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FUNCTIONAL SUPERPOSITION

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DEFINITION OF FUNCTIONAL SUPERPOSITION. Functional superposition is a theory of the syntactic behavior of word classes which is unique to Applicative Universal Grammar (AUG) (Shaumyan 1987). AUG claims that there is a universal syntactic structure which all languages share. This universal syntactic structure is characterized by four basic functions: predicates, terms (arguments of predicates), term modifiers, and predicate modifiers. Every word has a primary function and may also have one or more secondary functions.¹ The primary syntactic functions are

for verbs	–	predicate
for nouns	–	term
for adjectives	–	term modifier
for adverbs	–	predicate modifier

For example, the word *silk* has the primary function of term, but it also has the secondary functions of term modifier, as in *silk dress*, the secondary function of predicate modifier, as in *She dressed in silk*, and the secondary function of predicate, as in *This is silk*. A secondary function is, essentially, a function other than the word's primary function. A word may have several secondary functions but only one primary function. *Primary function* and *secondary function* must be understood behaviorally.

Functional superposition is a process by which a secondary function² is overlaid onto a primary function, resulting in a new, bistratal³ function Shaumyan (1987:116). Functional superposition creates a new function which is a *combination* of the primary and secondary functions rather than being a mere change of function from the primary to a secondary function. After superposition, a word (the *superponend*) has aspects of *both* its primary *and* its secondary functions, i.e., the superponend performs the roles of *each* member of its new bistratal function (Shaumyan & Segond 1992:5). Superposition is a theory which may apply to elements of language other than words, e.g., metaphor and analogy, but only superposition's effect on words will be described here.

AN EXAMPLE OF FUNCTIONAL SUPERPOSITION. Consider the sentence:

- (1) *John is a driver.*

According to AUG, in (1) *driver*, in the expression *is a driver*, has a secondary function superposed on it as the result of its being combined with the operator *is*. An operator which superposes a function on another function is called a *superposer*. While the primary function of *driver* is term, it also has the secondary function of predicate in the expression *is a driver*. *Driver*, in the expression *is a driver*, does not have two separate functions; it has one compound function. *Driver*, in the expression *is a driver*, functions as both term and predicate, though it does not necessarily perform each function to the same degree. *Driver*, in the expression *is a driver*, plays the role of a secondary term.⁴ We can see that *driver* plays both roles simultaneously if we try to construct sentences which are equivalent in meaning to (1). The sentence

- (2) *John drives.*

is not semantically equivalent to (1) because the predicate *drives* in (2) describes the action of *driving*, while the predicate *is* in (1) does not. Furthermore, *drives* in (2) does not capture the notion of *someone who drives*. A *driver* is not merely someone who has acquired certain skills and may or may not use them. Thus, there is an element of process in *is a driver*. We can say that the sentence

- (3) *John is a person who drives.*

is semantically equivalent to the sentence in (1) because it captures the notion that *John* is a person with certain skills who is capable of exercising them. *Is a driver* is, therefore, semantically equivalent to the phrase *a person who drives*. The latter phrase contains the functions of term and predicate although in separate words. The comparison between (1) and (3) shows that semantic equivalence requires functional similarity between the linguistic units which are members of the equivalence, in this case, between the word *driver* and the phrase *a person who drives*. We can see that this is the case by examining how each component can be modified. Since *driver* is a term, it can be modified like a term:

- (4) *John is a good driver.*

But it is not just the term function or the predicate function of *driver* which is modified. Both functions are modified. We cannot modify the predicate in (2) simply by using a term modifier:

(5) **John drives good.*

Simply modifying the predicate function of *a person who drives* from (3) with a term modifier results in an equally improper phrase:

(6) **a person who drives good*

In order to create a sentence which is semantically equivalent to (4), we must modify the *predicate function* in *a person who drives*:

(7) *John is a person who drives well.*

(7) shows us that it is the predicate (the process of *driving*) which is modified and which, in turn, modifies a term. Since the sentence in (7) is semantically equivalent to the sentence in (3), we can clearly see that functional superposition does, indeed, involve a new, combined function, a *dual*, rather than separate functions. Notice that simply modifying the term (the notion of person) in (4)

(8) *John is a good person who drives.*

does not result in a sentence which is equivalent to (4).

