Indo-European, Latin, Arabic (Semitic) languages. Some features according to the literature:
- Type of word class is marked by separate morphemes.
- Stems can be inflected through vowel change, for instance through “umlaut” in plural forms, or in tense inflection in the "strong verbs". The vowel alters to resemble the one in suffixes.
- Several different grammatical functions can be expressed with only one (1) suffix.
- Quite a few cases (2 in IE, 6 in Latin, 5 in ancient Greek, 4 in Old Swedish).
- Verb endings instead of pronouns (as in agglutinative languages, mainly 1st and 2nd person).
- The original word stems said to be verbs.
- Indo-European did not know prepositions but words for directions as additions.

Semitic languages among the inflectional ones were previously agglutinating (*LB*).

A suggestion of how to regard the relation between these two families in the dimension chain:

endings...
4 --> 3 --> <-- 2 <-- --1
| | *flect.* | |
| *agglutinative* |

One general aspect here is of course that double-direction in the loop model towards the middle in step 3-2 implies inflection as such, increasing toward the middle. Compare the angle step 4 → 3, assumed as a step in polarity type from 180° to 90°.



Comparison agglutinating - inflecting languages:

It has been discussed if the features of inflecting languages are older than that of the agglutinating ones or the inverse. A linguist as Bjorn Collinder points out that language development isn't unidirectional.

A direction *agglutinating* ——> *inflectional* languages = towards increasing complexity, may be regarded as towards a higher dimensional level. So does the opposite direction too, through angle steps complicating the structure. Both aspects can be reconciled in the loop model of the dimension chain above.

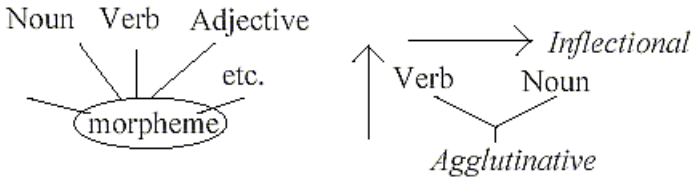
a) ***Morphemes***:
It's possible to find a contradiction too in the direction of differentiations of word stems: the separation of radicals *from within the semantics* through narrowing "base formants", more pronounced in agglutinating languages (?), - compared with word stem "classes" of e.g. Latin after end phonemes, i. e. *from the outer level of phonetics*?

Phonetics
↓
Word categories
↑
Semantics

If initial morphemes in agglutinating languages are *branched into verbs and nouns* (ambiguous in reference *BC*), it could be interpreted as the first differentiation of word classes (parts of speech), after the isolating languages and their concepts.

The inflecting languages as Indo-European on the other hand, where the development of morphemes is said to have gone from verb stems to nouns (V → N), should in that case imply a relation at straight angle to the agglutinating languages in this respect.

V
< |
N



b) ***Vowel harmony - vowel changes***:
About vowel changes in suffixes and word stems, agglutinating languages may be regarded as an "earlier" stage dimensionally, seen in outward direction: stems are indeclinable in agglutinating languages - as in isolating ones. Vowel change concerns the endings of words = outwards in words. (”Vowel harmony".)

In inflecting languages, word stems may also change, e.g. to more similarity with the endings, an effect inwards in the words, as a turning towards inward direction in the chain of steps 3 —><— 2.

Vowel harmony in agglutinative languages is also a phonetic history: the superimposed *phonetic level* “from outside” acts as 'a bending force'.

While the verb stems in inflectional languages may be regarded as inflected by and in service of grammar, e. g. in tenses in “strong verbs”, as from the ”deeper” *level of syntax.*

c) ***System of affixes***:
The system for affixes in the secondary differentiations within word classes shows the most characteristic difference between agglutinating and inflecting families. A comparison, if the principle of endings (according to *CEL*) is purified:

- *Agglutinating* languages: affixes are added one after another, e. g.:
  noun + affix 1 + affix 2 + affix 3 etc. One example from Swedish, although not belonging to this family: *kung-ar-na-s* (= the Kings’ in genitive):
  (noun) + *-ar* (plural) + *-na* (definite form) + *-s* (genitive).
- *Inflectional* languages as Latin: many such secondary determinations as tense, person etc. are expressed with one and the same suffix.

