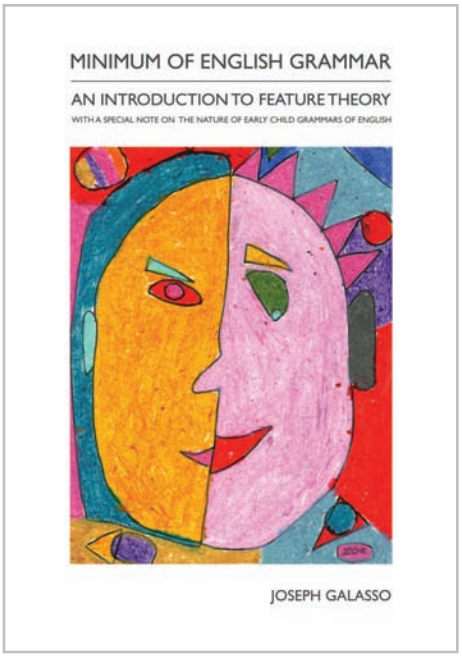

Minimum of English Grammar

An Introduction to Feature Theory

By Joseph Galasso

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Minimum of English Grammar

An Introduction to Feature Theory

with a special note on the nature of early child grammars of English

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Section II

Section II of Part 1 deals with general questions surrounding linguistic phenomena. In particular, the scope of the section looks to see how a 'Feature-Driven' account, as presented earlier in Section I, can further inform issues regarding specific language disorders (Chapter 10) and historical language change (Chapter 12). Previous 'end of chapter' remarks on child development are further extended here and make-up a self-containing chapter in its own right on the nature of child language acquisition (Chapter 11).

Section III

Section III of Part 1 presents a separate chapter on phonology, the (American) English International Phonetic Alphabet (IPA), and presents anecdotal evidence calling for a dual mechanism model of phonological representation. The final chapter of the section provides a note on tree diagramming.

PART 2

Minimum of English Grammar: Appendix & Exercises

Part 2 of this handbook (Chapters 15-23) takes much of the same material as presented in Part 1 and provides an additional exercise and analysis component. The essential conception of Part 2 is to provide students with an opportunity to consider some of the finer points of the theory as advanced herein. While the material presented in Part 2 is essentially the same as that found in Part 1, a more detailed revealing of structure allows for much more articulated expressions of theory. As the student moves through Part 2, this complexity becomes increasingly more involved as does the articulation of tree structures and analyses.

1
A Biological Basis for Language

1.1 INTRODUCTION

Language is quite possibly the most unique of all complex systems known to man, with little if any antecedents to its nature and origin traceable back to a Darwinistic world. It appears that mere communicative needs as would be determined by a Darwinian model could not have possibly provided any great selective pressure to produce such an elaborate system as language that relies heavily on properties of **abstraction**. What one gains from language rather is an inner symbolic thought process, autonomous and private onto itself, built upon a **mentalese** which is to a large degree not optimal for serving mere communicative needs. Complicating the picture even more so is the fact that language seems to sit in a kind of 'no-man's land', at a crossroads between being an innate, biologically determined system (on the one hand), and a learned, environmentally driven system (on the other). In other words, language is one and the same both **subjective** and **objective** in nature. Because of this, it seems any approximate understanding of language must be informed by a hybrid model of its **dualistic** nature. Such a model must straddle and bring together both Abstract/Mental and Physical/Material worlds. This coming together should by no means be interpreted as an attempt 'to make nice' with opposing philosophical camps, but rather, hybrid modeling of language and mind goes far in addressing the very complex and abstract nature of language, particularly in light of the current knowledge linguists have gained over what I think has been a very prosperous half century of linguistics.

What makes the above statements tricky, however, is that while there may be some level of (mental) learning going on for our first language, presumably based on the (material) frequency of input, (as with vocabulary learning), it has to be a 'strange' kind of learning unconnected to mere conscious observation and will. For instance, a child cannot willfully choose not to learn his/her native language. Nor can a child (subconsciously) fail to observe the hidden structures of language. So any talk of 'learning' must be accompanied by the fact that this type of learning, or whatever it is, is silent, automatic and biologically determined. The environmental aspect of language is evidenced by the fact that some input–driven learning, subconscious though it may be, is what triggers the otherwise innate mechanisms behind the

acquisition of language. In fact, the term **acquisition** comes with its own portmanteau of claims, chief among them being the claim that the child is born with an already predetermined template for language termed **Universal Grammar**, a (human only) species-specific **Language Faculty** that situates in a specific region of the human brain and gives rise to language acquisition. Some will argue that second language, a language 'learned' beyond the so called **Critical Period** (Lenneberg)—reached around puberty when the brain goes through phases of neurological restructuring—is not qualitatively/quantitatively the same as 'acquisition' as seen via first language, with some linguists suggesting that **learning** can never approximate the natural state of **acquisition**. (Two cases come to mind regarding the Critical Period: (i) The case of 'Genie', (S. Curtiss), and (ii) the case of 'Christopher' (N. Smith, I-M. Tsimpli)). I suppose the notion of trying to learn such a complex system that is meant to be biologically determined presents linguists with some fairly serious issues, many of which are not even close to being resolved, nor will they be any time soon.

