

# LANGUAGE PATTERNS AND INNATENESS

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## Abstract

The question whether and to what extent language should be regarded as an innate endowment of the human brain or the result of (ontogenetically) environmental stimulus and (phylogenetically) historical development is still open. The paper proposes some evidence, strictly linguistic in nature, against the widespread idea that the acquisition of language features from the stimulus available to the child should be impossible without an innate Universal Grammar working as a Language Acquisition Device already present in the brain at birth. It also evaluates in a methodological perspective the two main paths of explanation for the presence of linguistic features in our competence, namely their being encoded in a brain module and their being acquired from experience, concluding that - on epistemological grounds - the latter has to be preferred.

## 1. Introduction

Language may be innate at birth, i.e. the brain may

(A) contain a specifically linguistic (grammatical) module<sup>1</sup>, or not.

In the former case,

(B) such a module may have developed through natural selection, or not.

Question A logically precedes question B, because, if the answer to it is negative, then question B is devoid of sense. But euristically, question B can be treated as prior to question A, in that a possible demonstration that a grammar cannot have developed in the brain according to the laws of natural selection may rule out the very possibility of that grammar's having developed inside the brain at all; at least if one accepts that natural selection is the only way by which new features can come into being in organisms<sup>2</sup>.

This may be one reason why some authoritative scholars<sup>3</sup> have ended up denying that language may be the outcome of evolution (intended as natural selection): admitting natural selection at the origin of language would oblige us to admit that what we may have developed by selection in the brain is not the Universal Grammar of all existing languages, rather a set of more general predispositions to acquire and handle any language.

Actually, the Chomskyan idea that our brain contains an innate Universal Grammar, also serving as a Language Acquisition Device, has been believed by virtually half of the linguists in the world for some decades, and meanwhile has literally dominated the way how non-linguists preferred to conceive of the results of linguistics. Recently, it is being significantly re-examined. This has been (and is being) done from at least five perspectives. We list them briefly right away, and then we will concentrate on just one of them.

1. The most influential representative of this idea is, as it is well known, Noam Chomsky. It must be stressed that, although the foundations of linguistic innatism have been established during the Sixties and the Seventies of the past century, this conception of language is still taken for granted within the tradition of generative linguistics (cf. e.g. Chomsky, 1986; 1988; 2005; Hauser *et al.*, 2002; Pinker, 1984; 1994; Pinker & Jackendoff, 2005; Jackendoff, 1997; 2002; 2007; Culicover & Jackendoff, 2005). For some provisional surveys on the matter, cf. e.g. Lombardi Vallauri (2004), Sampson (2005).

2. Much in this way, Christiansen & Chater (2008) refute linguistic innatism by formulating a *logical problem of language evolution*, posed by specific incompatibilities between the way language seems to be made, and the possibility for it to have arisen in the brain through evolution.

3. No less than Chomsky and Fodor (with reference not only to language: cf. Fodor 1998), just to cite the most influential. Chomsky thinks that evolution theory, though explaining many things, has little to say on this matter: "In the case of such systems as language or wings it is not even easy to imagine a course of selection that might have given rise to them. A rudimentary wing, for example, is not "useful" for motion but is more of an impediment." (Chomsky 1988: 167.)

## 2. Describing language acquisition.

Well known experimental work<sup>4</sup>, mainly consisting of longitudinal studies on language acquisition by children, have shown evidence that language competence ontogenetically progresses along patterns not easily compatible with the presence of a grammar in the brain at birth. Roughly speaking, children first manage linguistic expressions which they directly take from the stimulus they receive, and then they increase such expressions in variety and length by simple analogy, without having recourse to grammatical patterns. Grammatical generalizations seem to appear later.

