THE METHODOLOGY AND ONTOLOGY IN BIOLINGUISTICS

The Disassociation of Methodology and Ontology in Biolinguistics:
An Application of Kant's Philosophy to Generative Linguistics

**THE DISASSOCIATION OF METHODOLOGY AND ONTOLOGY IN
BIOLINGUISTICS:
AN APPLICATION OF KANT'S PHILOSOPHY TO GENERATIVE
LINGUISTICS**

By Li Runze, B.A.

A Thesis Submitted to the School of Graduate Studies in Partial Fulfilment of the
Requirements for the Degree Master of Science

McMaster University MASTER OF SCIENCE (2020) Hamilton, Ontario (Cognitive Science of Linguistics)

TITLE: The Disassociation of Methodology and Ontology in Biolinguistics:

An Application of Kant's Philosophy to Generative Linguistics

AUTHOR: Li Runze, B.A. (McMaster University)

SUPERVISORS: Professor John Colarusso, Professor Magda Stroinska

NUMBER OF PAGES: VI, 61

LAY ABSTRACT

This thesis criticizes the general biolinguistics enterprise in terms of the *first* suggestion that Kant would give in chapter 2.6; namely that biolinguistics distances itself from reality. Generally, like all dogmatism or rationalism that Kant meant to criticize, biolinguistics is no exception. However, it redeems itself from being yet another dogmatism with this seemingly justified **disassociation of ontological dualism and methodological naturalism**. It is doing this so covertly that many scientists fall into believing it is a science. As an undergraduate student, I was always awed at ideas like universal grammar and how it affects language learning. My impression was that Kant was being *re-invited*: that unlike other language theories, nativism recognizes that the internal epistemological factors are part of the language itself. This is parallel to Kant, for Kant recognized how a seemingly completely external entity such as experience is actually heavily constructed by our cognition. Then, there was something that did not feel right, something that was *not very Kant* when I heard "language came from a sudden mutation around…years ago and had no evolution; children learn L1 so effortlessly solely because of the language organ; language is biologically innate…". I now know and will argue that they all come from the disassociation that I did not notice then, the disassociation that makes linguistics only a science on the surface but a dogmatism in the core, like demonology.

ABSTRACT

In this thesis, I argue that the current biolinguists commit a categorical error when they study the so-claimed "language organ" (an ontological non-naturalist act) with methods that (they claim) align with natural sciences (a methodological naturalist act). I will argue that they are turning linguistic studies into "demonology", a cult-like dogma, by having this disassociation in their ontological and methodological views, for this disassociation lets linguistics lose the ultimate ground that validates all knowledge: the reality, or *experience* in Kant's term. In turn, this disassociation enlarges the split of current linguistic study: the generative/biolinguistics vs. the cognitive linguistics/psych-linguistics/ usage-based linguistics (or whatever other name one wants to call them). I will first briefly introduce what Kant said about similar issues (**chapter 2**). Then, I will introduce the disassociation of methodological and ontological naturalism in current linguistic doctrine (**chapter 3**) and how this disassociation is turning linguistics into a self-entertaining demonology with examples of *the language organ*, *language evolution*, and *Principles and Parameters*. **Chapter 4** will be a discussion as why things have become what they are, and ends with some conclusions

Acknowledgements

I would like to thank the two supervisors in my committee, Professor John Colarusso and Professor Magda Stroinska, whose expertise was invaluable in formulating this thesis question. Their insightful feedbacks have set a professional example for me and brought my work to a higher level. I also thank them for bringing me to this program in the first place.

Table of Content

Li Runze (Hector)
Student ID: 001317140
McMaster University
Supervised by Dr. John Colarusso and Dr. Magda Stroinska

The Disassociation of Methodology and Ontology in Biolinguistics:
An Application of Kant's Philosophy to Generative Linguistics

Chapter 1. Introduction

Most, if not all, of our linguistic knowledge begins with experience. For we cannot set our linguistic ability to act without the objects that activate such an ability. The objects (of such ability) awaken our linguistic competence, and set it to act further to compare and relate the sensible impressions into "representations[1] of the objects", called *language*. Therefore, in a temporal sequence, there was no language before experience in the beginning. It is with experience (of language, of course) that all speech begins.

However, even if all our linguistic activities[2] begin with experience, it does not mean all of them originate from experience. To put it this way, there is some linguistic knowledge (knowledge about our linguistic activities) **prior to** our (linguistic) experience, prior to our experience not in a temporal sequence, but in a **logical** sequence. Thus, it could well be the case that our language is a compound of two things: 1) the (knowledge about) language we receive from impressions, via sensory organs, after a series of complex interactions with non-empirical systems[3]; and 2) our own linguistic ability (or language competence[4], merely

---

[1] **Impression:** German *der Eindruck*, originally from Hume. See Hume's *An Enquiry Concerning Human Understanding* 2.12 (1748): "By the term *impression*, then, I mean all our more lively perceptions, when we hear, or see, or feel, or love, or hate, or desire, or will."(Hume, 1748, 2.12)

[2] *Linguistic activities and language* mean the same in this thesis. Both refer to the use or practice of language in any circumstance.

[3] For how exactly we form impressions after (sensible data's) "complex interactions with non-empirical systems", please turn to Immanuel Kant and his *Critique of Pure Reason*.

[4] *Language competence* is defined as the general ability to perceive and produce language, an ideal system that enables us to speak, opposite to (actual) *language performance* (Chomsky,

prompted by the impressions). We are used to confusing the latter with the basic cognitive

elements in the former, like sensible data (language experience or exposure to languages in

the case of this thesis). For example, we usually confuse the mere contributions ("der

Zusatz") from the linguistic ability, with the contribution from the language experience. The

difference between these two only become obvious after long practice.

 Now, at least we have a question not to be ignored at the first glance, but one that

requires a closer examination: whether there would truly be such a kind of knowledge

independent of all experience, and even independent of all impressions of the senses? We call

this kind of knowledge **a priori**[5], and distinguish it from **a posteriori**[6] knowledge, the

empirical knowledge[7] (not all knowledge that comes from experience is empirical

knowledge[8]).

 For more information about the merit in the above paragraphs, please refer to Kant's

Critique of Pure Reason (B1-B2)[9] published in 1787. This thesis means to bring some

Kantian reflection to modern day linguistics.

1965, pp 3-4).

[5] **a priori**: Latin, meaning *from the former/ precedent*. Further clarification will emerge in **chapter 2**.

[6] **a posteriori***:* Latin, meaning *from the latter/ following*. The noun *posteriori* is the ablative form of the female third-declension noun *posterioritas*, meaning *what is in the inferior position*.

[7] **Empirical knowledge**: the empirical **elements** in our language and knowledge about language. It is different from experience in that to have language (or experience), one already has the **non-empirical** knowledge or elements of language. Please refer to **chapter 2** of this thesis for a closer explanation.

[8] In this thesis, without additional specification, all *experience* refers to *experience of* or *exposure to language*. Also, as you can see from **footnote 7**, the *experience* is different from that in empiricism, or what we usually understand as experience. We take experience as what we receive through sensible organs (i.e. senses). However, this is not the case argued in this thesis.

[9] This thesis adopts the special yet the conventional margin when quoting Immanuel Kant's *Kritik der reinen Vernunft*, like "(A.../ B...)" or simply "(B...)". "A" refers to the first edition

1.1 The scope of this thesis

For the record, current biolinguistics does not take the disassociation of methodology and ontology in biolinguistics (as shown in the title of this thesis) as a problem. This thesis does.

In this thesis, I argue that the current biolinguists commit a categorical error when they study the so-claimed "language organ" (an ontological non-naturalist act) with methods that (they claim) align with natural sciences (a methodological naturalist act). I will argue that they are turning linguistic studies into "demonology", a cult-like dogma, by having this disassociation in their ontological and methodological views, for this disassociation lets linguistics lose the ultimate ground that validates all knowledge: reality, or *experience* in Kant's term. In turn, this disassociation enlarges the split of current linguistic study: the generative/biolinguistics vs. the cognitive linguistics or psycho-linguistics usage-based linguistics (or whatever other name one wants to call them). I will first briefly introduce what Kant said about similar issues (**chapter 2**). Then, I will introduce the disassociation of methodological and ontological naturalism in current linguistic doctrine (**chapter 3**) and how this disassociation is turning linguistics into a self-entertaining demonology with examples of *the language organ*, *language evolution*, and *Principles and Parameters*. **Chapter 4** will be a discussion of why things have become what they are, and will provide some conclusions for this thesis.

---

of the book published in 1781; "B" refers to the second edition published in 1787. The original text is German (Kant & Weischedel, 2000); all English quotations are my own translation, for some of which I consulted Norman Kemp Smith's 1929 translation.

Chapter 2. Why Kant is Interesting

Kant's studies ranged from cosmology to anthropological ethics, but he said little about language. Before we talk about what Kant might say to biolinguistics, here are a few things that Kant has actually said:

2.1 *Philosophy* **(in Kant's time)** *Was in Peril*

Before the age of peril, in Kant's opinion, philosophy or metaphysics at that time (the "first philosophy", since Aristotle's time, Deng, 2007, p. 3) was once the *queen of all knowledge*[10] („Es war eine Zeit…sie [*die Metaphysik*] die Königin aller Wissenschaften genannt wurde…"; "Metaphysics was once known as the queen of all knowledge", A vii, *Kritik der reinen Vernunft*). What happened to her now? Well, according to Kant, her Majesty and her reign encountered "**dogmatic tyrants**" („…[*die Königin*] war …, unter der Verwaltung der Dogmatiker, despotisch."; "it was ruled tyrannically under the authority of the dogmatists", A ix) and "**a destructively barbaric skeptic**" („die Skeptiker, eine Art Nomaden die allen beständigen Anbau des Bodens verabscheuen, zertrennten… die bürgerliche Vereinigung"; "the skeptics, another kind of barbarians (nomads), dismiss all standing of borders and *principles*[11] . They tear apart her majesty's ruled territory and the ruled subjects," ibid.). This sudden change of worldly trend and time leaves her Majesty lost, forsaken, and crying like Hecuba in the oldest myth, beneath all the contempt („Jetzt bringt es der Modeton des Zeitalters so mit sich, ihre alle Verachtung zu beweisen und die Matrone klagt, verstoßen und verlassen, wie Hecuba", A viii-xi). The "tyrant" and the "barbarian" are

---

[10] It was „die Wissenschaft" here, which usually translates into "science". I based my translation on the root „wissen", to *know*, hence *knowledge* .

[11] Here, my interpretation slightly simplified the original text.

analogies. What exactly were they? Let us deal with them one by one, and then, briefly, we

will see how Kant spotted her Majesty's weakness (a.k.a. the reason why she was falling

before these two "villains") and Kant's idea for her salvation.

2.2 *The Dogmatic Tyrant*

Simply, it is **rationalism**.

One might wonder that Kant was also famous for being a rationalist, so is he going to

sabotage himself too? Well, indeed Kant has been influenced by Leibniz and Wulf, whose

school of philosophy was later regarded as *continental rationalism* or *continental idealism*

(Deng, 2007, p. 25). Kant initially supported this school and for this reason named his own

approach to philosophy *transcendental idealism* at the end. However, notably, Kant himself

draws a clear distinction between his idealism and all the idealism before him (B274-B279;

A305B362-A309/B366; A341/B399-A405, B432; A583/B611-A620/B648, et cetera). One

important distinction, to which I will come back later[12], is that his idealism incorporates

experience (die *Erfahrung*,), reality external to us. Kant deemed experience as one equally

indispensable source or origin of our knowledge (die *Erkenntnis*), whereas other idealisms

take mere *reason* or logic, the internal elements of knowledge. What does this mean? Well,

the continental idealism is like today's trendy biolinguistics: studying the "I-language": "the

internal language", an initial or "pure" state of "the language faculty" before encountering

any language stimulus (Chomsky, 2000, p. 78). They claimed that studying the *I-language*

reveals more about the true nature of human language than studying the "E-language" does.

E-language being the "external or extensional" language (Tondino, 2016), a mature state of

---

[12] At section 2.6.

"the language faculty" after encountering the language stimulus (Chomsky, 2000, p. 78). An

E-language is roughly any specific language in a common and real sense, e.g. Nuxalk,

Mohawk.

What kind of knowledge does the continental idealism prefer? Mathematics, for

example a triangle's properties, is something that is proved once and then it works for all

time. Something in and of itself, that is what the rationalists prefer. This, though, does not

mean that idealists are all mathematicians.

Propositional knowledge[13] is presented in terms of statements. Statements like "a

triangle has three angles" are "analytic statement/judgments". Why are they called "analytic"

("analytisch", B10-B11)? Because it was by "analyzing" the subject *triangle* that one reaches

the predicate *having three angles*. The rationalists were amazed at this fact and thus named

such knowledge *a priori*: analysing it *alone* validates the necessity of these kind of statements

before having accessed any *experience* ("…der Notwendigkeit des Urteil bewußt werden

kann, welche mir Erfahrung nicht einmal lehren würde. "; "[I] can see the necessity of such

statement/judgment, and no experience could tell me such necessity." B12). *A priori* is any

non-empirical element in such knowledge (or knowing act), what experience cannot tell us.

This is simply biolinguistics at Kant's time: language is so complex that nothing can help

human beings learn it *but* an *innate* language organ (common cliché in this field). The initial

state of the language faculty is just a bundle of *language universals* (Dąbrowska, 2015). One

cannot *find* any of those universals by pointing at an object in the empirical (sensible) world

---

[13] For knowledge, there are know-how, know-what, and propositional knowledge (Feldman, 2003, pp. 8-9). The knowledge that can be judged as true or false is the third kind and our concern here. Although later we *might* see that all three kinds interact with one another especially in terms of language (see chapter 4.3).

and say "there, that's an innate language universal!". For that reason, the biolinguistics

definitely takes *idealized* language and speakers as more valuable in their studies than the

corpora of "real world" text. For they say the number of (E-) languages is just too big for us

to study them all. What matters is the *I-language* and the linguistic competence: using finite

rules to create an infinite number of results (Chomsky, 1957). The rationalists at that time,

too, preferred the *a priori* knowledge of idealizations like *God, immortality*, *free will,*

substance (B7, *KrV*; Deng, 2007, p. 105). Descartes exemplifies this preference with an

argument on a ball of wax. Wax melts and even vaporizes. He argues that the changed wax is

still a ball of wax; one can always recognize it despite all the changing sensible properties

(Smart, 1950, p. 53). So, to him, senses and experience are always deceptive and random.