While the traditional treatment of grammar usually concerns itself with the basics behind language structure, our treatment of grammar also attempts to frame the general discussion of **language uniqueness** so that, overall, we can gain valuable insight into how the Human Language Faculty works as a complex, rule-based system. In understanding our English grammar, we do so first by understanding the abstract nature of language and how the integral parts of language fit together, down from the smallest levels of the **phoneme**, **morpheme** and **word**, up to the largest levels of **sentence** and **syntactic processing**.

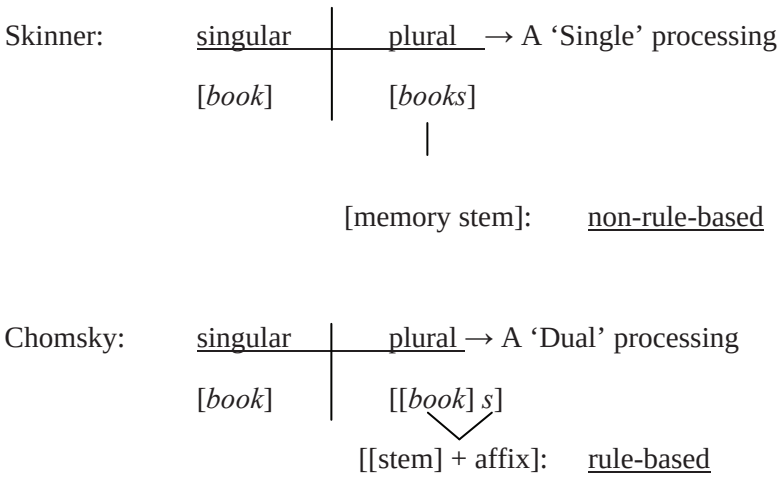
1.2 INNATE RULES OF GRAMMAR: THE LOGICAL PROBLEM OF LANGUAGE ACQUISITION

Perhaps the most crucial thrust of this text is the notion that language is **rule-based** (as opposed to being simply **memory-based**). In what has now become known as one of the most pivotal moments in contemporary linguistics, the theoretical and formal debates between **B.F. Skinner** and **Noam Chomsky** (as represented in Chomsky 1959) are to be considered not simply as a philosophical divide (say, between **Empirical** and **Rational** schools-of-thought (respectively)), but as a new pedagogical approach in coming to understand current experimental results showing how the brain partitions the incoming speech stream into (i) **stems** (which incorporate the associative-memory component of the brain), versus (ii) **affixes** (which incorporate the rule-component of the brain). These distinctions in stem+morphosyntactic processing have been attested in specific language tasks whereby the use of various **brain imaging devices** (fMRI and/or ERP electroencephalography) have shown where **word** recognition and retrieval elicit activity in areas of the brain involved with associative-memory—e.g., [*stem*] → [*book*]—and where **affix** formations elicit activity in areas of the brain

which involve a computation—e.g., [[*stem*]+*affix*] → [[*book*]-*s*]. In other words, before Chomsky it was not at all clear whether or not there was even a distinction to be made in processing between how **words** are stored and how **affixes** are stored. This 'dual' distinction is now part-and-parcel of what makes-up the Chomskyan revolution—namely, that language is processed in two fundamentally different ways. All are still not on board however with such a clear dual distinction: (**Connectionism** and **Single Mechanism Models** vs. **Computational** and **Dual Mechanism Models**). (For recent debates, see Seidenberg, Elman vs. Marcus).

1.3 THE DUAL MECHANISM MODEL

Out of a Chomskyan processing distinction came the **Dual Mechanism Model** (DMM). The DMM (or sometimes referred to as the **Words & Rules Theory** (Pinker)) claims there to be a stark contrast between stem formation and affix attachment. Where it was assumed by Skinner that both the stem [*book*] and stem/affix [*books*] would be uncomposed and memorized as chunks, the DMM would claim that there is a clear demarcation between stems and affixes—so that while stems [*book*] may take on 'Skinner-like' properties of associationism, affixes {s} take on 'Chomsky-like' properties of rule computation. The processing distinctions can be drawn as follows:



Wugs Test. It is this aspect of the debate which motivated the classic 'Wugs test' to be performed by Berko in which young children were observed to add the plural rule [N+{s} = plural] to nonce (non-existent) words such as *wug*. The fact that the children in the experiment produced *wug-s*—a word formation that could not have been simply memorized as a chunk from any preceding input, it being a nonce word not found in

the input—proved that children had an abstract rule capacity for plural which could be applied, absent any priming effect which would otherwise enable the word formation of *wugs* to be retrieved via brute memory. The tacit computational rule [N+{s}= plural] as found analogously in the language (e.g., *car>car-s, book>book-s*, etc.) is the inductive manner in which children applied the process, a true rule application.