Every superposition assumes a *superposer*, i.e., some formal device which creates the superposition.⁵ Superposers are often sound sequences but, being signs, superposers are not restricted to being sound sequences. For example, in some languages, like English or Chinese, word order can be a superposer. Suffixes are common superposers in many languages.

FUNCTIONAL SUPERPOSITION COMPARED TO THE TRADITIONAL VIEW OF PARTS OF SPEECH. The theory of superposition is a striking departure from the traditional notion of parts of speech. To emphasize the difference, I would like to examine an example of the traditional notion taken from Pinker's *The Language Instinct* (1994:133). Pinker examines the phrase *Yugoslavia report*. He claims that a typical grade school grammar teacher would describe *Yugoslavia*, in the example phrase, as an adjective because it modifies *report*. Pinker disagrees, preferring to see the phrase *Yugoslavia report* as a compound noun rather than a phrase composed of an adjective and a noun:

In English, a compound noun is often spelled with a hyphen or by running its two words together, but it can also be spelled with a space between the two components as if they were still separate words. This confused your grammar teacher into telling you that in *Yugoslavia report*, ‘Yugoslavia’ is an adjective. To see that this can’t be right, just try comparing it to a real adjective like interesting. You can say *This report seems interesting* but not *This report seems Yugoslavia!* (Pinker 1995:133)

Aside from the questionable reference to spelling as an indicator of word function, the important notion in the quotation above is that the word *interesting* is a *real adjective*. I do not question that *interesting* operates as a term modifier; I question whether there is such a thing as a *real adjective*. Pinker only briefly describes grammatical categories. He says:

A part of speech...is not a kind of meaning; it is a kind of token that obeys certain formal rules, like a chess piece or a poker chip. A noun, for example, is simply a word which does nouny things; it is the kind of word that comes after an article, can have a ‘s stuck onto it, and so on. (Pinker 1995:106)

While Pinker talks in ‘functional’ terms (‘a word which does nouny things’), he says that a part of speech is a kind of token. Generative Transformational Grammar (GTG), the tradition within which Pinker operates, sees a part of speech as a thing or, better, as the state of a thing. A noun is a noun because it acts like a noun (‘does nouny things’). This does not tell us how nouns act or why they act that way. Pinker simply says that if we knew how nouns acted, we could identify nouns, because we would then know what nouns were. Whatever a noun is, it is rigidly circumscribed. Pinker’s analysis of the phrase *Yugoslavia report* indicates that even if a noun appears to be acting like another type of word (the kind of behavior that befuddled Pinker’s poor old grammar teacher), a noun is still a noun. Ergo, *Yugoslavia report* consists of two nouns. Pinker says that a noun is a word which ‘does nouny things’ but actually means that a word ‘does nouny things’ because it is a noun. GTG’s *noun* is the name for a word type which has certain, arbitrary attributes, one of which is a certain type of behavior. Words are not defined in terms of behavior; behaviors are defined in terms of word types.⁶ Declaring *Yugoslavia report* to be a compound noun is nothing more than an attempt to salvage the notion that *noun*, as a state, is invariant, while still noting the obvious fact that *Yugoslavia* modifies *report*. In order to see a part of speech as a state, Pinker must say that if *w* is *P*, then *w* does what *P* does, where *w* is some word and *P* is a part of speech. I refer to this as an *is:does relation*. Notice that Pinker does not say that if *w* does what *P* does then *w* is *P*. In fact, he criticizes this very

notion when it is raised by his grammar teacher. Pinker's notion of a part of speech is as a fixed unit, or, as he calls it, a *token*.

In his telling simile of a word and a chess piece Pinker has unconsciously mentioned what is wrong with the part-of-speech-as-state notion. While it is the case that, *under most circumstances*, a chess piece plays a particular role, it is not *always* the case. If a player, say white, were to move a pawn to black's end of the board, white could promote the pawn to a queen. The pawn would still look like a pawn but would act like a queen. In the Japanese variant of chess called *shogi*, many types of pieces can get promoted. Promotion results in several different types of behavior. In European chess, how many queens does a player have at a given point during the game? How many queens does the player *potentially* have? These questions can be answered only situationally rather than absolutely.

