Scripta Philosophiæ Naturalis 15 (2019)

ISSN 2258 – 3335

ON THE FOUNDATIONS OF LANGUAGE (*)

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del Círculo de Filosofía de la Naturaleza
Universidad Austral de Chile, Valdivia, 21-23 de Noviembre de 2018

ABSTRACT: The fundamental factors that produce language are varied and elusive. There is controversy over which of these factors are particular to humans and/or particular to language; however, it is clear through research from neuroscience that a biological factor exists which endows human beings with the capacity for language. Though there are several elements of the language faculty that overlap with other cognitive faculties, it is suggested that human beings possess certain biological, cultural, and unknown elements that are exclusive to humans and to language use. The capacity to share and accumulate cultural information, on the one hand, permits human beings to acquire linguistic input through social learning which complements the cognitive processes. On the other hand, the mental representations caused by cerebral processes present an epistemological mystery to us, as a complete understanding of the causes of consciousness, meaning, and linguistic representations in the mind may not be accessible to humans due to our cognitive limits. Thus, an instinct encoded in our genes produces neural structures that, because of the functions they fulfill, can be considered as cognitive faculties. Said faculties and their learning mechanisms generate mental representations, three sets of which interact with each other to produce language: a universal limiting potential, a cultural code, and meaning. Although with effort we can reflect on the universal rules that underlie our cultural language codes and we can study the brain in order to discover the areas responsible for language production, the mysterious nature of the interactions among these origins is unclear.

Keywords: language; faculty of language; mental representation; culture.

RESUMEN: Los factores fundamentales que producen el lenguaje son diversos y esquivos. Hay una controversia respecto a cuáles de esos factores pertenecen solo a los seres humanos y/o solo al lenguaje; sin embargo, las investigaciones neurocientíficas nos demuestran que es clara la existencia de un factor biológico, el cual dota a los seres humanos con la capacidad de lenguaje. Aunque existen varios componentes de la facultad de lenguaje que son compartidos con otras facultades cognitivas, se sugiere que los seres humanos poseemos ciertos elementos biológicos, culturales y desconocidos exclusivos de los humanos y del uso del lenguaje. La capacidad de compartir y acumular la información cultural, por un lado, permite que los seres humanos adquiramos el input lingüístico mediante el aprendizaje social, lo cual complementa los procesos cognitivos. Por otro lado, las representaciones mentales generadas por los procesos cerebrales se presentan como un misterio epistemológico dado que el entendimiento completo de las causas de la conciencia, del significado y de las representaciones de la mente posiblemente no sea accesible a los humanos debido a nuestros límites cognitivos. Por lo tanto, un instinto codificado en nuestros genes produce estructuras neuronales que, por las funciones que cumplen, pueden ser consideradas como facultades cognitivas. Las facultades mencionadas y sus mecanismos de aprendizaje generan representaciones mentales; tres sets de dichas representaciones interactúan entre sí para producir lenguaje: una potencia universal limitante, un código cultural, y el significado. Si bien con esfuerzo podemos reflexionar sobre las reglas universales que subyacen a nuestros códigos culturales de lenguaje y podemos estudiar el *cerebro para descubrir las áreas responsables de la producción de lenguaje, la naturaleza misteriosa de las interacciones entre estos orígenes es incierta.*

Palabras clave: lenguaje; facultad de lenguaje; conciencia; cultura.

The factors that influence the human ability to use language are varied and elusive. No single theory satisfactorily encompasses the myriad components involved; this is undoubtedly due to its complexity, downplayed by those who do not study language, and at times exaggerated by those who do. Based on current available research, it is implausible that language has come to be used automatically by human beings solely due to general cognitive abilities or purely cultural factors. Language seems to require factors that theories based on only the former or latter cannot incorporate, but neither can these factors be ignored. In order to find the foundations of human language use, the present work pursues the extents of an irrefutable biological aspect, and where additional influences necessary for language use intercept and connect with this aspect.

There are obvious connections that language has to our biology – just consider the requisite anatomy to hear linguistic input and utter linguistic output using our auditory system and speech apparatus. Aside from the apparent areas, however, multiple cerebral processes are at work when we learn, use, and understand language. Steven Pinker (1994) presents data and evidence-based theories on various topics in language to support the claim that language use and learning stems from instinct. Though there is controversy over which of the processes at play are particular to humans and/or particular to language, it is clear through research from neuroscience that biological elements endow human beings with the capacity for language, regardless of what that may look like.

However, this work attempts to respond to a more problematic question: is there a cerebral mechanism, whose function is particular to our language ability, which is sufficient to support our use of language? First, it is suggested that considerable areas of a faculty for language overlap with other cognitive faculties; however, it is argued that an area responsible for language use has been adapted in humans, and that this area is comprised of neural mechanisms which other cognitive functions do not share.

That being said, one cannot simply be endowed from instinct with the complete cerebral mechanisms required to use language. The instinct needs a learning mechanism which is the potential for a pattern of neural architecture realized only when met with social environmental input. It is thus impossible to make use of our language faculty without the complementary cultural factor acquired through social learning.