For Skinner, the plural {s} would be incorporated and memorized as an entirely new word: viz., a speaker would have a list of words of her language, part of which would contain both the words *book* and *books*, treated both as different items in the **lexicon**. For Chomsky, while the stem *book* would indeed be stored as part of the lexicon, the affix {-s} of *book-s* would come about via a mental processing of [stem+affix] concatenation, or [[book] + {s}]. It is this processing distinction that makes the classic debate so valuable. For instance, first generation Chomskyan studies in which children (for the first time) were observed showed evidence for what is called **over-regularization** of Nouns (plural) and Verbs (past). For example, Chomsky might ask: 'how could it be possible for children to make attested errors such as e.g., *goed* (= went), *drawed* (= drew), *bringed* (= brought), *putted* (put), *tooths/teeths*, etc. if children have stored as chunks all items?' Recall, the nature of **chunking** is based on a 1-to-1 sound-meaning association. For example, the child's production of [*Goed*] as a lexical chunk necessarily entails that the child would have heard it likewise as a chunk, as found in the input. Well, clearly, children are not gaining access to such erroneous utterances from the direct input (provided that moms and dads, brothers and sisters don't speak that way). So, the errors must be coming from somewhere other than the direct input. If Skinner believes in a direct input-to-output 1-to-1 processing of *what comes in goes out* in terms of language, with the brain/mind simply serving as a memory way-station of sorts, then clearly such a direct 1-to-1 processing cannot account for both **creativity** and **child errors** (creativity in the sense that children can readily apply the rule to novel words, as in Berko's **Wugs test**, errors in the sense as shown above). In fact, it is this coupled phenomenon of creativity and errors which weakened the 'too strong a claim' made by Skinner in the famous 1957/1959 exchange with Chomsky regarding language and associationism—viz., Skinner's claim that all language reduces to associative memorization. Therefore the only other means by which children (and adults for that matter) can produce such errors if not via external means is via internal means (i.e., via rules—the malformation and/or under-development of rules). Given this, let's turn to what might amount to evidence for a hidden internal **generative grammar** of language whereby systematic structure is sought out in an environment otherwise reaming with uncertainty.

1.4 HIDDEN STRUCTURE

It seems grammar of any language involves hidden structures which are not necessarily penetrable to simple surface phenomena. That is, one often cannot glean the structure

of language by simply observing the surface structure of a phonological string (say, by observing mere adjacency patterns found in the input). It seems some hidden computational device must be behind how the child goes about acquiring her language. It seems phonological adjacency is not sufficient input as mere attention to sequential input alone would often yield wrong grammatical hypotheses. So, if language input *per se* is not sufficient, what else could be available given that children do eventually work out their grammars? The fact that mere observational powers are not enough to establish a full grammar has led to notions that the child comes equipped, as part of her language endowment, with a predetermined language template we term **Universal Grammar (UG)**. The fact that UG comes free suggests that there is something to the notion that language grammar is innate, as famously argued by Noam Chomsky (1959) in his first attack against behaviorist theories of the day which naively suggested that mere imitation could spawn grammar.

Consider the following famously cited observations which have led to the **Innateness Hypothesis** and theories of language acquisition, noting the mere (S)ubject, (V)erb, (O)bject phonological surface adjacency.

(1) John heard [*me* tell the truth].

S V [S…V……]

(2) John heard [*I* tell the truth].

S V [S…V……]

It seems the single frame [(*heard) Me/I tell*] on the surface creates a fair amount of ambiguity. How CASE (*I vs. Me*) is assigned is not so obvious for a child based on mere observational input: some computational mechanism (solving the 'logical problem of language acquisition') is required to somehow decipher these two ambiguous structures despite the fact that on the surface level phonology, the strings *heard me/me tell* and *heard I/I tell* abide by similar adjacency rules. Some other grammatical factor must present itself in the computation allowing the child to gain access to the syntatic distinction. The factor here would be grammatical Tense and Agreement noting that T/AGR license the subject of the clause to projecting either a NOMinative *I* or an ACCusative *me*. For instance, in (1) above, the ACC *me* is licensed given that its licensing verb is Non-finite (e.g., *telling*) (= John heard *me telling* the truth) and only ACC case pronouns can be licensed by a Non-finite verb (non-finite meaning no Tense/Agreement). Conversely, the NOM subject *I* in (2) is licensed by its finite verb (e.g., *tells*) in the same clause (= John heard (that) *he tells* the truth).

Likewise, consider the examples below complicating the picture even more so with (3) seemingly showing that NOM Subjects *I* must come first in an SVO sequence, though example (4) seemingly shows on the surface phonology an Accusative *Me* subject working against that SVO hypothesis.

(3) *I* give up chocolate!
(4) Me, *give* up chocolate?!

Again, of course while the underlying computational structure is not the same—with the NOM *I* subject in (3) functioning as the subject of simple present tense exclamative sentence and the ACC subject *me* in (4) functioning in the **default** Case form for purposes of focus of an otherwise imperative echo question—there is nothing in the direct phonological input that would indicate to the child, one way or the other, which case of the Pronoun would have to be used, Nominative or Accusative. The default form in English is the ACC case in the sense that whenever there is no structural Case—i.e., nothing in the sentence structure that would license Case for the subject—the default ACC form is utilized (e.g., *Who likes ice cream*? … *Me*! *Me* accusative (and not *I* nominative) is the default form which automatically surfaces for such unlicensed Case assignment. E.g., What, *me*, (you think) *I* should give up chocolate?! = [What [me give up chocolate]]).