## 3. Locating language in the brain.

The innatist standpoint has been seriously scaled down by some interpretations concerning the results of research on mirror neurons<sup>5</sup>. The common localization, in the brain, of both language and the sensory-motor system, together with the existence of neurons that allow what has been called an "embodied simulation" of other individuals' acts, has suggested a possible origin of language from shared internal representations of sensory-motor events, including the movements by which we articulate linguistic sounds; and it has suggested that language may be much less specific and *per se* than it would be in the hypothesis that a specifically linguistic module (a Universal Grammar) readily exists in the brain at birth.

## 4. Interpreting language universals.

The "necessity" to postulate a Universal Grammar at the basis of all actual languages is usually presented as also arising from the presence of language universals, i.e. features common to all languages: a linguistic module in the brain may be responsible for this<sup>6</sup>. This argument has been challenged mainly from two directions:

### 4.1. Denying language universals.

The first is the refusal of the idea that languages share features that are really universal. Recent studies<sup>7</sup> strongly argue against the existence of any linguistic pattern that may be considered

4. Cf. e.g. Braine (1992), Braine & Brooks (1995), Tomasello (1995, 2000a, 2000b, 2003), Brooks & Tomasello (1999), Brooks *et al.* (1999), Diessel (2004).

5. Cf. e.g. Rizzolatti & Arbib (1998), Gallese & Lakoff (2005), Gallese (2006).

6. Cf. Sampson (2005: 32-35, 50-54) for a summary of this opinion and criticism on the matter.

7. Cf. Evans & Levinson (2009), Cristofaro (2010).

properly universal, including features considered classical, *bona fide* universals, such as the existence of the category “Subject”, and even “Verb”. In this perspective, linguistic “universals” are just prevalent features, strong tendencies that give rise to slightly different phenomena across languages: then linguists classify those similar phenomena respectively by the same names for the sake of practicalness<sup>8</sup>.

## 4.2. Explaining language universals.

The second objection (not unrelated to the first) against postulating Universal Grammar from the existence of features shared by all languages consists of *explaining language universals*<sup>9</sup>. More precisely, of explaining language universals by other means than a universal grammar; typically, by showing what other pressures constrain language to work as it does. Such constraints are of many natures: physical limits of the body parts participating in communication, general elaboration and storage capacities of the brain, social patterns of human communication situations, semiotic features that are required for any symbolic/communication system to be efficient, etc.<sup>10</sup> In this view, when a linguistic universal can be explained by means of some of these constraints, no universal grammar in the brain is needed to explain it anymore.

For all these lines of research, aimed at criticizing the opinion that language as such is innate, we refer to the works cited so far. We will concentrate here on a last one.

## 5. Learning from the stimulus.

A further perspective<sup>11</sup>, that may shed some light on the nature of what we have in the brain as a language-handling device, is strictly linguistic in nature. Over time, the innatist school has presented several linguistic features as proving that there is a grammar in the brain, because such features would be impossible to acquire from the stimulus (i.e. from the samples of language available to the child during acquisition). This idea, though not shared by all linguists, has found enthusiastic acceptance by scholars in neighbour disciplines, on several grounds we cannot dwell upon here, such as the authority of Chomsky himself and, more effectively, the intrinsic appeal of a theory that seems to “free” language from its belonging to cultural products, by positioning it among natural phenomena. But, as Sampson (2002: 73) put it,

Widespread current acceptance of the poverty-of-stimulus idea has apparently come about not because linguists have found the contrary view empirically unsatisfactory, but merely because poverty of the stimulus is for one reason or another treated as an unquestioned axiom.

In fact, “demonstrations” (to be found in the literature) that linguistic features possessed by speakers cannot be acquired from the stimulus are usually too easy. Our perspective consists of showing that, instead, such features can be acquired from the stimulus.

We will exemplify this on a couple of arguments most repeated in the innatist literature<sup>12</sup>. We will try to show that they reveal

8. We agree with this perspective. Our use of the term “language universal” should be understood in this way.

9. Cf. the pathbreaking volume edited by John Hawkins (1982), Lombardi Vallauri (1999).

10. Cf. Lombardi Vallauri & Simone (2008, 2010, in press).

11. This perspective is not new, though probably less developed than it would deserve. Cf. Sampson (2002, 2005); Pullum & Scholz (2002), Lombardi Vallauri (2004, 2008, in press, to appear), Scholz & Pullum (2006).