When attempting to research the two factors previously stated, we are confronted with several epistemological mysteries that cannot be eliminated. These must be addressed in order to gain the most complete understanding possible of our faculty for language.

Due to the aforementioned, this paper is divided into four sections: the first explores the conception of language necessary to build an adequate theory of its foundations; the second reviews the extent to which our biology supports a language faculty, and what a specific language area or neural architecture might consist of; the third explores a selection of primary and secondary cultural factors involved in the acquisition and use of language that make clear the demand for linguistic environmental input to complement the biological mechanism; and the final section confronts aspects of language whose complete nature may be inaccessible due to humans' natural cognitive limits. Knowledge of said constraints can help interdisciplinary research to approach the complexities of language from two broad domains: the cerebral structure with its neuronal bases and synaptic firings, and the conscious representations accessed through reasoning using varying levels of effort.

The evidence suggests that human beings possess certain biological, cultural, and unknown elements that, though by nature are interrelated with other cognitive faculties, display attributes that are exclusive to humans and to language use.

§ 1. A conception of language

1.1. Language as separate from thought

We must part from a common understanding of certain issues surrounding language before we can place biological, cultural, and mysterious elements at its foundations. The first of these deals with the misconception that thought and language are one and the same. Though extensive interrelatedness and simultaneous evolution of both would make language appear to pervade thought (Tomasello, 1999), there are clear areas of each domain that function separately (Pinker, 1994). Furthermore, by holding that thought and language are the same, we must draw several false conclusions, including (1.) babies do not think before they start speaking, and (2.) people who have lost the ability to use language have also lost their conceptual basis.

Thus, we first create representations of the external world, then encode them with linguistic representations shared through social learning (Ingram, 2007). Linguistic expression is meaningless when listening to speakers of a language one has not been acquainted with, but we may be able to pick out patterns within that language, without the evocation of non-linguistic concepts. The first time a word, syntactic structure, or pragmatic use of even our own language is heard, it cannot be connected with a concept unless linguistic or other contextual factors are involved which can provide the link. Indeed, even if we recognize the words, "conversation out of context is virtually opaque" (Pinker, 1994, p. 224). However, syntax and even context may confuse us, for instance with garden-path sentences or unlikely thematic roles (Ingram, 2007), resulting in asking a conversational partner what he or she means.

On the other hand, we have all had the experience of attempting to speak and not finding the words, saying something that was received in a way not intended, or speaking another language and arriving at a linguistic dead end, where we know what we mean or intend to say but do not have the linguistic elements to say it.

Numerous studies cited by Löw et al. (2003) indicate that "areas in the occipito-temporal cortex are specialized in processing ecologically important stimuli, such as faces and words," yet there is not enough evidence to support how semantic organization in the brain occurs (2003, p. 367). This suggests there are at least two distinct yet interconnected systems for processing words and categorizing concepts. It is important to view these two systems as separate but connected and co-evolved phenomena to understand language foundations.

§ 1.2. Language as a representation

Maintaining that thought and language are separate systems, we can accept Ferdinand de Saussure's contribution (1966) to the field: that, to a certain degree, language consists of arbitrary signs, or the "wholly conventional pairing of a sound with a meaning" (Pinker, 1994, p. 83). Words do not have any inherent connection to concepts, but are instead symbols of them. We learn these sign-concept pairings as children and access our constantly-evolving network of them while we speak. Though this aspect would seem to imply that all symbolic systems can be used in this way, human languages are not imposed by authorities and are "induced by exposure to examples rather than being applied in explicit conformity with published standards" (Pinker & Jackendoff, 2005, p. 27). The mere fact that they are used spontaneously by children and not overtly taught furthers this notion (Pinker, 1994).

§ 1.3. Language as a code

Language is not simply comprised of pairings of sound-sign with meaning. There is a mental code that can use this finite set of pairings to an infinite extent. We can imply this is theoretically the case by the various ways of linguistically expressing a meaning based on intention, context, relationship between participants, and countless other unspoken factors present in all conversation, not to mention differences among dialects and languages.

Chomsky (1965) suggests that "an essential property of language is that it provides the means for expressing indefinitely many thoughts and for reacting appropriately in an indefinite range of new situations" (1965, p. 6), a necessary trait for a system evolved to communicate propositions, as it must accommodate infinite possible propositions to be communicated (Pinker & Jackendoff, 2005). The mental code that can permit this is called a generative grammar, a discrete combinatorial system which produces an infinite number of possible sentences in order to express an infinite number of discretely combined thoughts. This can allow new concepts to be created and passed throughout a community as well as the integration of new words or syntactic structures to express them. Discrete infinity is also an attribute of phonology. The two mentioned systems create a duality of patterning (Pinker & Jackendoff, 2005). This communication system seems a fitting structure for a faculty that creates, accumulates, and stores infinite (in theory) possible concepts.