Further examples come from the nature of Reflexives. Consider the position of the Reflexive Pronoun in the examples below (the index $_i$ shows that the two elements share coreference) (* indicates an ungrammatical structure):

(5) [Mary$_i$ washed herself$_i$].

S V O

(6) * [Herself$_i$ washed Mary$_i$].

* O V S

Notice that only SVO (Subject, Verb, Object) is possible for this configuration, and not OVS as shown by (*6). So, what a child might take away from this phonological sequencing is that OVS is strictly not allowed.

In considering examples (7) and (8), while the above SVO hypothesis obtained by the child would be correct, it would also have to somehow trump other observational phonological sequencing that does allow for a contradictory OVS order, as in 'Herself tired Mary' (where 'herself' ('her') would be considered the object of a clause).

(7) Washing [herself$_i$ tired Mary$_i$].

O V (S?) (showing surface OVS order)

(8) *Washing [Mary$_i$ tired herself$_i$].

(S?) V O (showing surface SVO order)

In fact, given our SVO preference above (5), we now must reconcile this new example (7) that doesn't allow in the bracketed clause our previously correct SVO order, but rather stipulates for what appears to be an OVS order (though it might be better thought of as an OVX order with X at least not being a NOM subject. Even still, an erroneous OV order would be hypothesized as based on the surface phonology). In sum, what was deemed incorrect in (6) due to incorrect OVS word order, is now a possible construction in (7), and what was a correct word order in (5) is now incorrect in (8). How is the child ever to make-out such counter-data found in the input?

The last consideration is the nature of embedded clauses. Consider below:

(9) John thinks that [Tom$_i$ likes himself$_i$].
(10) *John$_i$ thinks that [Tom likes himself$_i$].

It seems that the antecedent (the item being referred back to) of the Reflexive Pronouns (*himself*) must be the closest Noun (DP) (i.e., the DP antecedent and Reflexive must position in the same bracketed clause, ruling out (10) above). However, once again, there may be competing analogies upon which a child could deduce. For instance, sometimes there are possible multiple antecedents (13).

Consider the examples below:

(11) *John promised [Tom$_i$ to like himself$_i$]. (cf. 9)
(12) John$_i$ promised [Tom to like himself$_i$]. (cf. 10)
(13) [John$_i$ gave Mary *a picture* of himself$_i$].
→ [John$_i$ gave Mary *John's picture*$_i$ of himself$_i$].

Given our rule for (9, 10) which suggests that the antecedent of the reflexive must be in the same clause, we immediately encounter opposing evidence taken from (11, 12) above. Further consider below how it might be complicated for the child to devise a surface phonological analogy leading to the usage of Tense.

(14) [He *is* banned from traveling].
(15) The government demanded that [he *be* banned from traveling].
(16) [He *has* finished the exam by noon].
(17) The Prof. ordered that [he *have* finish the exam by noon].
(18) [She speaks to her lawyer about the matter].
(19) I suggest [she speak to her lawyer about the matter].
(20) I didn't know [John smokes].
(21) I have never known [John smoke].

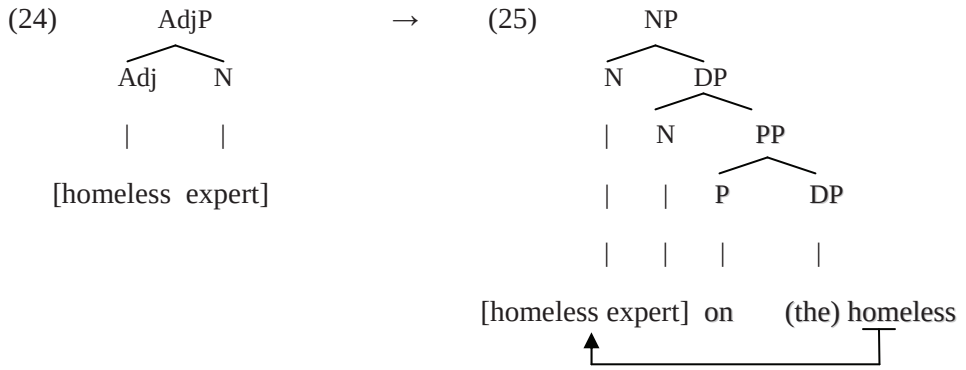
Note that the fine task of figuring out Tense is no simple matter. One could claim that Finite Verbs (Verbs which show Tense) must be licensed by a NOM Case subject (e.g., *He is/has/speaks/wanted*…). However, as found in (15, 17, 19, 21), these grammatically correct structures do not show this NOM-subject-to-Finite-verb correlation: viz., while the subject is NOM (*He, She*), the verb is seemingly a Non-Finite infinitive without tense (*be/have/speak/smoke*). Of course, in order to properly talk about these structures, we must be able to spell-out their appropriate grammars. By speaking about such complex grammars suggestively as if they were mere combinatory phonological strings completely dismantles any working notion of a grammar and leaves us with no means to account for the richness of language and the hidden knowledge children must have in order to secure their language.

A further case for confusion in the input data can be expressed by ambiguous sentences/phrases. Without the utile incorporation of syntactic trees, such ambiguity cannot be teased apart.