Pinker's chess piece analogy shows that, for him, word types are simple, hard-edged blocks. There may be advantages to the hard-edged view, especially if one wishes to perform certain types of analysis which presume such a view,⁷ but the 'hard-edged' view does not mirror reality very well. In AUG, functions do not have hard-edges. Words are thought of in functional terms;⁸ hence the adjective *functional* in *functional superposition*. AUG says that if x does y then x is F , where x is some word, y is some linguistic behavior, and F is the function name given to y . I refer to this type of relation as a *does:is relation*. If we look at a description of language as a description of linguistic behavior rather than as a description of linguistic states and if we see that functions are not exclusive to any particular word type, we will see that a word, when the occasion demands, can have a combination of functions. Since Pinker has used an analogy to explain his notion of parts of speech, it is appropriate that I use an analogy to explain *function*.

Function may be thought of as a job description. A job description is the description of an employee's *typical* role in an enterprise. If employee X has the job of preparing reports, secretary Y , another employee with a different job description, may be assigned to help X prepare the reports. Normally, X and Y perform the job of report preparation together with each of them performing different, but not necessarily completely or situationally discrete portions of the job. If Y is unavailable, X may have to perform all the requirements of the job, such as typing the report, which may normally be Y 's job. In the case of Y 's absence, X performs the roles of *both* X and Y in order to complete the job. At any moment, it may be impossible to say whether X is performing X 's role or Y 's role because X is performing both simultaneously. Taking Pinker's *Yugoslavia report* example, we see that Pinker is correct in saying that *Yugoslavia* is a term (noun) but that he is incorrect in saying that it is *always* a term (noun). His grammar teacher was correct in saying that *Yugoslavia* modifies report. In some languages, word order can functionally superpose words.

In this case, *Yugoslavia* has had the secondary function of term modifier superposed on its primary function of term by its position. In another context, *Yugoslavia* may continue to perform its primary function exclusively, as in the sentence:

- (9) *Yugoslavia was a nice country before the war.*

(9) shows us that functional superposition is contextually sensitive, i.e., it occurs in certain contexts but not others. Functional superposition requires a superposer. If no superposer is present, there is no functional superposition. Functional superposition applies only to its specific context. In the following example:

- (10) *According to the Yugoslavia report, Yugoslavia was a nice country before the war.*

the first instance of *Yugoslavia* is superposed (by word order) but the second instance performs only its primary function. Pinker's phrase *Yugoslavia report* is strained. Normally, *Yugoslavia* would be replaced by a term modifier, like *Yugoslavian* or the phrase *about Yugoslavia*. When Pinker compares *Yugoslavia* with a 'real adjective' like *interesting*, the strain shows. We can certainly say *The report was Yugoslavian* or *The report was about Yugoslavia*.

FUNCTIONAL SUPERPOSITION AND TRANSPOSITION. AUG does not claim that superposition occurs every time that a word acquires a new function. AUG has another operation which changes word function, called *transposition*, which is related to but not identical with functional superposition.

DEFINITION OF TRANSPOSITION. *Transposition* is a purely relational operation which applies a *transposer* to a *transponend*, resulting in some change the *transponend's* primary function (Shaumyan 1987:113). Functional transposition can change the primary function of a transponend from one functional category to a different functional category (*Yugoslavia* becomes *Yugoslavian*) or can change the transponend into a different word in the same functional category as the word which was transposed (*village* becomes *villager*). While transposition and superposition both alter word functions, the result of each operation is different. The result of superposition is a *dual*, i.e., a new, bistratal function consisting of a secondary function imposed upon a primary function. The result of a transposition may be called, by analogy to a *dual*, a *single*, i.e., the transponend has acquired a new primary function only.⁹ If we add the suffix *-ier* to the stem of the verb *carry*, the resultant *carrier* has a new primary function (term). *Gold* can be transposed to a term modifier by the suffix *-en*

(*golden*) or it can be superposed to a term modifier through linear position (*John received a gold watch*). Because transposition and superposition are closely related, it is not always obvious which operation takes place. For example, the suffix *-er* can be either a transposer or a superposer. Adding *-er* to *walk* results in the term *walker* (*Because of his injuries, John needed a walker*). Adding the same suffix to a verb like *blend* may result in either a transposition (*John bought a new blender*) or a superposition (*John got a job as a paint blender*). There are some words, derived from verbs, to *cut* : *cut*, *cutting*, which are so commonly used as nouns that we are justified in saying that they are transposed, while other words, derived from nouns, *hammer* : *to hammer*, *screw* : *to screw*, *nail* : *to nail*, which show their superposition.