Only reason grasps the *substance*[14], the unchanging nature of that wax (and other objects

alike). It is reason that perceives the wax as it is throughout all its sensible transformations

(Descartes, Haldane, & Ross, 1911, p. 66). Only reason, not sensible organs, can access that

eternal knowledge. Even long before Descartes, philosophers like Plato already denied

empirical objects as a legitimate source of knowledge. In his work *the Republic*, Plato

compares the changing nature of the empirical world to the shadows of the real objects

projected on a wall through fire (Plato, 2002, 515a-520a). Just like the manifold of those

speech materials collected in a corpus database: you can never grasp *all* of them[15]. By such an

analogy, Plato suggests that the sensible world is only an appearance of reality, and that

reality cannot be accessed by senses, but rather by reason (Cohen, 2006). Likewise, the data

collected in a corpus database can be affected by many non-linguistic factors, like

---

[14] A matter that stands as the eternal nature of objects, like in the wax.

[15] Like the speech yet to be said; all possible speech.

unintentional errors, making the data *not* ideal for studying the ideal language organ.

What is so dogmatic about rationalism or about the rationalists' preference in studies? We will talk about it after we discuss…

2.3 *The Destructive Skeptic*

…is an analogy of the 15th to 17th century **empiricism**.

Figures like Francis Bacon, John Locke, Bishop Berkeley, David Hume, Thomas Hobbes are the *British Empiricists*. They preferred *empirical* knowledge as the ultimate source of all knowledge. This is quite opposite to the rationalists' view.

Besides the analytic judgments, there are synthetic („synthetisch", B11) judgments. "Triangles are blue" is an example of such a judgment. In this case, one can *never* find the predicate matter ("blue") by analysing the subject matter. The predicate is usually not logically contained in the subject matter. Thus, one has to "experience" a blue triangle, to "go outside the concept" („… ich [muss] … über den Begriff, den ich mit dem [Dreieck] verbinde, hinausgehen,…", B11), in order to find that predicate "blue" as related to the triangle („…um [das Blau], als mit demselben [(dem Dreieck)] verknüft, zu finden,…", B11). Such knowledge is thus named *a posteriori*, the empirical knowledge that you will have *after* you have the experience of objects. Such an approach to knowledge stands at the core in any camp *opposite* to biolinguistics, like a usage-based model of language development (see Tomasello, 2001). Rather than a highly abstract language organ, the usage-based model believes that child language acquisition is a series of specific communicative events. The base-line principle is to observe actual language use and not to follow any theoretical fiat.

"Facts"[16] the empiricist linguists found include "children's earliest utterances are almost totally concrete in the sense that they are instantiations of item-based schemas or constructions"; and "abstractions result from children generalizing across the type variation they observe at particular 'slots' in otherwise recurrent tokens of the same utterance" (Tomasello, 2001, p 61). Indeed, the usage-based philosophers in 15th to 17th century Britain also did not buy any theoretical fiat from their continental opponents. They did not believe in any *a priori* or innate idea like *substance*. People like Francis Bacon were the first usage-based scientists (scientists in the modern sense for the first time) who challenged the Aristotelian scientific dogmas that typified the whole medieval era. One may wonder why Aristotle, a philosopher, had anything to do with science? Well, science was once very *rational*, before persons like Galileo and Bacon. One preposterous idea, from a modern perspective, is the falling speed in relation to objects' weights. Proposed by Aristotle, the heavier the object is, the faster it falls as compared to a lighter object. We all know today, that this was experimentally disproved by Galileo on the tower of Pisa in front of a crowd. The point here is not that the usage-based scientists always got the right hypothesis. The point is that before the 15th century the dogma or "paradigm" for science was rationalism, that saw reason as a much reliable source of knowledge. Thus, experiments and real-time observations were disregarded once the discussion of a certain natural phenomena ended once the *reason* was found: it is a one-way stop[17]. As to say, do not even think about it once the *argument* is closed. Why a stone always falls towards the ground? Well, because it is full of the *earth*

---

[16] The quotation mark used here is to mark the kind of language they use in their literature. No other meaning is intended by using the quotation marks.
[17] I.e., never coming back to the phenomena themselves, once the logical discussion about them is done.

element and it is a *natural* disposition of that element to always fall—— to the center of the

planet Earth: this circular argument seemed very well-reasoned, while the rest did not matter.

Does it matter if we can actually observe that element? No[18]. Why light travels and then

disappears? Well, because there is *ether* and sometimes there is not enough of ether to

transport light, another very well-reasoned argument. It did not matter whether we could or

could not find or observe ether. Now, why do humans but no other animals have language,

and how do they learn it so quickly and (seemingly) effortlessly? Well, the biolinguists would

say it is because there is a *language organ* that no other animals have but us, with yet another

delicately reasoned argument for something *that no one has seen*. To biolinguistics *does it*

matter whether we can find it one day and manipulate it to study its features like other

organs? No[19].

   To combat the rationalist dogma, John Locke made the *tabula rasa*[20] (or blank slate in

English) his major empiricist idea. He suggests that there is no knowledge or idea that comes

before experience. Through the senses, external objects are conceived into mind as ideas

(Locke, 1689, 2.1.2[21]). That said, the source of ideas (or knowledge) is the external objects

and what people get from them. Lock refutes any form of innate ideas or built-in knowledge,

by arguing that "ideas come into [people's] minds; and that they get no more, nor other, than

---

[18] In a rising intonation (pitch level from 2-5 or 4-5), for a sarcastic effect.

[19] If Aristotle still lived, he would say "no", I argue.

[20] Tabula Rasa: Latin for *a/the newly- scratched wax-covered board*. Since there was initially no blackboard in Roman times, its modern equivalent is a brand-new freshly-made sheet of blackboard. *Tabula* (*tabula, tabulae*) is a feminine first-declension noun meaning a table or board covered with wax for writing. *Rasa* is the feminine singular past-participle (used as a modifier in this case) of the third-conjunction verb *rādere* (*rādō, rādō, rāsī, rāsum*). The infinitive of the verb means to rub; to scrape; to touch.

[21]   2.1.2: Special margin indicating "book 2, chapter 1, chapter 2" of John Locke's An Essay Concerning Human Understanding. Same in the following context.

what experience... [can] furnish them with; which might be enough to satisfy us that they are not original characters stamped on the mind." (Locke, 1689, 1.3.2). Thus, for intellectuals like Locke, all human cognitive activities are done *a posteriori*; and any *a priori* part of them is either less significant or subordinate to the *a posteriori* part (experience, in the empiricism sense, or what we simply receive through sensible organs, in our common knowledge).

The followers of empiricism seemed peaceful, but their refutations of rationalism were revolutionary, alarming, and sometimes *destructive*. We can still see it years after, in 1971 Netherlands. A modern follower of empiricism (Chomsky & Foucault, 2006, p. 8), Michel Foucault, warned us that concepts thought to be innate, like *justice*, or even the notions like *humanities, life* themselves, were only developed from 17th to 18th century, and slowly socially, or even artificially, built into our understanding (ibid., pp. 68-72), although now they are taken for granted as part of our common knowledge. This kind of skeptic mentality along with empiricism once nearly "destroyed" science and dogmatic rationalism.

David Hume, another usage-based philosopher of the18th century, took up the issue of causality.

One might wonder what is so significant about *causality*. In fact, (for us) to have knowledge or experience of something is *all about* causality. It is intuitive that we cannot have an "apple" in our brain, as human anatomy never reports finding any object of that sort in human brains. Both rationalists and empiricists agreed that it was *ideas* of an apple that we could have. How do we get ideas at all? The object external to us somehow stimulates our sensible organs by the law of causality, and this *causes* us to have an idea or *impression* of that object in our mind. Then by reflecting on those ideas or impressions, we connect them

and build knowledge *about* them. This is pretty much the empiricists' story (Hume, 1748, 2.1-2.4).

On the rationalist's side, there are some ideas (or all of them) that arrive to us *before* experience, i.e. *a priori*. Like an *innate* idea or language. Causality still plays an important role, as in how a language organ *affects* language learning. After all, among all those entities in the ideal world, they have to affect one another in a certain way, causally. For example, PSCK9 affects our blood cholesterol level through a long but precise chain of causes and effects. Therefore, it is fair to say that without causality, science or any knowledge is not possible, zero: without it we do not see things in their mutual relations but merely have ideas of one (separate) thing and another in our memory.

Now, Hume's question was, how did we *know* causality in the first place, if we are using it every single day; what grants its certainty or necessity?

A cause-and-effect relation definitely goes beyond "A happened before B happened". Simply speaking, it is (Lin, 2011, p. 112):

(1) That A happened before B happened (temporarily), and

(2) That (1) is necessary.

We can certainly have (1): we see things happening one after another in time. We all experienced future developments that resemble the past like the *language organ* idea and its Aristotelian predecessors (that have not changed too much in the past five hundred years). So (1) is true. Then what about (2), that the future will *always* resemble the past, like the sun will always rise in the east tomorrow?

You would most likely find it insane if there were people saying that (s)he is not sure

whether the sun will rise tomorrow. Well, say insane of Hume, for he, for one, claimed

uncertainty on that (Hume, 1748, 2.2-2.3).

As a matter of fact, Hume had good reasons to claim the uncertainty.

Remember that Hume was an empiricist who did not think that you can have any idea *a priori* (remember, *tabula rasa*). We could test it with any analytic judgment, trying to discern causality from any concept by analyzing it and we would not find any (1748, 4.11; 4.12). What about the empirical method, observing (and concluding/ inducing) about events? Let's say we find the sun rising many times in the east and it is always in the morning. What makes you think that it will still do so *tomorrow*? "Well…I was expecting it the day before yesterday and … it was there today (the "tomorrow" at that moment)" then, that is a circular argument. Namely, that you prove one thing by that thing itself. It is like saying the stone falls because it always falls; that the children can *naturally* learn their native language very quickly because they are *naturally* able to (endowed with a language organ that enables them to do so) learn any language: the future resembles the past because the future resembles the past.

Therefore, according to Hume, all you can see are things happening one after another. We are never able to determine their relations necessarily. The cornerstone of all sciences turned out to be a hoax. Like all the changes of PCSK9 were just random events that happened; and they happened accidentally before some changes in long-term cholesterol-level, compared to the non-changed PSCK9 condition. Scientific studies, let alone philosophy, become nothing more than a report of past events.

The *dogmatic tyrant* of the rationalists took the assault from Hume to different degrees,

for Kant, though, it was devastating to what he had thought about rationalism before.

At the end of chapter 2.1, I promised that I will talk about what was so bad about dogmatic rationalism for philosophy.

2.4 *The Dogmas*

The *queen of all knowledge* at Kant's time had already had an enduring history of dogmatism („Anfänglich war ihre Herrschaft unter der Verwaltung der Dogmatiker, despotisch."; "Being manipulated by dogmatism's authority started her reign", A ix). This is not because of the rationalism convention *per se*, but because of human reason itself.

Reason is a special knowledge-faculty („Erkenntnisvermögen" *die*-, B1) that is set off to answer questions that are assigned to it by reason itself („…, (daß) sie[22] [wird $_{trace}$] durch Fragen belästigt [∅ $_{trace}$],…, die sie aber auch nicht beantworten kann, …, Avii), for no other faculties can do that. For example, questions like what is life after death. We have no intuition of it, obviously. Nor can we find it in any concept by analysing it. Reason, on the other hand, is curious and unresting („…denn sie sind ihr durch die Natur der Vernunft selbst aufgegeben,…", ibid; see also A761/B789). The thing is, reason cannot answer those questions either („… durch [die] Fragen…, die sie nicht abweisen kann", ibid.); for those questions are in nature beyond reason's reach („…, denn sie versteigen alles Vermögen der menschlichen Vernunft.", A vii). We thought reason is capable, it reflects upon ideas and relates them (see Hume 1748, 2.3-2.5). This is a due process unless the result of those relations is *out of this world*. One can see from the nature of analytic judgment that rationalists cannot really advance from what is already known, for any (*a priori*) analytic

---

[22] Die menschliche Vernunft

judgment is a mere "explanation" („Die [Analytischen Urteile] könte man auch Erläuterungs-…urteile… heißen,…"; "We could also call analytic judgments *explanatory judgments,…*", B10-B11). Thus, technically, like for any analytic judgment, one can never go *out of* or *beyond* a concept. This means, there is always a scope for our reasoning (relating ideas), and the biggest scope accordingly is our *experience*, "all our possible experience" („[die] allen möglich[en] Erfahrungsgebrauch "; "all the possible use of experience", A viii). Now, what if one *does* advance beyond all possible experience and advances *far* by using solely *a priori* knowledge? Well, there is a problem: to do that, one has to be *dogmatic*, to be a tyrant who does not have to justify her/his argument. This, now, is why her Majesty and some rationalist claims are dogmatic: they abandoned the only ground of verification, *experience*.

Take one rationalist concept *substance*[23] as an example. Descartes said there are two substances; Spinoza said there is actually just one and Leibniz said there is an infinite number of them…and the amazing thing is that they are all relatively sustained by their arguments. They were all *rational* persons[24] who do not rave, but why on earth, then, are there so many *substances*? It is like demonology[25], where two demonologists argue about one demon's appearance and they can never persuade each other —— oh, it is because they have never seen that demon.