Consider the two examples below:

(22) Homeless experts (= experts who are homeless) (cf. 24)
(23) Homeless experts (= experts on the topic of homelessness) (cf. 25)

So, the mere fact that both phrases sound the same only captures the surface-level phonology. There are in fact two different syntactic levels here, as can be shown via tree diagrams showing word-level, syntactic movement. In (25) below, we see how the reading in (23) (as compared to the reading in 22) can be diagrammed:



Despite the ubiquitous nature of this counter data, the child nevertheless arrives at a computation that leads her to a steady state of grammar (an adult state which we call the **target grammar**). One could argue that pure, observational data driven by input alone just doesn't suffice in holding the amount of **positive evidence** required for the child to eventually arrive at a correct, hypothesized-based grammar. In addition,

studies continuously show that **negative evidence,** a second form of evidence which could be made available to the child for hypotheses testing, as attested by correction, etc., just doesn't seem to be present in any significant way for the child. In other words, parents seldomly provide error correction as part and parcel of their language exchange. It has rather been shown that when parents do correct, they do so by targeting false statements, and not by targeting false grammars. This very problem has been termed the **Poverty-of-Stimulus** argument. The simple fact of the matter is that children come to the data seemingly with built-in hypotheses about how languages work (at a universal level). (Children may veer off slightly in their hypotheses testing as they fashion their target grammar, but never too far off—that is, children never entertain 'wild grammars' of the sort which would be unconstrained by UG). It is owing to these built-in universal hypotheses that the child arrives at a grammar irrespective of the fact that the data are lacking in fundamental ways. Such rationale has spawned notions of **innateness theories** concerning language development.

And finally, it seems once the child does gain the upper hand on these hidden syntactic structures, it still may not be enough. Consider below the sentence pairs which contain identical (hidden) syntactic structures yet which manifest ambiguous or different readings.

(26) (a) John saw Mary with *a telescope.*
(b) John saw Mary with *a boy*.

(27) (a) I *know* John who is standing at the bar.
(b) I *know* John standing at the bar.
(c) I *found* John who is standing at the bar.
(d) I *found* John standing at the bar.

Although (26) has the same hidden syntactic structure, there are two possible readings for (26a), but not so for (26b): (viz., (26a) *John has a telescope (with which he sees Mary) vs. Mary has a telescope (as seen by John)*). Likewise, the hidden structure of (27a-d) are essentially the same though only (27a-c) derive the same reading. (27d) doesn't necessarily derive the same reading (viz., the *finding* of *John* (in 27d) is in fact seemingly pegged to his location *at the bar*). In the other three readings (a-c), the 'knowing' and 'finding' of 'John' is not pegged to the location *at the bar*).

Notwithstanding such syntactic closeness, these ambiguous structures too will eventually have to be sorted out by the child, seemingly on a **lexical level** in addition to a **syntactic level** since the different readings stem from differences in **semantics** and not entirely from **syntax**. Whatever these innate rules may be which guide the child toward syntax, these same rules will similarly have to guide the child with both her learning of word and subsequent mapping of word onto syntax.

1.5 BIOLOGICAL BASIS FOR LANGUAGE

We now know that the 'brain-to-language' correlation is physiologically real: that is, we see specific language tasks (such as retrieval of *verbs, nouns*, such as *phrase structure constituency*) activate specific areas of the brain. In sum, what we shall term **Lexical Categories** in this book (e.g., *Nouns, Verbs, Adjectives, Adverbs*) will be said to activate the **Temporal Lobe** region of the brain (Wernicke's area), and what we shall term **Functional Categories** (e.g., *Determiners, Auxiliaries/Modals*) will be said to activate the **Left Frontal Lobe** region of the brain (Broca's area).

When we reach that juncture in our discussion which requires the drawing of tree diagrams, we must keep in mind that we are not simply drawing trees, but rather, what we are drawing is indeed a modeling of what we believe is going on inside the brain: a brain-to-language mapping. In fact, we will come to view trees as being cryptic models of the inner-trappings of our brains, so that when we process some aspect of language, we might visualize what is going on in our heads. Trees allow us to model such a mapping.

1.5.1 Brain/Mind-Language Relation

It is now largely accepted that language is subserved by two major regions of the brain: **Broca's area** (left-front hemisphere), and **Wernicke's area** (temporal lobe). As stated above, the differing activation areas seem to present us with categorical distinctions between **lexical** substantive words and **functional** abstract words. Also, it has been reported that the same distinctions hold between (rule-based) **Inflectional** morphology—e.g., the insertion of {s} after a noun to make it plural, (e.g., *book-s*)—and (rote-learned) **Derivational** morphology—e.g., the insertion of {er} after a verb to change it into a noun (e.g., *teach-er*). The picture is much more complicated as is made out here, with some overlap of processing that may blur clear distinctions. However, overall, the brain does seem to behave as a Swiss Army knife of sorts, with specific language tasks activating specific regions of the brain. This **dual distinction** is best shown in brain imaging studies using **fMRI** (functional Magnetic Resonance Imaging) and **ERPs** (event related potentials) whereby different areas of the brain undergo different blood flow as triggered by specific language-based tasks.