12. Further examples, more complex in nature and perhaps more significant, are to be found in Lombardi Vallauri (2004, 2008, in press, to appear). Here we lack the space that would be necessary to explain them properly.

two fallacies in reasoning, which affect the innatist point of view, preventing scholars from realizing that the facts at issue can be explained as the effects of the environment.

### 5.1. Disregarding semantics and context. Example: Basic Word Order acquisition

Innatist arguments are too often undermined by reasoning as if language were used and acquired in isolation from reality. In other words, language is seen as coincident with syntax only, disregarding semantics and the context where communication takes place.

A typical example of this, among others, has been adopted in one of the most important handbooks designed to summarize generative linguistics, which explicitly presents a version of the theory (the one called “Principles and Parameters”) particularly suitable for being proposed as the innate Universal Grammar, working as a Language Acquisition Device which should allow children to acquire their language, overcoming the poverty of the stimulus they receive<sup>13</sup>. According to Morgan (1986), children must be endowed with some innate linguistic knowledge because they get to know the right word order of their language although utterances like (1) do not help them understand if it is SVO or OVS:

(1) The dog bites the cat

When confronted to such an utterance, children would have no cues to establish whether its syntactic structure is (a) or (b):

(1a) The dog [bites the cat]  
(1b) [The dog bites] the cat

This is to say that the utterances as such do not reveal who is the Subject and who is the Direct Object of the verb. They would do so iff they were presented to children with some signals (pauses, intonation) of existing syntactic structure, in this case the bracketing of the Verbal Phrase given in (1a).

This way of reasoning is perfectly consequential if one conceives of the language as something purely formal, where meaning plays no role<sup>14</sup>. But reality is different. Children listen to very many utterances everyday, containing information absolutely not syntactical in nature, but very useful for them to establish who is the Subject and who is the Object, such as *The ball has broken the window* or *Jenny stole my GameBoy*. And even (1) probably becomes quite clear on who is the subject if it is uttered in a real context. Now, obviously, all the utterances a child listens to actually are produced in contexts.

Disregarding semantics and context is a side effect of the attitude which gives syntax the primacy in linguistic analysis. One of its consequences, as we have seen, is to look at language acquisition as if it should be guided by syntax alone. This leads to believe that the information available to children in the stimulus is not sufficient for them to build a theory of their language, *exactly because information deriving from semantics and context is not taken into account*. The final consequence of this fallacy is that one is led to hypothesize that the lacking information, still only syntactical in nature, must reside in the brain at birth (Scheme 1). So, syntax is paradoxically promoted as far as to a module in our brain, instead of being simply put next to semantics, pragmatics, phonology, etc. as one of the components of our interpretation of language.

13. Cf. Cook & Newson (1996:117), where Morgan’s argument is presented as valuable evidence.

14. An important exposition of exactly the opposite view is in Chafe (2002).

- Attributing the monopoly of language to syntax
- Disregarding semantics and context
- Conceiving of acquisition as guided only by syntax
- Believing that the stimulus lacks necessary information
- Postulating that such information must be in an innate UG
- Promoting syntax to a module in the brain

Scheme 1. Ignoring everything except syntax leads to believing that syntax is the only important thing.