It is the same with that language organ: nobody has seen it, yet we are never short of

---

[23] *Substance*: a philosophical term, referring, roughly, it is the most fundamental or the ultimate necessary existence.
[24] Ambiguity intended: rational being *reasonable* and *rationalism*.
[25] This string of thought was inspired by Dr Nick Stang.

stories about it. The stories are quite different, even contradictory to one another.[26]

2.5 Now, Linguistics is the New "Battlefield of Endless Disputations" („Der Kampfplatz dieser endlosen Streitigkeiten", A viii)

That battlefield used to be called *metaphysics* (ibid.). Before we see Kant's intervention in that argument, let us see some stories in linguistics.

The language organ story. It astonishes even many cognitive scientists outside linguistics (Evans, 2014, p. 140), or perhaps all the modern scientists, that *something-as-an-organ* kind of theory is still alive after years of developments in neuro-anatomy and general biology (ibid.). Yet it is a popular theory that still stands at the core of what is called biolinguistics. Perhaps because biolinguistics just started around fifty years ago, few biolinguists disagree on the number of the organs[27]. Biolinguists are pretty consistent in their language theory in general, unlike the rationalists having many general concepts but disagreeing on their content, like substance, free will, the status of logic in knowledge-formation. However, the *language organ* itself is one disputation in the world of science (biolinguistics is claimed to be a science, Chomsky, 2000, pp. 73-75; pp. 77-82; Mendívil-Giró, 2015, pp. 72-74). As researches progress with new neuro-imaging and neuro-timing technology, findings in neuroscience lean towards a domain-general idea about language: that language is not an organ, not one single module in the brain but a *network* of a multitude of brain areas (Culbertson & Kirby, 2016; Fedorenko et al., 2012; Thompson-Schill, 2017), whose individual functions involve more than producing language. In Kant's words, it is a

---

[26] See section 3.3.

[27] Joke on the substance story among the early rationalists.

synthesis of (the manifold)[28] of different domains of knowledge (or "knowledge elements",

A15/B29), which logically and temporarily precedes the act of analyzing (A197/158, *KrV*).

How this *language organ* still stands remains a dogmatic myth and a point of disputation in

language studies.

Another disputed issue is the number of *language universals*, which is somewhat

similar to the substance issue within the old-school rationalism.

Let us return to the *initial state* of the language organ. Roughly speaking, that state is a

set of "various subsystems of principles" (Chomsky, 1986, p. 148). Surely, with the

observations that all children, regardless of cultures and environments,[29] reach adult-like

speech "at around puberty" (Chomsky, 2000, p. 73), a similar set of language universals are

logically assumed to be at their disposal (temporally) *before* the children encounter their

language stimuli (from their parents, for example). Without these universals ready at hand,

one would expect, children would encounter difficulties in *acquiring* some native languages

(like Finnish, or Kabardian, which are said to be hard for language *learners*), or expected to

display some delay compared to acquiring simpler languages (like Chinese Putonghua[30]),

which is a claim yet to be discussed. However, the logic behind that claim is that certain

languages may contain rules too complex to be included in that pre-wired innate language

organ. Luckily, the observation so far is that no children ever reach adult-like speech much

---

[28] „[die] Synthesis des Mannigfaltigen" (A78/B104)

[29] The "environments" part is yet to be discussed in the following sections for it requires a closer look.

[30] I am not considering written language here, for written language emerged pretty late in the history of human language and thus there is a dissociation between the developments of spoken and written. For instance, even for some popular language, like Japanese, it has existed there for a long time (3 to 2nd Century BC, Proto-Japonic) but has been "writable" for only around 1800 to 1500 years (personal knowledge).

later or earlier than 8 (*Language development in children 5-8 years | Raising Children Network*, n.d.). The question is, what those universals are and how many there are.

According to Dąbrowska (2015), few biolinguists actually delve into that inquiry: Baker (2001) said there are *10* universals and Fodor & Sakas (2004) added *3* more but only *three* universals are shared in the two discussions (Dąbrowska, 2015). Pinker (1995, p. 112) claimed there are only "a few" and Fodor (2003, p. 734) indicated that there are around 20 universals. Roberts & Holmberg, (2005, p. 541) increased that number to a rather vague 50-100 range, which was less than the actual number according to Kayne (2005). Heine et al., (2002) extended that number to 400, which is still considered to be lower than the actual number proposed by Shlonsky (2010, p. 424). And, finally, in the most recent biolinguistics program, the number is actually just one, namely *merge* (Berwick et al., 2011; N Chomsky, 2004; Noam Chomsky, 2012).

Language universals is a concept that all biolinguists generally recognize, but its intricacies, pointed out in the last thirty years, remain yet to be determined. One observation by (Newmeyer, 2008) is that the studies of the universals are based on a limited number of languages. About the languages yet to be studied or which never have been observed at all (e.g. rare languages, dead languages, F. Y. Lin, 2017), the biolinguists have no way to deduce any universals from them but *assume* their universal behaviour *from* the major languages that they have examined. This kind of *assuming-without*-(sufficient)-*evidence* move is just like the dogmatic reason, the *pure use* of reason that we mentioned above: answering questions that cannot be answered except by using the material or principles beyond all possible experience.

2.6 What Kant Suggested to (the new) Metaphysics and *Would* Probably suggest to

Linguistics

Let us go back to around 300 years ago when linguistics was still part of metaphysics.

To summarize Kant's observation, the fundamental contradiction within metaphysics is the contradiction between our demands on reason and reason's actual capability (Deng, 2013, p 16). For philosophy in general, the following observations seem to apply:

1) All philosophers were trying to find some concepts that are vital for human cognition, like certainty (or *necessity*)[31]. Nonetheless, in doing that, some philosophers ended up talking about things that are not in this world, ignoring the only ground of verification: reality;

2) Other philosophers were trying to find these concepts too, but they looked for them in the wrong places. They, in turn, ended up with total skepticism.

This situation is like a confrontation between moral absolutism versus moral relativism, where one thinks there is always a moral truth and the other thinks no moral truth can be established at all[32].

The most rigid rationalist are almost impossible to be refuted, for they stay away from experience as far as possible, accepting any empirical absurdity as being *true*; likewise, the most rigid empiricists can never be refuted either, for they know *only* individual experiences

---

[31] Certainty of an epistemic law, for example, like that of causality.

[32] It is not saying that moral relativism does not reach to any moral truth or moral judgment: it is just that for moral absolutism this is a moral truth for the past, now, and the future, for example. So there is a *necessity* in the moral truth. For the moral relativist, though, there might be a moral truth for the past, and the present but *not* future: like the skeptic empiricist who does not believe in necessity.

and refrain from inferring anything from that[33]. In this situation, for metaphysics to advance like other subjects at that time, e.g. like natural sciences or mathematics, these two extremes had to be overcome.

This is analogous to the situation in linguistics now where both sides are polarized, trying to degrade the other part of human knowledge. The biolinguistics strays off-limit since they ignore the only things deemed real, languages and real language use. The more empiricist-like linguists live in a world where no one can be sure of anything except the things immediately presented to us at this point[34]. Kant's advice could be roughly summarized like this:

(1) That reality should not be ignored or separated from human knowledge, in any inquiry of reason's nature. Any claim of knowledge cannot exceed the limit of it (B x). If we allow that to happen, we would fall into dogmatism, talking to our empty self; for dogmatism resists verification and becomes a pure fantasy, impervious to all experience (A x).

Since reality is the only thing that we need to worry about now, if reason adheres to it as its verifying ground (for reason's judgments), then all we need is to establish the legitimacy of reality. Kant continues:

(2) Reality is actually not independent of our perception and knowledge; reality should conform to our perception, not the other way around (B xvii-xix).

Point (1) is easy to understand: to prevent logical but subjective, unverifiable claims,

---

[33] I will return to this point in section 3.4.
[34] In later context, this thesis will focus on biolinguistics, yet completely relying on empirical data for a language (e.g. psychological behaviorism) is also not a way-out.

so „grundlose Behauptungen" (B21). How should we understand (2), however?

In simpler words, roughly, all that Kant wants to do at this point is to "explicate" the validity of *experience*, thus a *critique* of (pure) reason: a review of the limitations of reason, what it can and cannot know. The mindset is simple, too: once we know *the conditions for the possibility of* experience („[die] Bedingungen der Möglichkeit der Erfahrung", B161), we then *know* experience better[35]: the universal grounds of it, clearly and distinctly. After that, we can be free from any form of dogmatism in our knowledge.

We said earlier that all synthetic judgments are deemed *a posteriori* and all analytic judgments *a priori*. Actually, Kant thinks that synthetic judgments are all *a priori* judgments, for at least they contain *a priori* elements in them. That said, even if synthetic judgments are usually *found* after encountering related experience, *experience itself* contains more than the mere empirical or the sensible elements. For instance, surely, one has to encounter a triangle and the colour of it to have a synthetic judgment about *a triangle being blue*. The thing is, though, why is it 1) that you identify the *blue* as related to the triangle but not anything else; and 2) that we all have access to the same experience in the general sense? Furthermore, by merely having encountered a triangle and the property "blue", there is no relationship of the two *that is given to you in merely experiencing them.* One has to realize that the "blue" is "on" the triangle or the triangle is "in" the "blue". Now, where does that "on" and "in" come from? Well, one surely cannot point at the empirical world and say "here, this is the 'in'!". Thus, Kant argues that experience is more than a mere source of sensible stimulus, for

---

[35] Of course, we all *know* or *have* experience just as we all know how to speak. Kant's effort is thus to demonstrate the preconditions of the experience, *why experience makes sense*, so we know better the limit of experience.

"matter without form is blind" (A51/ B75). Even for experience, like all knowledge, it has an

a priori part for it to be universal in human perception. Therefore, Kant wants to establish

that there are *a priori* elements in our experience; not only are they in our experience (which

seems purely empirical and unrelated to logic), but also they are important as the source of

universality *for* experience.

2.6.1 "*A priori*" is a Latin expression meaning *from the former/ precedent*. Preposition

a or *ā* means 'from; to; of' (and takes a noun in the ablative case as a complement). The noun

priori is the ablative singular form of the masculine noun prior, a third declension i-stem

noun meaning the thing in the superior position. The term comes from medieval philosophy

and represents a mode of demonstration ("from cause to effect", Caygill, 1995, p. 35). Kant

extended this notion in his philosophy into "logically before experience" (B3-B4). Notice that

the temporal sense is gone in this term, as Kant did emphasize several times that the

sequential difference between a priori and a posteriori is purely logical, not temporal (Ratke,

1929, pp. 22-23). This is why we cannot equate *a priori* with *innate*, even if both terms

indicate *non-empirical* types of knowledge.

A priori simply means "non-empirical". Please note that, if something is *a priori*, it

does not mean that it has to do with the *conditions of the possibility* of experience. Kant uses

an example of a man pushing against a falling wall. The man knows *a priori* that the wall is

going to fall and crush something. He knows that in an *a priori* fashion for he has deduced a

non-empirical law, a law of which the empirical world does not have an object/reference,

from his *previous experience*. However, there are some non-empirical/ *a priori* elements[36] in

---

[36] By "elements of knowledge", I mean the fundamental elements in our knowledge that
cannot be divided into smaller elements, or further defined, analyzed. They are not

our knowledge that have to do with our knowledge-formation, determining the very boundary of our experience/ what we could experience. Kant names them *transcendental*. I will introduce *transcendental knowledge* in section 2.6.2.

Kant advocated very hard for the non-empirical elements in our knowledge, even in something that people (at least those before Kant) have taken for granted for a long time, like experience itself. For Kant, "experience"("Erfahrung") is identical to "knowledge" ("Erkenntnis", B166). Experience or "Erfahrung" used by Kant is not the same "experience" used by empiricists or in everyday language. The empiricists along with our common understanding assume experience to be an intuitive passive result after the interactions between our sensory organs and an *external* stimulus ready to impinge upon our cognition. For Kant, on the other hand, experience is already *filled* with the analytic knowledge, with relations of universality and necessity (B4-B5), for instance, as I exemplified in the "triangle-in-blue". That said, *experience* is nothing external to us, but rather it is *internal* to us. Without our perception, experience does not exist. As for anything outside our perception, Kant says, we have no clue and no way to have the clue. The key thing now is that the mere property of being "empirical" ("empirisch") is not *being related to experience* in Kant. For Kant and the triangle example show that there is something *non-empirical* or *a priori* about our experience. Being empirical does not grant anything universal or necessary to experience ("Erfahrung"), as one cannot simply find anything called "universality" or "necessity" (e.g. its notion of relations) in the empirical world. Based on that, Kant feels like he can legitimize or reinforce

---

knowledge per se, as they themselves cannot constitute knowledge (B24-B26). On the other hand, however, it is also fair to call them a priori "knowledge". For one, they can be presented in the form of knowledge, if we make the efforts to make them explicit, like a mathematical formula, or a found pattern of Basque's syllabic onset.

the fact that experience is "the very ground of verification" (A5/B6), a task we shall expend more in chapter 2.6.2.

To summarize, *a priori* in logic means something logically prior to experience (B7). The very fact that we have (and are able to have) this certainty in our knowledge, that we can have this proposition as in this example, indicates that we know something not "immediately from experience, but from a universal law" (B-2). Thereby, Kant calls this kind of non-empirical knowledge or the conditions of possibilities of our knowledge, *a priori* (elements in our) knowledge.

2.6.2 "Transcendental" is to say that some *a priori* knowledge is the condition for the possibilities of our knowledge/experience. This means that transcendental is simply a kind of *a priori* knowledge. It is different from other *a priori* knowledge in that it has to do with the possible boundary and use of our knowledge, our *epistemology*. This is why transcendental knowledge corresponds to the "a priori conditions (of possibilities) of our knowledge". Transcendental principles are a different kind of *a priori* knowledge that enjoys a higher epistemic status. They are the a priori of all a priori, the pre-conditions for them. This means they have a regulating force, serving as a constraint on what knowledge can be like, and more importantly what knowledge cannot be like, what objects the a priori elements can be applied to:

> …daß nicht eine jede Erkenntnis *a priori*, sondern nur die, dadurch wir erkennen, daß und wie gewisse Vorstellungen (Anschauungen oder Begriffe) lediglich *a priori* angewandt werden, oder möglich sind, transzendental (d.i. die Möglichkeit der Erkenntnis oder der Gebrauch derselben a priori) heißen müsse.
> (A56/B80)

My interpretation goes:

"…(that) not just any sort of *a priori* knowledge may be called transcendental (i.e. the

> possibility of our knowledge, or the a priori application of such a possibility), but only this kind of *a priori* knowledge that we need to call *transcendental*: what kind of *a priori* knowledge? It is the kind of *a priori* through which we can know these: how certain representations (objects or concepts) become possible or are just used *a priori* [purely, in a negative sense- RL].”