1.5.2 Connectionism vs. Nativism

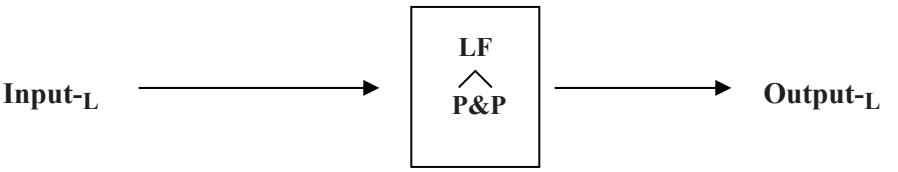
Connectionism. Some cognitive psychologists and developmental linguists wish to attribute a greater role of grammar and language development to the **environmental interface**. By stressing the 'exterior' environmental aspect, connectionists attempt to show correlations between the nature of the language input and subsequent language processing leading to output. Connectionism suggests that there is often a

one-to-one mapping between input and output as based on thresholds of type/token item frequency. Their models assume that though language input is 'stochastic' in nature (i.e., random), the child has an inborn statistical calculus ability to count and uncover patterns which lead to the formation of a given grammatical state. They further suggest that the only way a child can gain access to the stochastic surface level phenomena of language is by brute powers of analogical association. Such powers of association are assumed to be part of the general knowledge the child brings to bear on the data, a general knowledge as found in cognitive problem solving skills.

Unlike the **nativist position** (on the one hand) which upholds the view that the language faculty is **autonomous** in nature and **formal** in processing (i.e., not tethered to 'lower-level' cognitive arenas of the brain), connectionists argue against **formalism** and do not assume (nor believe) such 'higher-level' processing specific to language. Connectionists prefer a more **functionalist** stance in claiming that language development arises in its own niche as the need to communicate increases. Due to their functionalist stance, connectionists don't theoretically need to stipulate for an autonomous rule-based module in the brain. Connectionists rather believe that brut cognitive mechanisms alone are in of themselves enough to bring about language development. In stark contrasts to the nativist position stated below, connectionism assumes language development proceeds much in the same manner as any form of learning. (See Marcus for an overview of the ongoing debate).

Nativism. Other cognitive psychologists and developmental linguists rather place the burden of language acquisition squarely on the **innate interface** by stressing the internal aspect generating the grammar. While innate models also support the notion that the environment is stochastic in nature, they do so by stressing that the perceived input is at such a high level of randomness, with apparently ambiguous surface-level phenomena found at every turn, that one must rather assume a preconceived template in order to guide the child into making appropriate hypotheses about her language grammar. Otherwise, without such an innate template to guide the child, the randomness is simply too pervasive to deduce any workable analogy to the data. An important rationale of nativism is its claim that language development is much too stochastic in nature for the available input to make much of an impact on the child's learning scheme. Much of the work behind nativism is to show just how the child's perceived data are much too impoverished to determine an appropriate grammar of that target language (as was determined by the poverty of stimulus argued earlier in this chapter). In other words, since an appropriate minimum level of order is missing in the input, an innate module of the brain termed **Universal Grammar** (more currently being called the **Language Faculty**) must step in to supply whatever rules might be missing from the environmentally driven input.

The nativist model places its emphasis on the inner working of the brain/mind relationship to language by stipulating that there are innate **principles** which guide the language learner into making appropriate hypotheses about the **parameters** of a grammar being acquired. This Principles and Parameters model as illustrated below shows how (i) the language input first passes through the Language Faculty (LF), (ii) the LF determines the correct parameter settings (Principles & Parameters), and (iii) the parameterized language gets spelled-out in the output:



1.5.3 The Principles and Parameters Model

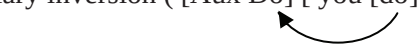
In summary, with more detailed discussion to follow, the Principles and Parameters Theory (PPT) removes the (conscious) burden of 'learning' language off of the child and rather positions the innate LF as a (subconscious) 'intervening computational system'. Chomsky claims it is this specific LF which is housed as an autonomous module for language, and not some general cognitive learning apparatus, which plays the greater role in the language acquisition process. In one sense, PPT interpretations suggest that LF holds all possible human grammars in the head of a child at any one time prior to parameterization (which is at about two years of age). In this sense, very young children, say before the age of two, are really citizens of the world. This is one way to view the term **Universal Grammar**. Even potential grammars that don't get realized in terms of a language are held as potential bundles of parameter settings waiting to be set by the relevant input the child would receive. This greatly reduces the role of 'active' **learning** and rather emphasizes the role of 'passive' **triggering** of the appropriate parameter settings which then form the spell-out of a specific language (say, English or French or German). In other words, PPT redefines a 'Language' as a set of specific bundles of arrangements of parameter settings (of which there could be as many as twenty or so).

Some of the basic parameters have to do with **Word Order** of a specific language type. For instance, languages that are SVO (Subject, Verb, Object) reduce to a parameter that specifices that **Head** of a **Phrase** place in **initial position**—

(28) [VP [V (head) *like*] [N (complement) *ice-cream*]], (+ **Head initial**)

or if a language allows verbs to invert or wh-words to move—

(29) Auxiliary inversion ([Aux Do] [you [~~do~~] smoke?]) or, (+ **Aux Invert**)



(30) [What do [you ~~do~~ study ~~what~~?]]. (+ **Wh-movment**)

Based on parameters being binary in nature [+/- setting], we could account for languages which do not allow such verb or wh-movement (as found in Chinese) or of languages which rather maintain the Head of a Phrase as Head Final (or [-Head initial]) (as found in Korean)—

(31) [VP [N ice-cream] [V like]].