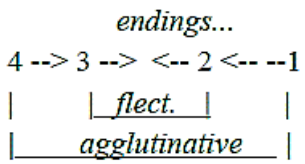
The principle could be interpreted as a difference in dimension degrees:
- Addition (+) implies a linear, 1-dimensional operation.
- Multiplication (x) implies a 2-3-dimensional operation, as defining squares or in two steps cubes.

In the inflectional system the suffixes may be interpreted as points in a plane or space geometry, to regard as result of further development inwards:

Inflecting languages could be compared with "sp- (spd-)hybridizations" in molecule bonds.

Hence, we would have the two systems for added suffixes in the lower degrees of the loop model:

Agglutinating languages in step (2) ← 1. Inflecting ones: step (3) ← 2 as in the figure above:



This is also in agreement with the assumption that agglutinating languages represent an earlier, deeper and more high-dimensional type. Cf. the statement that Semitic languages (inflectional) earlier was agglutinating.

Swahili with *pre*-fixes, an inverted direction in this respect compared with Uralic,

could perhaps represent a still earlier phase in these agglutinating languages, nearer as it is the origin of Homo Sapiens (?).

d) ***Number of cases and other suffixes***:
The increasing number of cases in agglutinating languages could be an expression of direction outwards (d-degree pole 4b) in the secondary chain of noun differentiations, e.g. in all their different cases for locality.

The agglutinating type is geometrically (grammatically) less complex than the inflecting, but more complex than the isolating one.

The additive principle is probably one reason for the possibility to develop and manage this significantly higher number of cases than in a language as Latin?

In the typical inflectional Latin the number of noun inflections (*AA*) resembles number of electrons in different orbitals in atomic shells:

	4	3	2	1	0
$2x^2$:	32	18	8	2	0
Orbital series:	14	10	6	2	

|_ 2 numbers
|_ 6 cases
|_ 10 phonetic "classes" of word stems:
(= 6 after end vowel, 4 after type of end consonant
N-P-F-L = nasal, plosive, fricative, liquid)
|— "5 declentions" - with variants

(18 + 5 is also = number of non-metals + transition elements in the Periodic system.)

Assuming that there are no endings coinciding and all distinctions gave suffixes, it should give 2 x 6 x 10 x 5 suffixes = 600 endings to remember? Up to 4 selected and united to 1 suffix for a noun.

With the Latin system purified the verbs should get about at lest 1440 endings! (5 moods x 2 = active / passive voice, x 3 for persons x 2 for number, x 6 for tenses including duration, x 4 verb stems after final vowel, (4 "conjugations") ?!

The vowel change inwards to the word stem in e. g. tenses reduces of course the need for suffixes. It could perhaps be regarded as a kind of *infix* too.

It seems also to exist a difference of degree within inflecting languages themselves, as in the relationship between Semitic and Indo-European languages:

In the 3-consonantal word stems of Semitic languages, (where the vowels often indicated grammatical features as in the strong verbs of IE), the 3rd consonant had the function to shade off and differentiate sense, was a kind of semantically narrowing suffix (*LB*).

In the similar word stems of Indo-European, this 3rd consonant was (mainly in verbs) reversed to an infix, position number 2. (*LB*)

This shift in position seems as a further step of turning inwards in direction, an inflection on the level of both semantics and phonetics, opposite ends of the level chain.. Note. 3 —> 2 +1, in the number of consonants.

5 —> 4 —> 3 —> 2 —> 1—> 0/00

Polysynthetic ("transposition") languages:

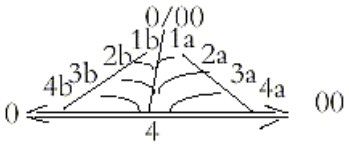
Typical example: Eskimo language, (some?), Indian languages and Australian languages (some or most of them?). Basque is reported to have some of these features.

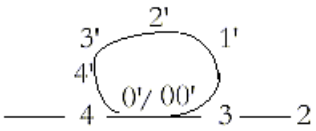
- Many clause elements are incorporated into the verb, so it's said, hence the term "synthesizing". The type has also been described as "multi-articulated sentences grown together into word bodies" (*BC, s*).
- The language type is said to have some similarities with both agglutinating and inflecting languages.
- Secondary grammatical qualifiers are often "infix".

Direction of "synthesis" is inward direction in a dimension chain (from d-degree 0/00).