For instance, I can argue that "all dolphins are blue". The relation/connection between "blue" and "dolphins" is totally logical. This is *a priori* judgment according to Kant, for it violates no principle in propositional logic[37]. Yet this does not stop this statement from being weird. Why? For other than the (logical) form of this statement, we are also curious about *where these dolphins are*, *when did you see them…* and other questions of that kind (Deng, 2007, pp. 100-101). This, then, is the transcendental demand for any knowledge, *a priori* pre-conditions for something to be a *possible* experience/knowledge.

Another explanation is this: if *a priori* knowledge combines with sensible data to form knowledge or experience, transcendental knowledge denotes *what counts as sensible data*, and to *which kind of sensible data certain a priori pattern could be applied….* As Kant said, transcendental principles set limits on a priori elements and concerns with objects, namely to what legitimate situation an a priori rule or element can be applied; what kind of object or target certain a priori element is for.

2.7 A Point to Note

It may seem that Kant's project of rebuilding metaphysics is just like another dogmatic rationalist move (Deng, 2007, p70): to give another set of arbitrary definitions on experience in order to combat skepticism. This is what we would expect from a rationalist, any transcendentally important principle for knowledge, like causality, would be taken for granted, as a **dogma**; this way, any skepticism about it is not allowed. It is true that Kant

---

[37] To Kant, propositional logic is a perfect example of *a priori* knowledge (B)

himself admitted that his critique of reason adopts **a dogmatic manner**, like his continental peers and predecessors („Die Kritik ist <u>nicht</u> dem **dogmatischen Verfahren** der Vernunft in ihrem reinen Erkenntnis, als Wissenschaft, entgegengesetzt, "; "The *Critique* is <u>not</u> contrary to the **dogmatic ways of doing things** of reason in its purest knowledge, as a subject [that is, metaphysics]", my own emphasise, B xxxv). This „*dogmatisch*" then is used in a neutral sense. It refers to the *a priori* principle (in conventional metaphysics) that for any knowledge to be systematic one has to study its non-empirical principles (Deng, 2007, p. 70). However, right after that, Kant says that his critique is not another **dogmatism** („sondern [ist die Kritik] dem Dogmatism [entgegengesetzt],…", B xxxv.), for his Critique is "against dogmatism that goes on with pure knowledge (*a priori* knowledge) alone, <u>without investigating how this pure knowledge is used and what objects it takes</u> to that goal: „…d.i. der Anmaßung, mit einer reinen Erkenntnis aus (Begriffen (der philosophischen), nach Prinzipien, so wie sie die Vernunft längst im Gebrauche hat), ohne Erkundigung der Art und des Rechts, womit sie dazu gelanget ist, allein fortzukommen." (B xxxv). Hence, in short, dogmatism is „das dogmatische Verfahren der reinen Vernunft, ohne vorangehende Kritik ihres eigenen Vermögens." ("the dogmatic way of doing things (by the pure reason) without an advanced review of its own ability", ibid.). Kant's Critique is not like that.

Here is an example: ~~when~~ Kant argues that "time is an *a priori* condition of all appearances in general" („Die Zeit ist die formale Bedingung *a priori* aller Erscheinungen überhaupt. "B50/A34). By "time", Kant does not mean "time" *per se* but an analogy, namely that things are in an *a priori* relation to one another *just like them in time* (e.g. one after another, A144/B184; simultaneity or succession, A30/B46) in appearances. Kant is not being

dogmatic there saying that *time* itself, as something *real*, affecting all the other things; he is not like Thales saying that "everything is made from water", or like Leibniz saying that a highly arbitrary being *Monad* is what everything is made from. Kant refutes that dogmatism and argues that his *time* is not the time that we think of in a daily life sense (,,Die Zeit ist kein empirischer Begriff, der irgend von einer Erfahrung abgezogen worden. "; "Time is not an empirical concept that had been abstracted from any experience", ibid.).

Again, to summarize in Kant's own words: dogmatism ,,ist also das dogmatische Verfahren der reinen Vernunft, ohne vorangehende Kritik ihres eigenen Vermögens." ("is therefore the pure reason working dogmatically, with no critique of its capacity prior to that", B xxxv).

2.8 Summarizing Chapter 2…

That "Philosophy stands in need of a science that *a priori* specifies its possibility, the principle and its scope of its knowledge" (,,Die Philosophie bedarf einer Wissenschaft, welche die Möglichkeit, die Prinzipien und den Umfang aller Erkenntnisse a priori bestimme.", B6) captures Kant's cure to a metaphysics that is arbitrarily isolated at the core from other's inspections and highly confused in what it is asking.

Chapter 3. The Disassociation

Curiously, linguistics *has* become a science[38]; hence, biolinguistics. Does this mean linguistics has lived up to the name *science* and been free from dogmatism and skepticism, as

---

[38] Yes, it has, in those people's eyes whom we are going to criticize.

Kant would expect it?

This thesis criticizes the general biolinguistics enterprise in terms of the *first* suggestion that Kant would give in chapter 2.6; namely that biolinguistics distances itself from reality. Generally, like all dogmatism or rationalism that Kant meant to criticize, biolinguistics is no exception. However, it redeems itself from being yet another dogmatism with this seemingly justified **disassociation of ontological dualism and methodological naturalism**. It is doing this so covertly that many scientists fall into believing biolinguistics is a science. As an undergraduate student, I was always awed at ideas like universal grammar and how it affects language learning. My impression was that Kant was being *re-invited*: that unlike other language theories, nativism recognizes that the internal epistemological factors are part of the language itself. This is parallel to Kant, for Kant recognized how a seemingly completely external entity such as experience is actually heavily constructed by our cognition. Then, there was something that did not feel right, something that was *not very Kant* when I heard "language came from a sudden mutation around…years ago and had no evolution; children learn L1 so effortlessly solely because of the language organ; language is biologically innate…". I now know and will argue that they all come from the disassociation that I did not notice then, the disassociation that makes linguistics only a science on the surface but a dogmatism in the core, like demonology.

3.1 Preamble to Section 3.2 and the Following…

I want to talk about the second suggestion that Kant gave to metaphysics formulated in chapter 2.3:

Besides methodological naturalism and ontological dualism, *internalism* is yet another

feature of biolinguistics that distinguishes it from its precursors (Noam Chomsky, 2002, pp 48- 52; Mendívil-Giró, 2015). It recognizes that language is more than an *a posteriori* trained behaviour (Noam Chomsky, 1959), more than an external object of studies like physics (Noam Chomsky, 1986; 2002, pp 48- 52; Mendívil-Giró, 2015, pp 76-82). Although it does so to an extreme[39], how Kant is involved in this enterprise has been recognized and studied a few times elsewhere (see T.C.William 1993 for details). The ideas of biolinguistics itself have thus a clear historical root and more than *one* person has contributed to its formation, from Leibniz to Kant to Humboldt and then to people developing Chomsky's models (Levinson, 1996, p. 133; Amoroso, 1978; Slagle, 1974; also see T.C. William 1993). However, the names of those earlier scholars like Kant's were seldom or never mentioned and not given fair credit, let alone those who were omitted when biolinguistics dogma was being formed and was the most dogmatic (see Colarusso, 2017b, 2017a, and Bialystok et al., 2007).

3.2 Ontological and Methodological Naturalism

In short, biolinguistics has *not* lived up to its claim of being a science and committed dogmatism, for a confusion of its methodology and ontology.

Let us first examine the two seemingly separate naturalisms:

3.2.1 *Naturalism* refers to the idea that there are only natural entities and the principles that they operate on are natural. As Quine puts it, "the *most* we can reasonably seek in support of an inventory and description of *reality* is the testability of observable consequences" (the second italicization is my own, Quine, 1995, p 252). This describes both ontological and methodological naturalism: the best way to study the nature of things is to

---

[39] A feature which is not so Kant and therefore yields the first suggestion.

study their *natural* properties and to know them as *natural* entities. This summary of Quine's

words might sound rhetorical, as at least Quine's words provide more tangible definitions like

testability and *observable*, while I just keep saying *natural*. Well, while it is true that what

counts as "natural" still remains debatable, as in philosophy and science (Dawes & Smith,

2018), simply "natural" itself is telling, I argue. If we quit arguing about the positive

definition and take a look at the negative definition of *natural*, we shall see that naturalism is

simply an idea against super-naturalism or dogmatism in our studies. One famous saying

grasps the negative definition of naturalism: "no spooky stuff" (Forrest, 2000, p 24). This is

merely what Galileo and Bacon first advocated: there are no mysterious things or *ether* or *one*

of the four elements that keep things moving, and if there were, we should be able to *see*

them. Modern science is totally for naturalism and armed with *both* methodological and

ontological naturalism. Nature sciences are not dogmatisms for this reason too: they have

transcendentally identified the scopes of their studies and never exceeded those limits when

making hypotheses or conducting experiments. One may think that science once transcended

reality and frequently invoked super- or un-natural agents or factors in their studies, once

having been heavily influenced by religions or belief systems[40]. However, this is not true in

their actual practices and naturalism has always been followed by the scientists (Dawes &

Smith, 2018, pp 23-25), even at the time when the theistic ideal was frequently referred to[41].

---

[40] Newton, for example, claimed that God is the origin of all forces or the starter of all
motions (Zhao, 2001, p 244). He is also said to have been obsessed with alchemy, which
"inspires many of his scientific ideas*"* and was thus described as "the last wizard and the first
scientist" (Z, 2004, pp 224-225), and this is *early modern* science. The point here, though, is
that science commits to a domain-specific naturalistic inquiry right from *day one* (Dawes &
Smith, 2018), like the contrast between Thales, Aristotle and Galileo, Bacon (see section 2.3),
and to be fair, *they*, Bacon, Galileo, Copernicus…, are the first scientists.
[41] Even so… Newton said "religion and [Natural] Philosophy are to be preserved distinct.

It is important not to mistake naturalism with materialism, though. Naturalism is not saying that all natural entities have to be *matter* in a conventional sense. *Gravity*, for instance, is a perfect naturalistic scientific entity, for it is a natural *principle* within a testable hypothesis and has no spooky explanations or causal chain (e.g. mass, distance, field…), even if it fails to exhibit material form.

There is another principle to bear in mind before we talk about naturalism and biolinguistics: There *was* a time when ontological <u>super-naturalism</u> or <u>dualism</u> *did* co-exist with methodological <u>naturalism</u>: in the lives of scientists. Please note here that I am saying *scientists'* lives not *science's* itself. Since the separation of State and Church, science did not intend to become a hostile camp opposed to religions. There is no screening process for anyone's belief before one becomes a *scientist*, in the name of any institute like, for instance, the *Scich*[42]. There is no such thing. Scientists can believe in whatever they want and they should be allowed to, as what happened when the separation of Church and State was applied. That was also when the term *ontological dualism* was invented, thus scientists did not have to make a choice between their religious belief and career (see Ecklund, 2010; Schafersman, 1996). The character of scientists and science do not have to be the same. So science itself, we can say, commits to both ontological and methodological naturalism.

Henceforth, in short, for a subject to be a science, descriptively, it needs to care about natural entities only (the ontological thesis for scientific naturalism) and only studies their natural causes (the methodological thesis). We shall present a concrete example, then an

---

We are not to introduce divine revelations into Philosophy nor philosophical opinions into religion" (Newton, 1950, p.150).

[42] the *Church* for science.

extreme scenario of it in the following two sections.

3.2.2. An actual example of naturalistic study: One day, an apple-like idea drops upon a biologist's head, then (s)he starts to consider the genomic factors, like how genos affect the inflammation in cardiovascular dieses. After years of searching and comparing, peer reviewing, the biologists pinned it down to a gene called *PCSK9* in Chromosome 1. They found that some patients, not rare cases, had absolutely no common bad habits related to cardiovascular diseases: high-fat and sugar diet, smoking, lack of physical activities with being constantly stressed in life…; these patients acquired their cardiovascular diseases at a very young age, while there are patients who do not have cardiovascular problems despite having these life style issues (Hwang et al., 2020). The biologists were amazed at PCSK9 and claimed to have found a gene that might be related to the inflammatory effect in blood vessels, the direct cause of cardiovascular disease (Abifadel, 2003). The biologist kept on studying and found that PCSK9 as a gene does not affect these cardiovascular features *per se*. This gene transcribes[43] into mRNA after many physiological reactions, and then the PCSK9 mRNA translates[44] into the corresponding protein, so PCSK9 is a protein in this case, now[45]. The protein affects another protein (among many others) called low-density lipoprotein (LDL)-receptor, aka. LDLR protein (Benjannet et al., 2004; Canuel et al., 2013; Demers et al., 2015; Poirier et al., 2008). Normally, when hepatic LDLR protein on the cell surface binds to LDL cholesterol, the LDLR-LDL complex will be internalized into the cell. Then, LDL will be degraded in the lysosome (an organelle within the cell), and LDLR will be

---

[43] A certain biological transformation process
[44] Ibid.
[45] Yes, the resulting protein of the gene PCSK9 is also called "PCSK9".

recycled back to the cell surface for reuse. However, when active PCSK9 protein is produced and secreted into the blood circulation, it binds to LDLR along with the LDL particle on the cell surface (Awan et al., 2014). The LDL-LDLR-PCSK9 complex will be directed to the lysosome for degradation[46], preventing LDLR recycling back to the cell surface (Benjannet et al., 2004). Therefore, PCSK9 protein increases circulating LDL cholesterol accumulation in the blood by mediating hepatic LDLR protein degradation (Benjannet et al., 2004). This means, when the PCSK9 gene mutates as more potent than normal, more (active) PCSK9 protein will be produced and in turn less LDLR protein will be recycling (Benjannet et al., 2004). This results in more LDL cholesterol in the plasma, so hypercholesterolemia. In this case, there will be a higher risk for cardiovascular malfunctioning, for a high LDL level is the most important triggering factor for arteriosclerosis[47] (odds ratio 3.25, Yusuf, 2004), the underlying cause of cardiovascular malfunctioning. On the other hand, when the PCSK9 gene mutates as less potent than normal, less (active) PCSK9 protein will be produced and in turn, more LDLR protein will be recycled for re-use. This results in a lower LDL cholesterol level in the plasma, so hypocholesterolaemia (Berge et al., 2006), thus a lower risk for cardiovascular malfunctioning (e.g. a decisively much lower chance for arteriosclerosis).