THE LAW OF THE INVERSE RELATION BETWEEN THE CONTENT AND RANGE OF AN ELEMENT. The law of the Inverse Relation between the Content and Range of an Element says:

The larger the number of features of an element the smaller the number of its occurrences, and, inversely, the larger the number of its occurrences the smaller the number of its features. (Shaumyan & Segond 1993:4)

Superposition results in an element with a larger number of features than it had prior to the superposition. The word now has a *dual* function while previously it had a *single* function. The Law predicts that superposition occurs less frequently than transposition because transposition does not result in the increase of the number of features. Depending on the context, any sign may be either a transposer or a superposer. Transposition results in the change of a feature. *Gold* is transposed into *golden*. *Golden* has a primary function of term modifier. It can occur anywhere its primary function would be appropriate. When *gold* is superposed into a term modifier, as in *John received a gold watch*, *gold*, **as the result of a superposition**, can occur only within the context of the superposition. AUG defines a syntactic context as a type of syntactic configuration. A specific example of functional superposition can occur only in a specific context. Transposition is not limited to specific contexts (Shaumyan & Segond 1993:4).

The Law informs us that the superposition of *driver* in (1) must be seen in context. The superposer may be the construction *is a* rather than *is*, i.e., the predicate *to be* is not, per se, the superposer; it is the predicate *to be in a certain context* (here accompanied by the word *a*) which is the superposer. The form *x is a y* is different from the form *x is the y* in meaning. *X is a y* is a categorical statement; *x is the y* is a statement of identity (*John is the driver*).¹⁰ Categorical statements may be contexts in which the predicate *to be* is a

superposer, while the same verb in identity statements may not act as superposers. More work needs to be done.

Functional transposition and functional superposition are observable phenomena. My current project to measure functional superposition with my theory of importance (Sypniewski 1994) has shown some preliminary promise in producing results which may permit the computer analysis of functional superposition.

¹While Shaumyan (1987: 116–17) describes *functions* in terms of syntax, the notion of functional superposition is general enough to encompass other types of linguistic features.

²An expression may have more than one additional function superposed upon it. Such functions are referred to as tertiary, quaternary, etc. functions. For simplicity's sake, this paper will only consider secondary functions

³The formal definition of *superposition* is

Let E be an expression of type x , and let E take on type y over type x . Then E shall be said to belong to type z such that z is stratified into y superposed onto x . Type z is represented by the formula $\langle x : y \rangle$, where colon ($:$) indicates the stratification of type z into y superposed on x , enclosed in angle brackets. The right part of the formula indicates the primary type of E , and its left part indicates the secondary type of E . (Shaumyan & Segond 1993:8).

⁴A secondary term is one of three types of terms in AUG: primary, secondary, and tertiary. A secondary term is similar to but not identical with a direct object. The terminology *secondary term* reminds us that AUG concerns itself with word functions.

⁵The formal definition of superposer is:

An operator R of type $O \langle x:y:x \rangle$ shall be called a superposer. (Shaumyan & Segond 1993:8).

⁶This description would be familiar to Aristotle.

⁷GTG assumes that a logico-mathematical model of language is satisfactory and that all logical or mathematical operations are appropriate for the analysis of language. Since both logic (at least traditionally) and mathematics see the world as being made of discrete entities, GTG must see linguistic phenomenon as hard-edged in order to use the formalisms and operations it wishes to use. I think this is a serious error. Interestingly, GTG is based on first order logic, i.e., the logic of propositions. AUG uses second order logic (the logic of functions) for its formalism.

⁸When AUG speaks of *function*, it does not mean function in the set theoretic sense, but rather in the sense of *operation* (Shaumyan & Segond 1992).

⁹In the case of *village*: *villager*, *villager* is said to have acquired a new primary function because it has acquired a new semantic meaning.

¹⁰It is interesting to speculate whether the current discussion of superposition would apply if the sentence in (1) were *John is a driver*. For the purposes of determining whether transposition or superposition has occurred, the context *is a* and *is the* may be, and in this case are, different.

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