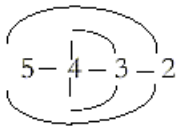
If verbs are interpreted as "directions", i.e. as expressions for the 4th d-degree on the level of word classes, the later d-degree steps may be regarded as developed and differentiated within the outer poles 0 and 00 of d-degree 4, in this sense potentially (virtually) "incorporated" in the verbs.

With a couple of alternative sketches of this principle from previous parts and other files here:





A secondary chain of steps within the step 4→3 on the level of word classes /parts of speech).



Potentials growing towards lower d-degrees and stepwise turning towards more circular structure.

However, it is difficult to see all three examples below as clause elements incorporated in the verbs. (It's obvious that pronouns come first, as suggested before: pronouns as originally from outer poles 0- and 00 in speech situation, defining d-degree 4.)

a) *"citayu'ah"* -->	*ci*	*ta*	*yu'*	*ah*
- Amrican Indian *caddo:*	= I	hang	causative	the perfect
= *"I have hanged..."*	pron.	intr. verb—>trans.	—>	tense
(object not given in the example)	0	4	4—>3	1-0/00

b) *"ngirruunthingapukani"* -->	*ngi*	*rru*	*unthing*	*apu*	*kani*
- Aborigine language:	= I	past tense	during some time	eat	repeated
= *"I kept on eating"*	pron.	tense	duration	verb	|
	0	0/00-1	1—2	4—3*	(2-1)
			└- duration+(adv.) —┘		

* (Infinitive, is also known in Latin grammar as "verbal noun", hence a step towards d-degree 3.)

In both examples, the "words" seem to illustrate the differentiation steps within the word class verbs, for instance in first giving the intransitive verb, then the step to unidirection, the transitive form.

c) "angyaghllangyugtuqo"--> = angya- ghlla- ng- yug- tuqo
- Eskimo language — boat | | | affix for 3rd person singular
= *"he want to procure* | | affix for a *wish*
a bigger boat" | |- *procure*
|- affix meaning *bigger, increasing*

~ *boat bigger procure wants he.* word order completely in opposite direction to that in Swedish - and English.

Here the wished object gets the role of centre, followed as in the word class chain by an adjective. Then the verb, as hauling in this object, then the mood "*optative*" of the verb as affix, last arriving at the formal subject, only as affix of to the verb. (Cf. about moods.)

Should such a language be interpreted as an early or a late stage?

With respect to the morphemes - or parts of the words, it seems as if that which in agglutinating and inflecting languages is only affixes, has more substance (left?). As adverbial morphemes - from a role of independent expressions? (The prehistory of tenses in inflecting languages?)

Polysynthetic languages are spoken by what linguists call "border people". By applying a linguistic theory within phonetics, they would correspond to an older language type.
If so, they have also had a longer time to develop. With respect to syntax, it could imply a secondary synthesis of previously developed, more distinct, separated words - the result of "abbreviations", made possible within isolated language groups?

> Cf. the immune system, where an "alphabet" of 3 amino acids are said to exist (?). Like our type of abbreviations, ABB, SKF etc.: to regard as a superposed level of language. A "later" development of abbreviations.)

An additional question: If western linguists hear a row of sounds (calling them word-bodies), not understanding the language, why shouldn't those people hear western speech in the same way, as just a row of sounds we call phonemes?

And what's the conclusion? It seems as if we have to regard the "polysynthetic" languages as in both main directions in a "haploid" chain:
0 <= 4 == 3 => <= 2 == 1 ==> 00, where the inward direction (as from phonemes in that gradient of the big level chain !) is chosen in the name.
Cf. "infix" as in the middle step. Basque for instance has many infixes.

Analytical language:

Typical examples: the development of the Latin language as inflecting to its daughter languages.
Features according to the literature:
- More and more "free form-words". "independent words" and word categories replaced endings.

- Pronouns replaced the verb endings. 50% of the pronouns existed in the twelfth century.
- Prepositions developed, were released and replaced case endings.
- Mood endings on verbs became auxiliaries.

Such a development has been going on, as mentioned about pronouns and prepositions, not only in Indo-European languages but also in the Semitic ones and for instance in Chinese. It has been described as a "grammatical dissolution".

Generally, such languages could be said to illustrate the steps into lower dimensional degrees —> 2 — 1 — 0/00.