So, to summarize, technically, the gene PCSK9 determines our cholesterol level *in a distinctively naturalistic way*, and in turn determines our cardiovascular condition with a *necessary* series of natural events though. This is also an example of how a "genetic endowment" determines some feature of an organism.

---

[46] However, how does PCSK9 direct LDLR into the lysosome for degradation is still unclear.
[47] A condition where too much cholesterol accumulates in a certain spot in a vessel, to an extent that an atherosclerotic plaque is formed. The plaque obstructs the blood flow, resulting in an insufficient oxygen and nutrition supply to the heart muscle.

There was no *spooky stuff* ever found in this example or even considered to be found, until…

3.2.3. An imagined example of super- or non-natural factor in a naturalistic study:

PCSK9 works naturally but imagine what would scientists do if they could not figure out how PCSK9 directs LDLR into the lysosome for degradation. They actually have not yet filled in this gap in that long causal chain stated in section 3.2.2. In this case, the scientists usually wait for new technologies or new inspirations from other fields (like genetics, bio-chemistry, …, or even geology), look at other animals' PCSK9 with some more experiments to be approved…until yet another apple-like idea hits them.

What if someone tried to fill in this gap by invoking a non- or super-natural factor? For the purpose of this thesis, let us say that the scientists would seriously consider that proposal.

Let us say that some claimed to have found an undetected particle that obeyed all of physics and transferred PCSK9 protein's signal to LDLR onto the lysosome. This particle was found due to some inspirations from ancient scripts[48] and said what the scripts actually say and where they say that do not matter (or so this person says). It were hard to detect because it were a higher form of the natural entity, a super-natural particle or cell-form that transferred the protein's biological signal by also covering all the natural entities' features, from some higher form's order.

In this case, the scientists probably would *not* dismiss this finding; they would not do that not just because the finding did not align itself with the naturalism *doctrine* (Dawes &

---

[48] This is inspired by Russell's Teapot, an analogy to explicate the non-provability of any super- or non-natural arguments, especially religious one. See https://en.wikipedia.org/wiki/Russell%27s_teapot#cite_note-2 and https://www.humanities.mcmaster.ca/~russell/cpbr11p69.pdf for details.

Smith, 2018, p. 28). Instead, they would expect to establish the causal chain of that super-natural power to that naturally-engaged particle, or the physical mechanics of that particle. The methodological naturalism would only generate an ontological naturalism or vice versa, as one cannot find anything beyond the causal relations of thing or the causal relations are the only thing being considered here. With that having been said, is naturalism a *dogma* for science, or does it make science a dogmatism? No. As Kant says, science like *physics* has already been on a "secure way of knowledge" ("den sichern Weg einer Wissenschaft gegangen", B x; "den Heeresweg der Wissenschaft traf", B xii). By sticking to the natural *objects in reality* and a theoretical framework bound to reality, science is not going to lose its objective validity ("die objektive Gültigkeit" A27/B43-A28/B43). Why has such validity put science on *the highway of knowledge*? Because once the objects of the study are "transcendentally" set, any move that tries to exceed them would not be permitted.

Kant himself was an outstanding natural scientist at his time. Sciences are not things to be desecrated in Kant's view. Sciences are also "the very ground, the leading foundation, of his Critical Philosophy, as Kant's belief in science is never shaken (Deng, 2007, p. 6). Kant's refutation of Hume's skepticism[49] is not giving another *proof* of the necessity of scientific principles (e.g. causality, ibid.), as Kant thought the necessity of scientific principles was a *fact*. His *Critique* was only meant to give a philosophical (metaphysical) explanation of such a fact, explicating where it comes from, its foundations and conditions (ibid.), thus the word *transcendental*. That said, biolinguistics, a discipline that claims to adhere to scientific principles (methodological naturalism) but aims not at such a transcendentally prescribed

---

[49] … as well as to any *refutation* to Hume given by the dogmatizers at Kant's time…

reality (ontological *dualism*) of science, to Kant would have only been a sacrilege.

Also, once again, in *science*, naturalism is at best a *description* of what a science does; the causal relations are the only relevant topic since science adopts a *pro truth* communicative strategy (Stroinska, 2001, pp. 200-201)[50]. Other things, like the un- or super-natural nature of that particle, would be disregarded in scientific writings and thought of as irrelevant. This is, in turn, another example where the method and the ontology of science intertwine: the method of scientific study includes its writing style; by being relevant to ontological naturalism, nothing beyond that would emerge.

An even stronger example of this kind would be that the phenomenon at question *itself* is super-natural, for example, *telekinesis*. Let us now say telekinesis existed and it had been observed by the scientists under controlled conditions: "repeated experiments showed that some people were able to move objects merely by thinking" (Dawes & Smith, 2018, p. 29). Would scientists turn to a super-naturalism for an explanation of it? They would most likely not, as "scientists would seek some hitherto unknown causal link between the mind and the physical world" (Ibid.). Even the most unnatural observations would not invoke anything unnatural in science. This indicates that the ontology and method are one and the same naturalism in science; there is no chance for a scientist to stick to the method but to conclude anything super-natural, or to encounter something un-natural with a super-natural method.

To put it simply: the scientists are not going to construct something non-natural, as a most fundamental attitude described as naturalism, both of the naturalisms. Is it because all scientists are antithetic or biased towards ignoring super-natural causes? Yes and no, because

---

[50] Now, this specific communicative style *does* make naturalism look like a doctrine that somehow gets reinforced in, for example, the way scientists talk to each other.

there are scientists who are really religious in their personal lives, although this kind of

question misses the point. The point is that naturalism is an unspoken but manifested conduct

of all scientists, which is manifested all the way from the pre-modern scientists' statements

(see: *Curriculum in Cardiology*, 2001; Dawes & Smith, 2018; KATZ & KATZ, 1962) to their

person-and-stance neutral writing style (see: Stroinska, 2001).

Based on the discussion above, we could say that naturalism and the consistency of its

ontology and methodology are at least a *doctrine-like* attitude for sciences: no one in science

reinforces it, but every scientist adheres to it by default.

Alas for Kant, ontology was honoured as *the first philosophy* and the *essence of*

metaphysics, and now few talk about things in terms of that; naturalism or sciences assume

nothing *a priori* ("no foundational discipline distinct from the sciences that could justify or

criticize their methods", Dawes & Smith, 2018, p 21)[51]. We can say that the scientists only

care about what comes to their *intuition* (Anschauung) or their *pure receptivity* (B 11).

Before we move on, there is one more thing to notice here: that naturalistic science is

not immune to dogmatism; but naturalism makes science stay away from dogmatism. Science

limited its objects of study to natural entities a long time ago (Dawes & Smith, 2018), but

---

[51] One might argue as "...but Kant said there is transcendental conditions that science and all knowledge presuppose…". This is actually not contrary to Kant, for 1) Kant opposed any *arbitrarily* or *dogmatically* presupposed principles; and 2) Kant's transcendental idealism was not prescribing any dogmatic rule to knowledge or science, yet it is about the fundamental ways of how we perceive things, which are the transcendental conditions for sciences and all knowledge.

The content that one might complain about showed in the previous footnote *could* be a matter of argument here, for Quine, an advocate of naturalism, disagrees with Kant including the *a prior/a posteriori* distinction. That is yet another issue that is worth discussing on yet another occasion. For this thesis, since *a priori*-like conditions of human language *are* assumed in biolinguistics in ideas like language organ, I will take a slightly-Kant-leaning-to interpretation of the issue.

what happened to the science before Bacon and Galileo? The Aristotelian science was clearly a kind of dogmatism[52] but claimed to study natural objects too. How? Well, actually, this is a case where ontological naturalism is admitted[53] but not methodological naturalism. This only says that a naturalism in the full sense is what defines and prevents science from being a dogmatism.

Now let us go back to the things I was arguing before the last paragraph. Based on the discussion above, we could say that naturalism and the consistency of its ontology and methodology are at least a *doctrine-like* attitude for sciences: no one in science reinforces it but every scientist adheres to it by default.

3.2.4 Ontological dualism in the context of methodological naturalism is created by the biolinguists in the actual practice of science. It says that scientific concepts, like *physical* or *chemical* features are only used from the ontological doctrine (a.k.a. ontological/ metaphysical naturalism, Jacob, 2010, pp. 14-16), and cannot explain language (Mendívil-Giró, 2015, pp. 73-74). Henceforth, there is only one naturalism left, the methodological naturalism (Chomsky, 2000, p. 143).

Let me succinctly introduce the mentality behind this inconsistency:

The first step to form the idea of ontological naturalism is to embrace a relative interpretation of the term *natural* or *real*. Accordingly, to say that naturalism can be ontological is to subscribe to physicalist monism (Jacob, 2010, p. 14), namely that everything is reducible to physics. This is an idea that Chomsky does not want to relate to. He argued

---

[52] See section 2.3
[53] At least nominally. Someone could argue that *ether* or the Four Elements were not considered as natural by the medieval natural scientists.

that all the scientific terms (*physical, chemical, electronic…*) are real only because they are prescribed to be real: they are real because of the *intelligibility of the theories* (Chomsky, 2002, p. 68), not because they necessarily explain reality. These concepts are somehow *invented* under the doctrine of the ontological naturalism to help us better understand the (scientific theories of) reality. They are not *actually* natural or real but rather they are *expected* to be. To say the least, it would not hurt if we added on another *layer* to reality: something as *mental* as the language (organ) can be real as well. After all, language is such a natural phenomenon and it is almost certain that it is stored completely in the brain (Mendívil-Giró, 2015, pp. 74-75). Thus, why not *take* something so mental as language *as real*, too? It will help us better understand the language as a real entity while other sciences and their concepts cannot. As a result, with the dream of using the naturalistic method but "amplifying the reach of natural science" (ibid, p. 76), biolinguistics was born and named a science for language as a natural phenomenon and methodological naturalism is the only valid naturalism. This science will be an *abstract biology*, to amplify *the reach of biology*. A new sense of *organ, neurons…*is going to be constructed by the linguists in the era of biolinguistics.

Clearly, at the center of the argument for biolinguists was the definition of the term *natural* or *real*. They were in a great debate with analytic philosophers, physicalists (Searle, Putnam, Plantinga, and others). Rarely was an actual scientist involved. This thesis does not intend to take part in such a debate; *natural*'s nominal definition *de jure* is not a concern here. Nonetheless, as we see in sections 3.2.3 and 3.2.4, simply leaving one necessary part of naturalism (the ontological part) aside is already very *un-scientific*. For we know right from

the beginning of natural sciences (Dawes & Smith, 2018) that naturalism is not a doctrine or teaching but simply *what the scientists do de facto*. This means, the scientific concepts are not somehow prescribed *a priori* in a scientific theory, rather they are found in reality and given a name *a posteriori* <u>in the text</u> that is intelligible (to the readers[54]).

"In strictly logical sense…the ontological… precedes the methodological naturalism…" (Mendívil-Giró, 2015). Of course, that is the strictly "logical" sense; but in the "strictly" *actual* sense, science presupposes nothing *a priori*, *but* a naturalistic domain (see section 3.2.4 and chapter 4, footnote 50 and 51; for more details, see Dawes & Smith, 2018). In the history of natural philosophy, ontological naturalism or anything like it never guided scientific inquiries as much as a doctrine guiding, say, theological inquiries; but rather it is more like an *attitude* that all scientists have towards their work (Dawes & Smith, 2018, pp. 24-28). The attitude has been demonstrated by the scientists and their reactions in the two imagined but extreme examples in section 3.2.3, where someone tried to invoke non- or super-natural factors for the explanatory gap in our understanding of the world.

Thus, this thesis will not repeat any *de jure* discussion of the word *natural*, but argues that the split of naturalism in biolinguistics *de facto* misleads language studies into being a dogmatism. This thesis demonstrates such a misleading idea with three examples in the next section.

3.3 The *Language* Organ

As sections 2.2, 2.3, and especially 2.4 have already introduced, the notion of language

---

[54] Intelligibility is important, of course. However, for one to understand a scientific concept or entity in its full sense, one has to do experiments on it, really observe it. This is why I do not think that scientific concepts are only for the intelligibility of its theory; they always entail something real that one could know better than mere words and their description.

organ is itself a dogmatic belief in biolinguistics. We all *know* that it does not exist but the biolinguistics theories are *always* studied and organized around it.

To be more precise, the weird combination of ontological dualism and methodological naturalism is itself a *blooming-buzzing* confusion (James, 1890, p.488), of such a contradiction. Your aim is something un-natural or super-natural or something that you do not know, but your method *for it* is meant for something natural. For this reason, the confusion played out in many conceptions in biolinguistics; the *language organ* being one of these conceptions. Linguists were baffled encountering this kind of confusion: on the one hand, the language organ is a "bodily organ in a biological sense" (Mendívil-Giró, 2015, p. 73; Chomsky, 2000, p. 144; p. 146; Chomsky, 1975, p. 10); on the other hand, the language organ is "not to be compared to a bodily organ in an anatomical sense" (Anderson & Lightfoot, 2000, p. 3), but be interpreted as in the functional sense (Ibid., p. 7, p. 12). All the organs that I know of have anatomical structures that are tightly related to their functions. The language organ was first a speculative explanation for L1 acquisition when mere external reinforcement could not do the job. However, after so many years, the biolinguists still hold on and talk about it, despite the fact that *no* report claiming to have observed it (Dąbrowska, 2015) along with long-term advancement in cognitive- and neuroscience. This is exactly the kind of *dogmatic slumber* from which Kant was awakened by Hume's skepticism; the slumber where all the dogmatic rationalists had their *sweetest dreams* about an ideal world. One may think of Kant's awaking as Hume made him realize that dogmatism had its foundations arbitrarily built. Kant also realized that dogmatism only focuses on its own internal development, e.g. its own logical construction; while dogmatism was itself

completely insulated from reality, including any alarm[55] inspired by reality. The

unquestionable status of the language organ at the very core of biolinguistics *is* the dogmatic

slumber of our time.