## 5.2. Underestimating negative information. Example: (non) pro-drop detection

Belief in the innateness of grammar is based also on disregarding the extension and nature of negative information, i.e. the possibility of inferring the non grammaticality of a structure from its systematic absence. It is reasonable to think that children can infer that some elements do not belong to their language, simply because such elements never appear, *even if there are no explicit warnings of their being unacceptable in the stimulus*. Since Chomsky (1965: 25) innatists divide the information received by children into "positive" and "negative". The former consists of utterances produced in their presence without warning of their acceptability, and the latter consists of utterances for which they receive (for instance by their parents) explicit warning of unacceptability, by way of some kind of correction. As Wexler and Culicover (1980: 63) put it:

If the learner hears a sentence, he can assume that it is in his language. But if he does not hear a sentence, it does not imply that the sentence is ungrammatical. Possibly he has simply not yet heard the sentence<sup>15</sup>.

This attitude fails to realize that the systematic absence of a pattern, in spite of thousands of potential opportunities for its occurrence, may be valuable (though implicit) negative information in that it may lead the acquirer to the certitude that such a pattern does not belong to the language<sup>16</sup>. For instance, leading innatists<sup>17</sup> have claimed that the fixing of the so-called *pro-drop parameter* cannot happen without a pre-existing, innate principle. Linguists classify languages into two types according to their behaviour as concerns the explicit expression of the Subject. In "non-pro-drop" languages (like English or French) the Subject must always be expressed, and in "pro-drop" languages (like Spanish or Japanese) it can be omitted. According to the innatist opinion<sup>18</sup>, the only way children can understand how things work in their language is a parametric predisposition resident in their brains, which allows two values: pro-drop and non-pro-drop:

Children must be learning either from positive evidence alone or from indirect negative evidence, such as the lack of null-subject sentences in English. *This is possible only if their choice is circumscribed*; if they know there are a few possibilities, say pro-drop and non-pro-drop, they only require evidence to tell them which one they have encountered.<sup>19</sup>

This opinion leads Hyams (1986) to hypothesize that the fixing of the innate non-pro-drop parameter by English acquirers may be allowed by the existence of expletive subjects. Children

would understand that the expression of subjects is obligatory in English only because the stimulus contains sentences like *it's time for bed* and *once upon a time there were three bears*.

All this is treating children as if they were just personal computers with a very poor software inside. The reason why English speaking children quickly learn that they must always produce sentences with subjects is that the overwhelming majority of the sentences they hear every day all contain overt subjects. On the contrary, Spanish children feel that they do not always need to produce an overt subject because the subject is not always overtly present in the sentences they hear. An innate switch in the brain is not necessary for that.

Although nobody ever tells them, children know that material objects always fall downwards: this is why they are fascinated by coloured balloons filled with helium. The fact that something always happens and something else never does allows for generalizations. The argument that children have no elements to exclude wrong structures because in their experience negative stimuli (parents explicitly censuring a wrong sentence) are extremely rare, considers children as completely unconscious and incapable of generalizations as Gold's (1967) algorithm<sup>20</sup>, which compares input data and grammars, accepting all (and only) those grammars that are totally consistent with the input. But it is not unwise to suppose that children can see the difference between a grammar that (though not violating any explicit prohibition) produces innumerable structures that are not to be found in the input, and another grammar that (beside not violating any prohibition) does not produce any structure unforeseen by the input. Children, unlike Gold's algorithm, induce that if something never happens in thousands of utterances where it could theoretically happen, then such a thing is excluded.

That children may have such an elementary capacity seems also proved by the fact that they give much more difficult performances in the same field. Spanish children (and all native speakers of *pro-drop* languages) *learn by experience* when to make the Subject explicit and when not. This is determined by rules (related to the informational status speakers want to give to the Subject, and the degree of familiarity enjoyed by its referent in the context) that are much more complex than the simple notion that the Subject is optional or not. To be precise, so complex that it is virtually impossible to make them completely explicit in linguistic theory and in the grammars of single languages. At the same time, this information cannot be innate, because it follows different patterns cross-linguistically.

## 6. Epistemological remarks

It may be objected that our explanations of how the child can learn from the stimulus those linguistic patterns that are attributed to universal grammar actually go as far as telling how the child *might well* acquire those patterns, but do not demonstrate that the same patterns do not exist in the brain at birth. In other words, the Language Acquisition Device may be at work, and actually also responsible for the acquisition of some features that - if it were not at work - would be (less easily) acquired only from the stimulus.