In Uralic (agglutinating) languages for instance, there has been a development of nouns, which reduced may become case endings (*BC*). In inflecting (fusional) languages *one* development goes from case endings to prepositions. Such data imply a gradual reduction outwards of word categories and a "dissolution" as liberation of quanta.

In terms of the dimensional model steps outwards imply an increasing number of dimensions translated into motional moments. Very elementary:

0/00 — 1 — 2 — 3 — 4 — 5 ← Motions
Structure: → 5 — 4 — 3 — 2 — 1 — 0/00

It corresponds to increasing mobility of language "form elements", which in this sense becomes independent words.

The trend towards analytical language is here vaguely proposed as a stepwise substantiation of such ”grammatical motions” as expressions for relations in whole sentences.

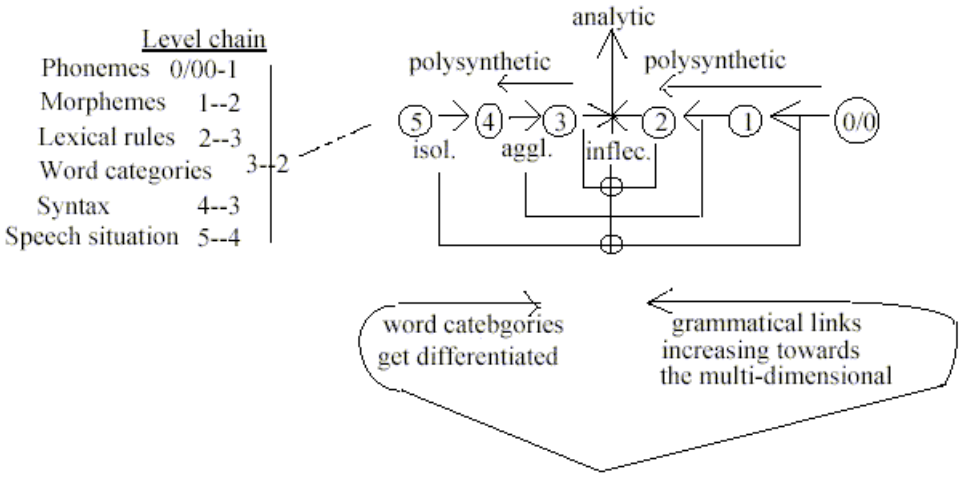
Summery:

From the aspect of "development inwards” towards higher d-degrees:
- Isolating languages: the lining up of isolated words decide the word class, ~ 1.
- Agglutinating languages: the lining up of endings determines the secondary developments within word classes, ~ 2,
- Inflecting, synthetic or fusional languages: - co-ordinate and stores the determinations of secondary chains within word classes into one (1) suffix, - 3 <— 2,
- Polysynthetic languages: co-ordinate and store both secondary and primary chains on the level of word classes in verbs to "word bodies", ~ 4 <— 3.

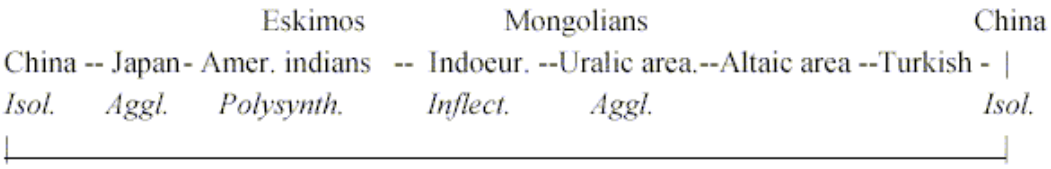
From the aspect of development towards lower dimensional degrees:
An increasing differentiation of word categories (the parts of speech)? From isolating languages to polysynthetic ones - to agglutinating, - to fusional - to analytic languages.

Then, as a "feedback", or meeting between opposite poles in terms of the dimension model, a combination of isolating - analytic characters (?), when looking at the development underway in contemporary English.

The consecutive order of the development of the different language types, here sketched with aspects from the dimension model, becomes essentially the same as Bjorn Collinder suggests in his book “Språket” (“The Language"):



A note:
Geographical distribution on Northern Hemisphere:



END PART I

PART II:
The Speech Organs
Phonemes - consonants
Vowels - and some annotations on syllables and morphemes
Semantic roles of phonemes - some annotations
Sound shifts
Appendix
References