3.4 About Language Evolution

In this thesis the term *language evolution* means the origin of language; how language

came to be; not a synonym of (historical) *language variations.*

I just talked about the bio-linguistic slumber. It turns out that the biolinguistics theory

of language evolution, especially its initial state, aims to back up that slumber, and in turn

turns into yet another bio-linguistic myth: that there is no evolution, or at least a very short

one; a *sudden* mutation triggers it and then it comes into full existence. The canonical

presentation is:

> Languages did not exist… until 10,000+ years ago…within some small group from which we are descended, a rewiring of the brain took place in some individual, call him *Prometheus,* yielding the operation of unbounded Merge, applying to concepts with intricate (and little understood) properties...Prometheus's language provides him with an intricate array of structured expressions with interpretations of the kind illustrated: duality of semantics, operator-variable constructions...Prometheus had many advantages: capacities for complex thought, planning, interpretation, and so on. The capacity would then be transmitted to offspring, coming to predominate.... (Chomsky, 2010, p. 59)

One the one hand, language stems from a natural and biological organ; on the other

hand, this organ has no history of natural evolution, or just appeared in a few persons as a

result of a sudden *rewiring*. How? And especially how did this contradiction even survive and

how does it still exist (in other forms though) in biolinguistics?

To understand the mentality behind such a null-evolution hypothesis of language, let

---

[55] At Kant's time, many rationalists thought that skepticism was just an ill-state of reason and did not pay much attention to it (A ix- A x; Deng, 2007, pp. 4-6)

us briefly deconstruct the bio-linguistic slumber in more detail. One of the reasons why the

biolinguists think that way is the uniqueness of language among all organisms. Also,

language is powerful because it uses finite apparatus (e.g. finite elements and rules) to

produce infinite results. Therefore, the language ability must be an independent module in the

brain specified for this task, effectively (Fodor, 2003). It has to be in a highly isolated form

and have little to do with other functions of the brain, for it is too distinctive; otherwise, we

would observe linguistic behaviours in other animals.

It could be understood if it were the 17th-century rationalist who denied the

evolutionary history of human language. However, alas, the null-evolution hypothesis is still

here in the last twenty years despite copious new findings in animal communication and

human written language. Anthropological studies show that the emergence of written

language has to do with social development. Not only the Pirahã but also many other

gatherers-hunters societies have their languages in rather simple forms, to say the very least[56]

(Hallpike, 2018, p. 3, p. 23). Moreover, these hunter-gatherers societies have not have

developed their own written languages. Combined these two observations with other features

of these hunter-gatherers societies: simpler social structure, simple labour-distribution,

inventory recording needs, etc., and we see a clear correlation between the complexity of the

society and the complexity of its language (see Hallpike, 2018). Studies showed that

---

[56] The point originally made by Danial Everett and many anthropologists is that these languages are not just *simple* but lack *recursion* or *merge* in nature. Such that recursion is not as innate as but more *a posteriori* than the biolinguists claimed it to be. One can certainly imagine how the biolinguists refute that, but I believe that there are also good reasons to agree with Everett and the anthropologists (beyond the scope of this thesis, though). Regardless of whether recursion is or is not innate, the key observation is that the hunter-gatherers societies' languages lack the kind of syntactic complexity found in other languages to an significant degree.

chimpanzees were taught to make sentences with signs, and they did use the signs to communicate. The chimpanzee failed to *speak*, for their language use is always limited, for example, almost always referring to second and first persons and using imperatives (Pika et al., 2005). A new neuroimaging study shows that baboons and many primates can recognize linguistic symbols with the same brain areas activated as in the human brain (inferior temporal cortex, Rajalingham et al., 2020). These results suggest that previously non-linguistic functions and organs were later adapted for language, contrary to what biolinguists speculate.

Rarely was there a structural change in biolinguistic dogma facing these shreds of evidence, which suggests that biolinguistics is an internally developing dogmatism whose focus is the logical construction of its core dogma.

3.5 The Principles & Parameters (P&P) Theory

This section offers a brief introduction to the theory of Principles & Parameters (P&P), and how it has become a dogma by failing to address language diversity. This section begins with an overview of how the P&P model emerged.

In my opinion, there are at least two motivations for P&P:

3.5.1 Language diversity was always a problem for the UG paradigm. Some leading linguists of this paradigm always wanted to (and still do) *unify* languages, based on the assumption that we as human beings all share the same language ability or *competence*. If all languages have emerged from and go back to one same epistemic system, then why do they show such distinct features in their *performance*? On the other hand, however, we found a universal pattern for children of different cultures: they reach adult-level speech in their

mother tongues at an approximately similar age (age 6 to 8, if not 10), and no language so far

is reported to delay that (Saxton, 2010, pp 4-5). Given that children 1) receive only limited

linguistic data (and most of the time only positive data); 2) in a short period (one cannot

possibly have heard and memorized all the words and their possible combinations in one

language in ten years), therefore, one assumes that there must be something ***a priori*** to

facilitate such a learning process. This *a priori* capacity was termed the "language-

acquisition-device" (LAD) and was later, by linguists like Noam Chomsky, developed into

(or at least part of) "Universal Grammar" (UG). Although to assume that every single

language has its own LAD would easily explain language diversity, there are reasons why we

should assume the universality of LAD. After all, there are similarities between languages

and people can learn and speak other languages (like what the author is doing right now).

Even more strikingly surprising, children can use grammar from another language in

speaking their mother tongue. Thence, it appears that they know something that they are not

even taught to know[57], unless it is something accessible to all the children other than the

particular empirical data they receive (let us assume so).

 3.5.2 A logical problem of *completeness* that the early rule-based UG faced also

triggered the idea of P&P. The earliest versions of UG (or at that moment, LAD) were

creative in having the *rewrite rules* to define the basic grammatical entities like a noun

---

[57] For example, English speakers do not drop the nouns or pronounces in any case as a descriptive grammatical rule, but English speaking children systematically drop the nouns in object position when the noun is the topic of the conversation (Valian, 1991). This is not a misuse *per se*; in fact, it is a regular grammatical pattern found in Italian and Chinese (Guan Hua). More strikingly, English children and Chinese adults use this grammar at a similar ratio: null object over null subject ratio, 0.29 and 0.32 (11.6%/ 40.6% and 8.3%/ 25.9%, Wang, Lillo-Martin, Best, & Levitt, 1992).

phrase, verb phrase (Valian, 1991, p 30), and having transformational rules to describe how

languages form more complex grammatical structures like wh-question, passive, etc. (1991,

pp 35- 34). Besides the uniformity of the diverse[58] transformational rules in different

languages, this rule-based system itself runs into a halting problem that all rule-based

computation system will have (UG is considered a computation to solve the epistemic

problems like how to form a sentence, how to learn a language). Before P&P, linguists like

John Colarusso did identify this halting problem in UG, and P&P was developed as a solution

to this problem. In one of his letters to Chomsky (which, for having challenged the very

dogma at the time, could only have been published much later in 2017). Colarusso compares

the halting problem, i.e. *when does a program stop on its own* or *when does it know to stop*

(Turing, 1937, pp. 260–262) to the problem *when does a generative rule know when to stop*

(Colarusso, 2017a). Here, I will try to formulate the halting problem in terms of sentence

structure presented in Dr. Colarusso's letter:

The halting problem was proposed by Alan Turing to demonstrate the incompleteness

of mathematics (Turing, 1937)[59]. *Incompleteness* means that there are things a mathematical

system cannot do, problems it cannot solve. Since UG was also a rule-based system like

mathematics, it faced the same kind of problems: there is perhaps an utterance UG cannot

---

[58] *Transformational rules* were regarded as language-specific, meaning that some grammatical structures are unique to certain languages but not to others. For example, though all the languages have *yes-no* questions, English uses an auxiliary inversion (to the pre-subject position); but German, a closely related language, simply has the lexical verb inverted; and Japanese uses an agglutinated bound morpheme at the sentence-final position, right opposite to English and German. This means, as said in section 3.3.1, each language then would tend to have their own manifestations of UG, different sets of transformational rules to account for their language-unique structures.

[59] This paper "happened" to become the very foundation of modern computers.

generate but humans say or could think of, or an impossible utterance for us but one necessarily generated by the rules. For example, we all know a sentence must have a period, must be "finished" at some point. A rule in UG has only one purpose and it only knows to do one thing: to generate sentence type X. How does Rule A know when the output sentence is "done"? The only way for a computing machine to solve this is by having another rule (or program), for example, Rule A, dedicated to this kind of task: to tell whether or when some rule has done its job. For any rule like Rule X, we shall simply input it to Rule B and get either of the two[60] possible outputs: 1) Rule X stops applying; 2) Rule X does not stop yet. It sounds like we now have a solution to this problem, but let us focus on the completeness thesis, i.e. whether Rule A can indicate or determine the stop-or-not status for any rule. Let us assume that there is simply another rule, B, that *always* negates the output of A: whenever A yields that rule C, the wh-question formation rule, for example, has stopped, rule B yields that no, rule C still continues. Rule B might be a revising rule that works when we found we formed the wrong sentence. The issue here is that we want to know when rule C stops and input it to rule A. We have two possible outputs: 1) rule C stops; 2) rule C continues applying. However, both outputs are problematic for the system: if 1), it is negated, so rule C still continues; if 2), as negated by rule C itself, rule C actually stops. The most problematic part is this: since the system cannot decide the status of C, and the system cannot accept contradictory outputs, it has to take this output to rule A again… In this way, rule A, or the system as a whole, goes forever on deciding the status of C. The system becomes locked into an infinite feedback loop. Thence, we have found a flaw in the system[61], which means that

---

[60] *Because* computation machines are in a binary design.
[61] *Completeness* means a logical system can generate all the possible outputs. We have found

the system cannot function on its own but requires some additional constraint.

There is a simpler problem, that of infinite sequences: UG is or produces a set of rules to generate certain utterances, but what about UG itself? What generates UG or the set of rules of it? If there is such a set of rules, no matter what they may look like, what are the rules that generate *them...* the rules then go on in an infinite regress.

As linguists like Dr. Colarusso pointed out, there must be something out of pure logic or pure rules, that works as a limit of the UG or the constraint of how many rules can there be. Then we have the ultimate distinction of principles and parameters.

Henceforth, the P&P model is a speculative solution to the two observations above. Let us now consider P&P as a natural entity.

3.5.3 *Principles* have another name: language universals. Parameters are, thus, the variants of those principles. If languages are more similar to than different from one another, the universals will be found, or are supposed to be found, in all languages. Nevertheless, the fact is that the universals are not *manifested* in all languages, and sometimes even absent in certain languages. Yet the very fact that we categorize some languages as one type (language similarities) and the fact that all languages are learnable regardless of the learner's cultural background (language-specific backgrounds), prove that those specifics are just variants of some universal property of UG. For example, all languages form wh-questions in some fashion. They can all have this form of questioning. It turns out that the wh-question formations, despite different movements or even none observed in some languages, all obey

---

a counterexample for the completeness, something the system cannot produce, or that it produces something that it cannot "explain". Therefore, we say this system is flawed or *incomplete*.

the *locality principle*. Roughly, this principle says that the wh-word will stay in a certain domain in the sentence structure (Rizzi, 2013, pp. 170–171). This means there are some places in a wh-question where the wh-word cannot appear. This, hence, functions as a universal constraint for all the wh-formation rules. We can also say that all the language-specific rules are derivatives of this principle.

There is also evidence for P&P in child language development:

There is a principle called null-topic principle manifested in some but not all of the world's languages (e.g. not in English). This principle states: if the topic of a conversation is mentioned in the direct object or subject position, it can be covert or not covert. The principle is manifested in German. For example, people would say *hab' ich schon gesehen* (Huang, 1984), meaning "I have already seen (him, etc.)". The *him* (or any other object pronoun) part, i.e. the object of the verb *see*, can be anything, so not just *him* but anything aforementioned. The item in that position (the object the verb *see*) is dropped as an aforementioned topic in the conversation: (*something*, *which you just mentioned*,) *hab' ich schon gesehen*. This indicates German's direct object is *left out* because it is a topic of the conversation, a positive example of the null-topic principle. A topic that both speakers have in mind in the current conversation thus gets to be omitted in the overt speech. On the other hand, German routinely does not allow verbs at the sentence-initial position[62] (personal knowledge); the typical word order of saying *I have already seen something you just said)* in German is supposed to be *ich hab' schon gesehen* or *schon hab ich gesehen* at the very least. However, to say it in the supposedly correct grammar: *ich hab' schon gesehen** to mean the proposition *I have already*

---

[62] Unless it is imperative mood or yes-no question, both of which do not apply to *hab' ich schon gesehen*.

seen (something you just said) is actually deemed as ungrammatical by German speakers (Huang, 1984). The supposedly wrong example where the verb *hab'* goes to the start of the sentence, becomes not wrong. How do we deal with it?