There are sound reasons to be suspect of any putative form of active learning of language outside of what parameters would provide. As noted earlier, it may very well be that language is just that kind of a biologically determined system (as is cell division or the acquisition and fending off of a virus) which can't be learned, delearned, or abridged (by statistical counting or otherwise). And so nativists take as their biological null hypothesis the assumption that some maturational scheduling of the innate LF must serve as a surrogate learning mechanism and, in time, deliver the language grammar.

1.6 THE CRITICAL PERIOD HYPOTHESIS

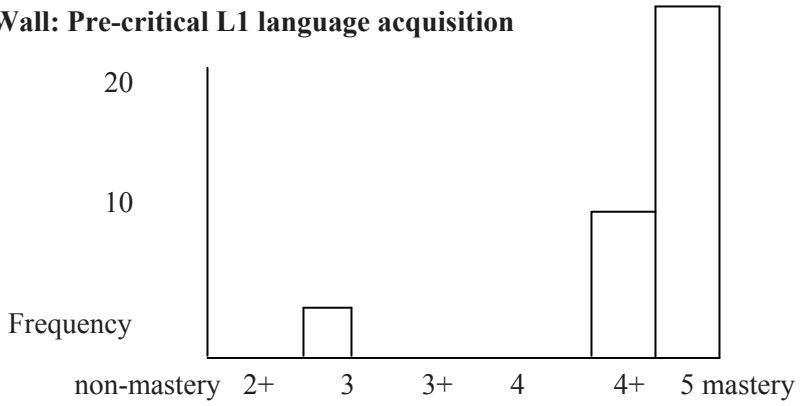
If language is biologically determined, might there be a closing window of opportunity for such a biological system to manifest a full fledge grammar? Many think so. In fact, the critical period has been used to help account for the well known fact that the learning of a second language (during adulthood) seldomly seems to progress as smoothly as the acquisition of a first native language (during childhood). But to speak of a critical period is somewhat strange. One doesn't typically speak about critical periods when we are dealing with 'learned endeavors', i.e., cognitive problem solving skills, etc. For instance, one doesn't necessarily assume that there is some upper age limit that would prevent a wishful adult from, say, learning how to drive a car, granted there is no disability that would otherwise hamper cognitive learning. Conversely, pre-critical period child language doesn't seem to follow the typical **bell shape curve**

found in learned activities which show a statistical bell curve of distributional mastery for the given activity. (See insert below). It seems that if there is a critical period, it doesn't support any putative culture-bound 'learning of language' *per se*. Rather, it seems a critical period has more to do with an endowed human gift for 'acquiring a language'—an acquisition that (i) is our free birth right, making-up part of our species-specific genetic code (the mental/internal component), that (ii) must be triggered by the natural input (the material/external component), and that (iii) than closes up at around puberty, fully after the acquisition has been secured. If there is any concept of learning taking place within language acquisition, it would be with the material/external second component, though nativists would prefer to us the term **parameter setting** instead of **learning**, since parameter setting is considered to be done on a more passive, subconscious level.

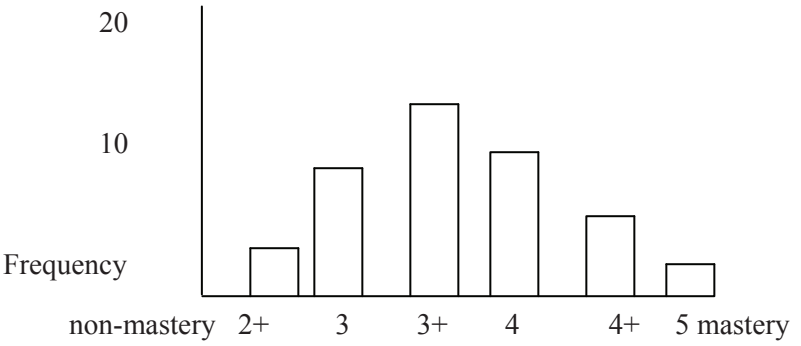
One of the more striking distinctions made between nativism and classic behaviorism is that the former assumes parameter setting and language knowledge thereof to be of an implicit nature, (i.e., grammar is considered a form of **procedural** knowledge we don't normally access on-line), while the latter affirms that knowledge of language is **declarative**, active and arrived at by a conscious will. Having said this, there seems to be some consensus brewing from both sides of the debate that, minimally, some form of innate *a priori* knowledge or mechanism is indeed required in order for a child to speculate on the range of possible hypotheses generated by the input. Current arguments today, often termed the **Nature of Nurture**, therefore may boil down to only the second component cited here—viz., of whether or not 'learning' is taking place or whether 'parameter-setting' more accurately describes the acquisition process. It seems now all but a very few accept the idea that some amount of an innate apparatus must already be realized by design in order to get the ball rolling. So, it is becoming more recognized that the cited first component which speaks to the mental/internal nature of language must be somehow given *a priori* if any feasible theory of language is to be offered—much to the credit of Chomsky and to the chagrin of the early behavioralists of the pre-Chomskyan era.