In principle this is possible, but it must be stressed that different concurring explanations are not all equally worthy. In particular, the two alternatives considered here can be characterized in terms of different epistemological legitimacy.

On the one side, the knowledge we have so far of the working of the brain is quantitative rather than qualitative, being based on imaging techniques such as PET and fMRI, as well as on the measurements of event related potentials (ERPs) in the brain, such as (E)LAN, MMN or P600, and the like<sup>21</sup>. More specifically, what we know is that the brain activates (at best: in certain

15. Scholars usually focus on the idea that negative information, based on corrections or failure of comprehension on the part of parents, is almost absent in the child's experience. Cf. for example Pinker (1984: 29).

16. This is part of the phenomenon of "entrenchment", described e.g. by Braine and Brooks (1995), Brooks *et al.* (1999), Tomasello (2003: 178-182).

17. Cf. Hyams (1986), Cook & Newson (1996: 110-111).

18. A synthesis of the innatist position on the matter is offered by Cook & Newson (1996), who cite Chomsky a number of times.

19. Cook and Newson (1996: 110-111). Italics mine.

20. Cf. Gleitman & Wanner (1982: 5-7).

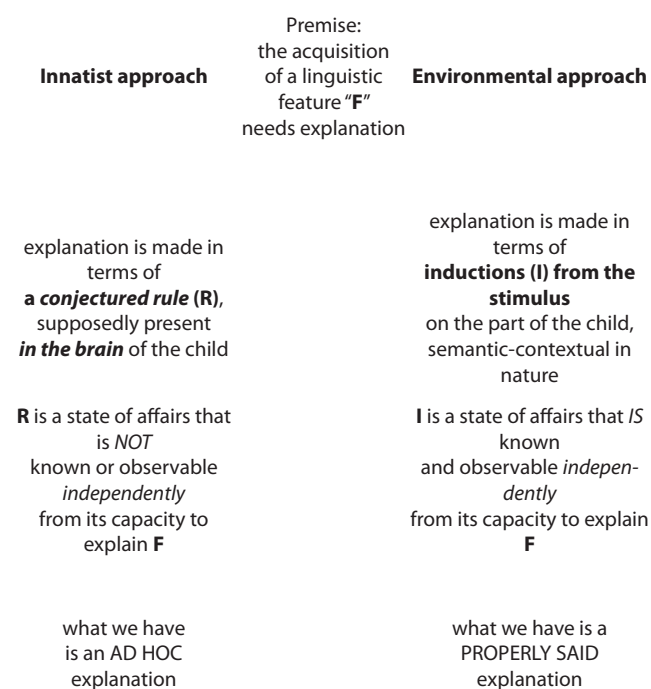
21. Cf. e.g. Moro *et al.* (2001), (2006), Friederici & Weissenborn (2007), Friederici, Steinhauer & Pfeifer (2002), Friederici, Schlesewsky & Fiebach (2008), Crinion *et al.* (2006).

precise areas) when performing certain tasks. We partially know the nature of such an activation in terms of increased biochemical activity; but we completely ignore what the relation may be between physical activity and its subjectively perceived counterparts, viz. thought, language, conscience and so on. There is no cue to understand how something absolutely immaterial as consciousness or meaning can arise from something material as biochemical activity<sup>22</sup>. Just to quote one of the many possible declarations in this sense (Libet 2005: §5.1.1.-5.5.7.):

Why subjective experience emerges from appropriate neuronal activities may be no more answerable than similar questions about other fundamental phenomena. That is, why does mass have inertia? Why do masses exhibit gravitational attraction? Why does matter behave both in wave-like and quantal fashions? [...] The emergence of conscious subjective experience from nerve cell activities is still a mystery.