Accordingly, this is the case where another principle/ language universal is postulated: the topic-moving principle. This principle states: in any language, if the object is topicalized, it can be dropped in the sentence-initial position (by first being moved to that position, of course, 14.3.3, 2017)[63]. Then we combine the topic-moving principle and the null-topic principle into one and get a new null-topic principle. The new null-topic principle now goes: a language drops its topic item in a conversation or not; and if it does, it either (1) moves and drops the topic item in the sentence-initial position, or (2) drops the topic item in its original position. This way, German fits the explanations of the P&P model: it first generates *ihn* hab' ich schon gesehen by first moving the topic to the sentence-initial position; then (2) generates hab' ich schon gesehen by dropping the topic. This is, accordingly, how the world's languages gain their diversities: by (choosing to) say (-ing) "yes" or "no" or "partially yes" to all the many principles and their parameters.

The point of this P&P example and child language development is this:

Even though English does not adhere to the null-topic principle, this principle can still exist in the English mind; it is not unique to only some languages. Researches show that English speaking children, who did not learn Chinese or German at all, demonstrate this topic-drop in their speech at the age of two to four. It is not one or two times or just

---

[63] …, or just got dropped in its original position like that in Chinese. In *footnote 57*, I mention how Chinese falls into the null-topic principle. It happens that Chinese does *not always* topicalize an object in the sentence-initial position: Chinese also topicalizes an object in its original position.

randomly: they do that as often as Chinese adults (Wang, Lillo-Martin, Best, & Levitt, 1992).

Children of one culture conduct speeches employing another culture's linguistic strategies

that they could not possibly have had contact with. The findings like these show that the

principles are built-in or transcendental, and the actual activation or revision of them need

sensible data *a posteriori*. Just like children in all cultures seem to share all those parameters

of the language universals, but later their speech develops into that of their cultures, being

adjusted and influenced by the language constantly spoken surrounding them.

3.5.4 Nevertheless, *parameters* are trickier than the principles. This is where P&P gets

to be part of the biolinguistic slumber.

Now, P&P was supposed to account for language diversity, but did it actually? When

one is asking why there are so many different cats in the world, and another just tells her/him

that there are black cats, white cats, etc., did the other person answer the initial question?

P&P might just be like that; it is at best a new sorting system that merely begs the question

itself (Newmeyer, 2007, pp. 8-9). It may inform us of this and that universal (and parameters

for these universals), but it will never tell us *why* this language checks this parameter on (this

universal) but not another parameter (and other parameters). The *parameter* is "nothing but

jargon for language-particular rule" (ibid, p. 59) and thus fails to address the nature of

language diversity. Even though it is true that P&P deepens our understanding of *comparative

syntax* (Boeckx, 2010, p. 3), it is in biolinguistics' dogmatic nature that the biolinguists do not

want to take diversity as a problem. Early on in his *Syntactic Structures* (Chomsky, 1957, 6.1,

6.2), Chomsky stated that the study of grammar does not focus on matters like why particular

word orders or morphemes are adopted in a language. It shall focus on an abstract or

universal system that describes the transformational rules of all languages. That is, biolinguistics is not concerned with questions like why a certain language takes a particular word order (and others do not). This is yet a typical dogmatic move: caring not about its connection to reality but only about the inner development of its logical construction. The question of why German and Chinese (*Putonghua*[64]) but not English or other languages drop their conversational topic is not on the biolinguistics agenda. To put it in a more epistemically-curious way: *why German and Chinese do* despite that Proto-West-Germanic and Middle Chinese almost certainly never interacted even if they existed at roughly the same time (about 3rd century to 12th century)? Why two completely unrelated languages, Maori and Circassian, tabbed the same parameter in their ergative marking (Colarusso, 1984). Alas, the language organ is a mental organ of ideals and does not work on natural objects with messy details.

Chapter 4. Discussion

Now, there is a more descriptive way of defining naturalism. I think it grasps the vital consistency of ontological and methodological naturalism of scientific naturalism as a whole:

---

[64] For there are other Chinese (group) languages that may not drop their topic, I feel like I need to specify which one does.

Putonghua is an official term. So for the current standardized official language in China, there is an official and technical name for it: 普通话 or Pǔ Tōng Huà. It literally means (the) *ordinary/common speech*. The language was finalized as a hybrid of Beijing and Northern dialects of *Mandarin* in 1950s and maintained by a language authority until now.

It is also a word people use when referring to today's Chinese language, for carrying a social ideal there: a language spoken in China that everyone can learn and understand (thus, *common*). For example, "你的普通话说的真标准，我好羡慕你啊"; "nǐ de Pǔ Tōng Huà Huà shuō de zhēn biāo zhǔn, wǒ hǎo xiàn mu nǐ a" ("your Chinese Putonghua sounds so perfect/accent-less, I envy you so much").

domain naturalism and epistemological naturalism.

4.1 Epistemological naturalism

…is the idea that the science shall only use a method that elicits intersubjective agreement (Smith, 2017, p. 331). That said, for biolinguistics to be a science, its method for studying the universal grammar shall be public enough and not promote intersubjective disagreement. Such naturalism cares about the method but not the object. This is why there might also be a science for super-natural objects like *God* (Dawes & Smith, 2018, p. 28) or *the language organ*. Since *God* is not generally studied in modern science, to fully describe scientific studies, a complement to epistemological naturalism is needed:

4.2 Domain naturalism

…says "…that the causal influences of which [sciences] speak are restricted to those found within the created (or "natural") order" (Dawes & Smith, 2018, p. 28).

Therefore, it is not the case that Chomsky's proposal of biolinguistics replaced the behaviourism as *more scientific*, as many would think. Even Chomsky explicated in his own critique of behaviourism that behaviourism was a mere play of words, of using different ways of defining human activities without literally mentioning anything mental (Noam Chomsky, 1959, pp. 561-563). Chomsky did not dismiss behaviourism as not being a science (though many others did). Now, as we look at both theories of language represented by Chomsky and B.F. Skinner, from a scientific (*domain naturalism*) viewpoint, neither exhibits naturalism: behaviourism *under-commits* to the domain naturalism, because it omits some natural entities and causal influences that the natural order has[65]; while biolinguistics *over*-commits to such a

---

[65] At the very least, we shall admit that neurological activities are *causal* enough in determining behaviours. A private state exists behind the more public or "observable"

naturalism: by introducing something that this natural order does *not* have, by *dogmatically* including something that is clearly *superior* to or *outside* the given natural order[66]. The language organ or its so-called *ontological dualism*, the thought behind it, is just yet another *ghost in the machine* (Ryle, 1949, p. 19)[67] resurrected in the field of linguistics (see the following paragraph).

The ghost in the machine is an analogy: a seemingly and mysteriously (from *a sudden genetic mutation*) omnipotent ("the answer to all the language acquisition myth and performance myth) ghost (the *mental* grammar, not physical, not in any scientific categories), and the ghost is said to live in an all naturally- and physically-determined (being an object of all naturalistic methods) organ (falling under a biological category).What is sarcastic is that they are said to *match* and *work together* (studying the nature of the *ghost* will give the answers to most if not all, for example, language acquisition problems, the biolinguists think). With the terms like *mental organ* still discussed as a thing at this time (see Chomsky, 2000, 2002, 2017; Mendívil-Giró, 2015) for almost 70 years alongside tremendous developments in evolutionary anthropology, linguistic typology, and genetics[68], the *language*

---

external state of behaviours.

[66] If anything equivalent to an organ like the skin that is "found" and named "language" or "mental grammar" by the scientific community, especially the one recognized by the mature scientific community of biology. I would revise or retract this thesis immediately if that happened or had happened.

[67] **The ghost in the machine** is an ironic description of the Cartesian mind-body dualism, given by the 20th century British philosopher Gilbert Ryle in his *Concept of Mind*. The sarcasm focuses on two aspects of the Cartesian mind-body relation: 1) mind and body are two totally different substances of totally different nature (thus a *ghost* and a *machine*); 2) yet these two interact with each other, like in human (thus one is *in* each other). The amazing co-existent effect of these two completely different substances (accordingly), is the sarcastic *ghost in the machine* story.

[68] I am not mentioning neuroscience and experiment-based psychology here simply to avoid getting into the fight of nativism vs. generalism.

organ in homo sapiens, an ill-formed spooky stuff that is supposed to be a *no* to all sciences, is the new ghost in the machine that haunts linguistics after it haunted philosophy, studies of history, political science, and natural sciences. What's more, the reason why it still haunts is that this spooky language organ story has become a dogma that refuses corrections from reality, as if the dogma were reality itself, the true reality. Just as Kant depicted it 300 years ago.

4.3 Conclusion

In conclusion, I would suggest that, according to Kant's views, biolinguistics is turning itself into another demonology, a dogmatism whose object of study is vaguely defined in terms of reality. The examples given showed that it does so by being a science that over-commits to the domain of scientific studies. Futures studies are in need of a better definition of its objects in relation to nature.

The following is some mere speculation of mine.

Part of the reasons why there is such a split (of ontology and methodology) in linguistics, or such split is *the best we could have*, is that *maybe* language is *not* a natural object. Certainly, language appears natural with many features of a natural object, as the anthropologists and structuralists already showed us. On the other hand, though, if we look at the emergence of internalism in the history of linguistics, we shall see that internalism had not been a popular idea up until Saussure's time. Why? For language and entities like *gravity*, water flow, *et cetera*, are heterogeneous; the later are all independent of human perception. Can we say the same for language? I do not think so.

Well, yes, homo sapiens is the only human species that speaks. But this does not mean

that having language is the only distinguishing feature. Having societies, art, a complex knowledge-faculty, and a *reason* that always sets itself to answer questions that are beyond its payrate…, all of these distinguish us from other species (maybe not other homos). These are consistent with having language in the long history of language evolution. Simply that having languages set up the base for all other unique-human features, is hard to imagine, constructible but not likely according to many studies.

Thus, based on the observation above, we can also see this: the so-called nativism vs. generalism is not only a new genus of rationalism vs. empiricism, dogmatism vs. (skeptical-) naturalism. It is *not* even whether an isolated cognitive faculty is necessary for explaining language; rather it is *whether having languages underlies other humanly-unique activities* as the most primitive distinctions of human species. Hence, the very core of this debate, and the core-reason why biolinguistics has been a dogmatism, started with the question *whether having languages in the long history of human evolution, ever since Lucy[69] and her close relatives, was the start of everything after*.

---

[69] The earliest Australopithecina known so-far, whose fossil was found in Ethiopia in 1974.

References

Amoroso, L. (1978). Chomsky, Kant, and the Transcendental. ..*Studi Di Grammatica Italiana*, *7*, 47–55. https://search-proquest-com.libaccess.lib.mcmaster.ca/docview/58070013/6F2C411316D34697PQ/1?accountid=12347

Anderson, S. R., & Lightfoot, D. W. (2000). The Human Language Faculty as an Organ. In *Annu. Rev. Physiol*.

Awan, Z., Baass, A., & Genest, J. (2014). Proprotein Convertase Subtilisin/Kexin Type 9 (PCSK9): Lessons Learned from Patients with Hypercholesterolemia. *Clinical Chemistry*, *60*(11), 1380–1389. https://doi.org/10.1373/clinchem.2014.225946

Baker, M. C. (2001). *The atoms of language*. Basic Books.

Benjannet, S., Rhainds, D., Essalmani, R., Mayne, J., Wickham, L., Jin, W., Asselin, M. C., Hamelin, J., Varret, M., Allard, D., Trillard, M., Abifadel, M., Tebon, A., Attie, A. D., Rader, D. J., Boileau, C., Brissette, L., Chrétien, M., Prat, A., & Seidah, N. G. (2004). NARC-1/PCSK9 and its natural mutants: Zymogen cleavage and effects on the low density lipoprotein (LDL) receptor and LDL cholesterol. *Journal of Biological Chemistry*, *279*(47), 48865–48875. https://doi.org/10.1074/jbc.M409699200

Berge, K. E., Ose, L., & Leren, T. P. (2006). Missense mutations in the PCSK9 gene are associated with hypocholesterolemia and possibly increased response to statin therapy. *Arteriosclerosis, Thrombosis, and Vascular Biology*, *26*(5), 1094–1100. https://doi.org/10.1161/01.ATV.0000204337.81286.1c

Berwick, R. C., Pietroski, P., Yankama, B., & Chomsky, N. (2011). Poverty of the Stimulus Revisited. *Cognitive Science*, *35*(7), 1207–1242. https://doi.org/10.1111/j.1551-6709.2011.01189.x

Bialystok, E., Craik, F. I. M., & Freedman, M. (2007). Bilingualism as a protection against the onset of symptoms of dementia. *Neuropsychologia*, *45*(2), 459–464. https://doi.org/10.1016/j.neuropsychologia.2006.10.009

Boeckx, C. (2010). *What Principles & Parameters Got Wrong* [Universitat Aut`onoma de Barcelona]. https://pdfs.semanticscholar.org/c717/22886d92920b056b2e2a159651cf487a7898.pdf

Canuel, M., Sun, X., Asselin, M. C., Paramithiotis, E., Prat, A., & Seidah, N. G. (2013). Proprotein Convertase Subtilisin/Kexin Type 9 (PCSK9) Can Mediate Degradation of the Low Density Lipoprotein Receptor-Related Protein 1 (LRP-1). *PLoS ONE*, *8*(5), e64145. https://doi.org/10.1371/journal.pone.0064145

Caygill, H. (1995). *A Kant Dictionary*. https://philpapers.org/rec/CAYAKD-2

Chomsky, N. (2004). *The Generative Enterprise Revisited: Discussions with Riny Huybregts, Henk van Riemsdijk, Naoki Fukui and Mihoko Zushi*. https://books.google.com/books?hl=en&lr=&id=mRkvyXyAIOcC&oi=fnd&pg=PP8&ots=-Ti7VIF-hy&sig=0DXSw0yWG1WNz6zxL_AVVWOskXc

Chomsky, Noam. (1957). *Syntactic structures*. Mouton de Gruyter. https://books.google.ca/books?hl=en&lr=&id=SNeHkMXHcd8C&oi=fnd&pg=PR5&dq=chomsky+syntactic+structures&ots=AV8tNy_ptN&sig=plbmCGZwIxyNPfWu1FKQmHjiNws#v=onepage&q=chomsky syntactic structures&f=false

Chomsky, Noam., & Foucault, M. (2006). *The Chomsky-Foucault debate : on human nature*. New Press.