Bell Shape Curve. Bar charts showing a bell curve for post-critical second language learning (L2) and a 'right-wall' for pre-critical first language acquisition (L1). (Patkowski 1980, taken from Lightbown and Spada, p. 63).

Right Wall: Pre-critical L1 language acquisition



Bell Shape Curve: post-critical L2 language learning



Such data have been used in the literature to support not only claims for a critical period hypothesis for first language acquisition, but also in support of more general claims that L2 is on a par with declarative conscious learning and is fundamentally different from the procedural parameter setting of L1. Note that all learned activities follow the bell shape curve. (For a good discussion and relative history of the subject, see Herrnstein & Murray vs. Gould).

1.7 FUTURE RESEARCH AND DIRECTIONS: WHERE DO WE GO FROM HERE?

In addition to core questions as to what forms the bases of our grammar, other peripheral questions regarding the uniqueness of language, the biological basis of language, along with notions of a critical period and brain imaging of language related tasks, etc. will remain with us for a very long time to come. Ongoing, as we begin to understand the many complexities behind this brain-to-language relation—while keeping up with current pursuits for utilizing brain imaging devices—our continual aim is to sustain

this *shift* in linguistics from being a mere typological, classificatory and historical discipline, a branch of humanities (though fruitful as it has been in its own right) to being a hard scientific discipline, on a par with biological studies.

The material as presented in this text squarely comes down on the nativism side of the debate. However, what is important to understand is that both connectionism and nativism have their own unique roles to play in determining language processing and grammar development—both are to certain degrees correct depending on what aspects of language one is talking about. For instance, it may very well be that vocabulary learning is associative-driven and sensitive to frequency. It seems though that the same arguments seemingly cannot be made for syntax, which relies more on a computational algorithm to detect hidden rules of grammar. As will unfold in the following pages and chapters of the text, the debate between associative vs. rule-based systems, or connectionism vs. nativism, will make itself known, so much so that the debate will actually infiltrate all aspects of our discussion of grammar.

As a final note, I firmly believe the greatest impact to be made on our future understanding of language and linguistics will be in how we come to partition specific regions of the brain which are responsible for specific language tasks. Our understanding of grammar, viewed in this way, will be informed as based upon our understanding of the brain-to-language relation.

FURTHER READING

Bates, E. & B. MacWhinney (1982) Functionalist Approaches to Grammar. In L. Gleitman & E. Wanner (Eds) *Language Acquisition: The State of the Art.* (173-218) Cambridge University Press.

Berko, J. (1958) The child's learning of English morphology. *Word* 14: 150-177.

Chomsky, N. (1959) Review of *Verbal Language* by B.F. Skinner. *Language* 35: 26-58.

——— (1965) *Aspects of the Theory of Syntax.* MIT Press.

——— (1972) *Language and Mind* (enlarged edition). Harcourt Brace Jovanovich.

Cook, V. (1988) *Chomsky's Universal Grammar.* Blackwell.

Curtiss, S. (1977) *Genie: A Linguistic Study of a Modern-Day 'Wild Child'*. Academic Press.

Fodor, J.D. & C. Crowther (2002) Understanding Stimulus Poverty Arguments. *The Linguistic Review*. 19: 105-45.

Gould, S.J. (1981) *The Mismeasure of Man.* W.W. Norton.

Harley, T. (3rd Ed. 2008) *The Psychology of Language.* Psychology Press.

Herrnstein, R. & Murray, C. (1994) *The Bell Curve***.** Free Press.

Hoff, E. (3rd Ed. 2005) *Language Development* (Chapter Two). Thomson/Wadsworth.

Honda, M. & W. O'Neil (2008) *Thinking Linguistically*. Blackwell.

Hyams, N. (1986) *Language Acquisition and the Theory of Parameters*. Reidel.

Lenneberg, E. (1967) *Biological Foundations of Language.* Wiley.
Lenneberg, E. & E. Lenneberg (Eds., 1975) *Foundations of Language Development*. Vol. 1. Academic Press.
Lightbown, P. & N. Spada (revised) *How Languages are Learned*. Oxford University Press.
Marcus, G. (1999) Do infants learn grammar with algebra or statistics? Response to Seidenberb & Elman, Eimas, and Negishi. *Science* 284: 436-437.
——— (2001) *The Algebraic Mind*. MIT Press.
Pinker, S. (1994) *The Language Instinct.* William Morrow & Co.
——— (1999) *Words and Rules*. HarperCollins.
——— (2002) *The Blank Slate.* Viiking.
Pinker, S. & P. Bloom (1990) Natural Language and Natural Selection. *Behavorial and Brain Sciences* 13: 707-784.
Seidenberg, M., & J.L. Elman (1999). Do infants learn grammar with algebra or statistics? Letter to *Science* commenting on Marcus et al., 1999. *Science* 284: 433.
Skinner, B.F. (1957) *Verbal Language.* Prentice-Hall.
Smith, N. & I-M. Tsimpli (1995) *The Mind of a Savant: Language Learning and Modularity*. Blackwell.