This is the extent to which we can grasp the relation between the mind (including language) and the brain<sup>23</sup>. But, on the other side, we have a sufficiently wide-ranging knowledge of how language works. On a phenomenological level, it is quite clear that such inductions as those we have attributed to children in sections 5.1. (about word order) and 5.2. (about overt subjects) are possible and even not difficult for a human mind. Similar inductions are possible for hundreds of other linguistic features.

Now, the conceptual links we can establish between our knowledge of language and our knowledge of its anthropological bases (i.e. the *explanations* we can give) vary dramatically according to whether we select the innatist approach or the environmental one. This is shown in Scheme 2:



Scheme 2. Explaining through innatism or environment  
The difference between these explanations is one of episte-

22. Of course there are hypotheses, such as those, e.g., of Edelman (1987, 1992, 2007). But they are just hypotheses.

23. Others express the same lack of confidence in the current possibility to assess how the structure and working of the organism and especially of the brain reflects itself in the working of language. See for instance, Moro (2006: 234): "Trope sono le variabili fisiche, troppo profonda è la nostra ignoranza del sistema neuronale che sovrintende alle funzioni linguistiche, troppo lontano è il raggiungimento di una "linguistica mendeliana" che ci porti a individuare i geni che controllano la facoltà di linguaggio."

mological dignity. This affects the interpretation of any linguistic fact. For instance, in order to explain how children get to know that the language spoken by their parents has obligatory Subject, we might search for an explanation in terms of brain organization. Since it is still impossible to establish what could be in the brain such things as the anatomical/physiological basis for a grammatical rule, we are compelled to *suppose a hypothetical 'structure in the brain'* whose existence makes it explicit to the acquirer that any language must have either obligatory Subject or not, and that s/he must search confirmation for one of these just two alternatives in the stimulus. It may be the right guess, but there is no way to check it independently, by means of specific, qualitative inquiry of brain phenomena. In sum, the only reason to think that such a structure exists is that if it exists it may be apt to explain this aspect of language acquisition. As a consequence, if such a structure is meant to be an explanation for language acquisition, it is an *ad hoc* explanation, circular and tautological in nature.

Under such conditions, the best we can do may still be to assume a specialized brain module as an explanation for linguistic facts, but *just in case there is no other possible path to get an explanation* for those facts. Otherwise, solutions in terms of 'brain structure' should be regarded as violations of Occam's razor, since what they definitely do is creating *entia (explicationis) praeter necessitatem* from scratch, in order to account for things that can be explained in other terms with more connection to empirically observable facts. For example, the speakers' awareness that their language has obligatory Subject can be attributed to a mental capacity which is separately observable in other domains of human consciousness (such as, in this case, the capacity to generalize a pattern from its overwhelming occurrence). This means having recourse to real and observable facts: as a consequence, this explanation must be preferred to the ones that consist in *ad hoc* stipulations (such as the existence of a dedicated brain structure), and methodologically rules them out.

## 7. Conclusions

Although we have not directly addressed the problem of what kind of structures devoted to language should have evolved in the human brain, in section 5 we may have added a little contribution, specifically linguistic in nature, to the understanding of what those structures may *not* be. In particular, we have tried to show that some pretended evidence of the presence of an innate universal grammar is no evidence at all. Our argument adds itself to the different ones we have summarized in sections 2-4, in supporting the view of language as a function managed by more general-purpose brain modules, probably common to other functions of the mind. In this view<sup>24</sup>, the brain preconditions for the management of language are not as specific as a (universal) grammar; the (different) grammars of the languages are historical products of human civilization, and we acquire them from our environments because they are not in anyone's brain at birth.

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24. Obviously, it is the view maintained in many different ways, against Chomsky's, by scholars from different disciplines such as, just to cite a few, Jean Piaget (cf. Piattelli Palmarini (ed.) 1979), Hilary Putnam (cf. Putnam, 1967), Philip Lieberman (cf. Lieberman, 1984; 1991), and many others.

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