Chomsky, Noam. (1959). *A review of B. F. Skinner's Verbal Behavior*. https://philpapers.org/rec/CHOARO-2

Chomsky, Noam. (1975). *Reflections on Language*. Pantheon.

Chomsky, Noam. (1986). *Language: Its Nature, Origin, and Use CONVERGENCE*.

Chomsky, Noam. (2000). *New Horizons in the Study of Language and Mind*. Cambridge University Press. https://academiaanalitica.files.wordpress.com/2016/10/noam-chomsky-new-horizons-in-the-study-of-language-and-mind.pdf

Chomsky, Noam. (2002). On Nature and Language. In *On Nature and Language*. Cambridge University Press. https://doi.org/10.1017/cbo9780511613876

Chomsky, Noam. (2012). Poverty of Stimulus: Unfinished Business *. In *cuhk.edu.hk*. http://www.cuhk.edu.hk/ics/clrc/scl_33_1/chomsky.pdf

Chomsky, Noam, & Press, T. M. L. (n.d.). *ASPECTS OF THE THEORY OF SYNTAX This is Special Technical Report Number*. Retrieved December 7, 2018, from https://faculty.georgetown.edu/irvinem/theory/Chomsky-Aspects-excerpt.pdf

Colarusso, J. (2017a). A Platonic Paradox. *Inference: International Review of Science*, *3*(1). https://inference-review.com/letter/a-platonic-paradox

Colarusso, J. (2017b). VASTNESS REVISITED. *LACUS Forum 37*, *10*. http://johncolarusso.net/pdf/LACUS-Infinity.pdf

Colarusso, J. (1984). Circassian /-qa-/ Meets Semantic Algebra and Ergativity. In H. Aronson & W. Darden (Eds.), *Papers from the Third Conference on the Non-Slavic Languages of the USSR* (Vol. 7, pp. 49–90). Folia Slavica.

Culbertson, J., & Kirby, S. (2016). Simplicity and Specificity in Language: Domain-General Biases Have Domain-Specific Effects. *Frontiers in Psychology*, *6*(JAN), 1964. https://doi.org/10.3389/fpsyg.2015.01964

Curriculum in Cardiology. (2001). https://doi.org/10.1067/mhj.2001.112490

Dąbrowska, E. (2015). What exactly is Universal Grammar, and has anyone seen it? *Frontiers in Psychology*, *6*, 852. https://doi.org/10.3389/fpsyg.2015.00852

Dawes, G. W., & Smith, T. (2018). *The naturalism of the sciences*. https://doi.org/10.1016/j.shpsa.2017.11.012

Demers, A., Samami, S., Lauzier, B., Des Rosiers, C., Sock, E. T. N., Ong, H., & Mayer, G. (2015). PCSK9 Induces CD36 Degradation and Affects Long-Chain Fatty Acid Uptake and Triglyceride Metabolism in Adipocytes and in Mouse Liver. *Arteriosclerosis, Thrombosis, and Vascular Biology*, *35*(12), 2517–2525. https://doi.org/10.1161/ATVBAHA.115.306032

Deng, X. (2007). *Reading Kant's Critique of Pure Reason (first half)* (2nd ed.). People's Publishing House.

Deng, X. (2013). *Lectures on Kritik der Reinen Vernunft* (1st ed.). The Commerical Press.

Ecklund, E. H. (2010). *Science Vs. Religion: What Scientists Really Think*. Oxford University Press, USA. https://books.google.ca/books?id=_a8RDAAAQBAJ

Evans, V. (2014). *The language myth : why language is not an instinct*.

Fedorenko, E., Duncan, J., & Kanwisher, N. (2012). Language-selective and domain-general regions lie side by side within Broca's area. *Current Biology*, *22*(21), 2059–2062.

https://doi.org/10.1016/j.cub.2012.09.011

Feldman, R. (2003). *Epistemology*. Prentice Hall.

Fodor, J. D. (2003). Setting syntactic parameters. In M. Baltin & C. Collins (Eds.), *in The Handbook of Contemporary Syntactic Theory* (pp. 730–767). Blackwell.

Fodor, J. D., & Sakas, W. G. (2004). Evaluating models of parameter setting. In A. Brugos, L. Micciulla, & C. E. Smith (Eds.), *BUCLD 28: Proceedings of the 28th Annual Boston University Conference on Language Development* (pp. 1–27). Cascadilla Press. http://www.edoc.mpg.de/305610

Forrest, B. (2000). *METHODOLOGICAL NATURALISM AND PHILOSOPHICAL NATURALISM: CLARIFYING THE CONNECTION* (Vol. 3, Issue 2).

Hallpike, C. R. (2018). *So all languages aren't equally complex after all*. http://hallpike.com/publications.htm

Heine, B., & Kuteva, T. (2002). *World Lexicon of Grammaticalization*. Cambridge University Press. http://www.cambridge.org

Huang, C.-T. J. (1984). On the Distribution And Rederence of Empty Pronouns. *Linguistic Inquiry*, *15*, 531–574.

Hume, D. (1748). An Enquiry Concerning Human Understanding David Hume. *Philosophy*, 1–121. https://doi.org/10.1007/s13213-010-0039-y

Hwang, H. S., Kim, J. S., Kim, Y. G., Lee, S.-Y., Ahn, S. Y., Lee, H. J., Lee, D.-Y., Lee, S. H., Moon, J. Y., & Jeong, K. H. (2020). Circulating PCSK9 Level and Risk of Cardiovascular Events and Death in Hemodialysis Patients. *Journal of Clinical Medicine*, *9*(1), 244. https://doi.org/10.3390/jcm9010244

Jacob, P. (2010). The scope and limits of Chomsky's naturalism. In J. Bricmont & J. Franck (Eds.), *Chomsky's Notebook* (pp. 211–234). Columbia University Press. https://jeannicod.ccsd.cnrs.fr/ijn_00755897

James, W. (1890). *The Principles of psychology v. 1* (Issue v. 1). Holt. https://books.google.ca/books?id=8dG0-c8wQEUC

Kant, I., & Weischedel, W. (2000). *Kritik der reinen Vernunft 2. 4*.

KATZ, A. M., & KATZ, P. B. (1962). Diseases of the heart in the works of Hippocrates. *British Heart Journal*, *24*(3), 257–264. https://doi.org/10.1136/hrt.24.3.257

Kayne, R. S. (2005). Some notes on comparative syntax, with particular reference to English and French. In G. Cinque & R. S. Kayne (Eds.), *The Oxford Handbook of Comparative Syntax* (pp. 3–69). Oxford University Press. https://books.google.com/books?hl=en&lr=&id=8ax72A8NsS8C&oi=fnd&pg=PR7&ots=SjzLGsGl2j&sig=uSq4PsJkLMnFg8opfW7Wm0DI9vA

Kitzmiller v. Dover: Decision of the Court, Part 2. (n.d.). Retrieved August 24, 2020, from http://www.talkorigins.org/faqs/dover/kitzmiller_v_dover_decision2.html

Language development in children 5-8 years | Raising Children Network. (n.d.). Retrieved June 16, 2020, from https://raisingchildren.net.au/school-age/development/language-development/language-5-8-years

Levinson, S. C. (1996). Frames of reference and Molyneux's Question: cross-linguistic evidence. In P. Bloom, M. Peterson, L. Nadel, & M. Garrett (Eds.), *Language and Space* (1st ed., pp. 109–169). MIT Press.

Lin, F. Y. (2017). A refutation of universal grammar. *Lingua*, *193*, 1–22.

https://doi.org/10.1016/j.lingua.2017.04.003

Lin, X. (2011). *What Did Philosophers do?* (1st ed.). Liaoning Education Press.

Mendívil-Giró, J. L. (2015). What are languages? A biolinguistic perspective. *Open Linguistics*, *1*(1), 71–95. https://doi.org/10.2478/opli-2014-0005

Newmeyer, F. J. (2007). Possible and Probable Languages: A Generative Perspective on Linguistic Typology. In *Possible and Probable Languages: A Generative Perspective on Linguistic Typology*. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199274338.001.0001

Newmeyer, F. J. (2008). Universals in syntax. In *Linguistic Review* (Vol. 25, Issues 1–2, pp. 35–82). Walter de Gruyter GmbH. https://doi.org/10.1515/TLIR.2008.002

Newton, I. (1950). Seven Statements on Religion. In H. McLachlan (Ed.), *Theological Manuscripts*. Liverpool University Press.

Pinker, S. (1995). *The Language Instinct* (1st ed.). Harper-Collins Publisher. https://monoskop.org/images/2/20/Pinker_Steven_The_language_instinct_1995.Pdf

Poirier, S., Mayer, G., Benjannet, S., Bergeron, E., Marcinkiewicz, J., Nassoury, N., Mayer, H., Nimpf, J., Prat, A., & Seidah, N. G. (2008). The proprotein convertase PCSK9 induces the degradation of low density lipoprotein receptor (LDLR) and its closest family members VLDLR and ApoER2. *Journal of Biological Chemistry*, *283*(4), 2363–2372. https://doi.org/10.1074/jbc.M708098200

Quine, W. V. (1995). Naturalism; Or, Living Within One's Means. *Dialectica*, *49*(2–4), 251–263. https://doi.org/10.1111/j.1746-8361.1995.tb00164.x

Rajalingham, R., Kar, K., Sanghavi, S., Dehaene, S., & DiCarlo, J. J. (2020). The inferior temporal cortex is a potential cortical precursor of orthographic processing in untrained monkeys. *Nature Communications*, *11*(1), 1–13. https://doi.org/10.1038/s41467-020-17714-3

Ratke, H. (1929). *Systematisches Handlexikon zu Kants Kritik der reinen Vernunft*. https://philpapers.org/rec/RATSHZ-3

Rizzi, L. (2013). Locality. *Lingua*, *130*, 169–186. https://doi.org/10.1016/J.LINGUA.2012.12.002

Roberts, I. G. (2017). *The Oxford handbook of universal grammar*. Oxford University Press,. https://discovery.mcmaster.ca/iii/encore/record/C__Rb2493388__Soxford handbook of universal grammar__Orightresult__U__X7?lang=eng&suite=def

Roberts, I., & Holmberg, A. (2005). On the role of parameters in universal grammar: a reply to Newmeyer. In H. Broekhuis, N. Corver, R. Huybregts, U. Kleinhenz, & J. Koster (Eds.), *Organizing Grammar: Linguistic Studies in Honor of Henk Van Riemsdijk* (pp. 538–553). Mouton de Gruyter. https://books.google.com/books?hl=en&lr=&id=1qhmbF03r2YC&oi=fnd&pg=PR13&ots=jTm4dfbXGc&sig=p4RjDkjfb5ehtqQe7RYKiVsgQYU

Ryle, G. (1949). *The Concept of Mind* (1st ed.). [[University of Chicago Press]].

Saxton, M. (2010). *Child language : acquisition and development*. SAGE Publications.

Schafersman, S. D. (1996). Naturalism is an Essential Part of Science. *Conference on Naturalism, Theism and the Scientific Enterprise*. http://www.leaderu.com/offices/koons/docs/Schafersman.html

Shlonsky, U. (2010). The Cartographic Enterprise in Syntax. *Language and Linguistics*

Compass, *4*(6), 417–429. https://doi.org/10.1111/j.1749-818X.2010.00202.x

Slagle, U. V. (1974). The Kantian influence on Humboldt's linguistic thought. *Historiographia Linguistica*, *1*(3), 341–350. https://search-proquest-com.libaccess.lib.mcmaster.ca/docview/85481340/8A15264DF5DB4BF0PQ/1?accounti d=12347

Smith, T. (2017). Methodological naturalism and its misconceptions. *International Journal for Philosophy of Religion*, *82*(3), 321–336. https://doi.org/10.1007/s11153-017-9616-3

Stroinska, M. (2001). Pragmatics of Scientific Discourse. In H. Schroder, P. Kumschlies, & M. Gonzalez (Eds.), *Linguistik als Kulturwissenschaft: Festschrift fuer Bernd Spillner zum 60* (pp. 199–209). Peter Lang. https://www.academia.edu/39784616/Pragmatics_of_Scientific_Discourse

T.C., W. (1993). *Kant's Philosophy of Language. Chomskyan Linguistics and its Kantian Roots*. E. Mellen Press. https://mellenpress.com/book/Kants-Philosophy-of-Language-Chomskyan-Linguistics-and-its-Kantian-Roots/709/

Thompson-Schill, S. L. (2017). Dissecting the language organ: A new look at the role of Broca's area in language processing. In A. Cutler (Ed.), *Twenty-First Century Psycholinguistics: Four Cornerstones* (1st ed., p. 411). Routledge.

Tomasello, M. (2001). First steps toward a usage-based theory of language acquisition. *Cognitive Linguistics*, *11*(1–2), 61–82. https://doi.org/10.1515/cogl.2001.012

Tondino, T. (2016). *I LANGUAGE, E LANGUAGE, P LANGUAGE*.

Turing, A. M. (1937). On Computable Numbers, with an Application to the Entscheidungsproblem. *Proceedings of the London Mathematical Society*, *s2-42*(1), 230–265. https://doi.org/10.1112/plms/s2-42.1.230

Valian, V. (1991). Syntactic subjects in the early speech of American and Italian children. *Cognition*, *40*(1–2), 21–81. https://doi.org/10.1016/0010-0277(91)90046-7

Wang, Q., Lillo-Martin, D., Best, C. T., & Levitt, A. (1992). Null Subject Versus Null Object: Some Evidence From the Acquisition of Chinese and English. *Language Acquisition*, *2*(3), 221–254. https://doi.org/10.1207/s15327817la0203_2

Yusuf, P. S. et al. (2004). Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): Case-control study. *Lancet*, *364*, 937–952.

Z, P. (2004). *Testament of Nicholas Flamel* (1st ed.). China Peace Publishing House. https://www.scribd.com/document/397249197/尼古拉的遗嘱

Zhao, D. (2001). *A Short History of Western Philosophy* (pp. 211–213). PKU Eduction Press.