§ 1.4. Language as a cognitive faculty

A faculty can be likened to a single gadget on a Swiss army knife, an analogy suggested by Colin McGinn (1993). Each faculty is an instinctual cerebral process used to perform a particular cognitive task. These tasks would look something like acquiring and utilizing language, performing tasks in logic or mathematics, etcetera (see McGinn, 1993; Pinker, 1994 for other possible faculties). However, faculties are not separate as the analogy would lead us to believe, but extensively interconnected. Though we can infer that linguistic input is theoretically separate from categorizing the world into semantic networks, how can we know that it is separate from other cognitive faculties?

The gadget analogy is not to be taken in the sense that Ibbotson and Tomasello (2016) use it to suggest that the brain draws upon many "general-purpose tools," or multiple cognitive faculties, without the use of an independent faculty for language. Though similar, it misses the mark: referring to what the brain uses for language as "general-purpose tools" is not seeing the trees for the forest. By discussing patterns of brain activity supporting specific functions such as categorization, motor control, and perception, or explain the effects on language function due to pure word deafness or trauma to Broca's area (Ingram, 2007; Pinker & Jackendoff, 2005), we refer to specific faculties. It is simply a matter of playing with terminology: either we speak of "general" cognitive mechanisms which we can individually associate with specific functions, or we speak of functionally specific but interconnected cognitive faculties. With neurosciences and neuroimaging techniques to support the notion that functions pertain to areas of neural architecture (Ackerman, 1992; Ingram, 2007), the better expression of what the brain does with language is the latter.

During brain development, neuronal migration occurs to situate neurons in specific cerebral areas based on predetermined factors which differentiate the neurons into the appropriate cell for that location (Ackerman, 1992; Volpe, 2017). This allows connections to occur among neurons within and across these areas (Ackerman, 1992), thus determining the function of the region, which can vary across individuals (Kanai & Rees, 2011), adding to the difficulty in matching a single specific area of the brain to a function.

What is more, at the moment we have only the power to say that a cerebral mechanism has an *association* with a certain behavior, due to the complexity of the brain's connections and our current available processes of examining cerebral structure (Kanai & Rees, 2011; Reynolds, 2009). Neuroimaging techniques and the investigation of disorders that arise from neuronal migration and genetic variation (Purves, 2001) offer promise in eventually showing us a significant amount about cerebral architecture giving rise to a language function. But our finding a specific area of the brain that can be labeled as "language area" is simply not required to say that there are cerebral mechanisms that have evolved to aid exclusively in the acquisition of language and the communication of propositions. Indeed, Reynolds (2009) asserts that it would be “futile to look for any specific growth process that might explain language acquisition,” not because it does not exist, but because of how complex “the neural control of language” is (2009, p. 33).

It is therefore essential to add the distinction made by Hauser, Chomsky, and Fitch (2002). They refer to all psychological abilities used for language, including those also used for non-linguistic tasks, as *the faculty of language in the broad sense* (FLB), and use *the faculty of language in the narrow sense* (FLN) to refer to what is unique to human language. Additionally, the present work attempts to differentiate the biological from the cultural: (1.) the universal human capacity for language, whose preconfigured cerebral mechanism stems from instinct; and (2.) the layered code which allows for infinite and creative language use, which is spontaneously inferred from an individual’s social environment through a learning mechanism. The term *language faculty* is employed for the former, and *language* for the latter, or the biological and cultural, respectively.

§ 1.5. Language as an instinct

Some believe that language is made possible by cultural evolution and is thus acquired as other cultural skills are. But an instinct to learn and acquiring a skill are two different things. When riding a bike, we first must acquire the concept through cultural means and experience; our biology then permits us to achieve this skill with conscious effort and practice. But there are also concepts we can acquire and understand through cultural experience, like flying; yet our biology prohibits it, even with effort and practice. But language is where the two meet, with an instinct at the core.

Pinker and Jackendoff (2005) deduce that a cerebral mechanism for language stems from an innate ability, which is likely considering much of the neuronal migration and resulting neural architecture is preconfigured by proteins and genes (Kanai & Rees, 2011; Pinker & Jackendoff, 2005). The term *instinct* is chosen in order to equate human language use to, for example, how a spider spins a web (Pinker, 1994). However, this metaphor is lacking; genes can serve as the basis of diverse levels or blends of instincts, behaviors, and learned skills. There are internal processes in an organism, such as breathing, that are not behaviors in response to external factors, but can be controlled with effort and volition or through learned skills. There are also pure instincts, like a spider’s web-spinning. Then there are instincts for learning which our biology propels us to do with a very low level of conscious effort, without formal instruction or practice. This is the case with language: it is an ability to spontaneously acquire stimuli provided by the environment during a critical period (Hartshorne et al., 2018), stimuli that cannot be pre-wired due to lack of space in the human genome and inevitable exposure to diverse environments (Pinker, 1994).

§ 2. The biological foundation

Initially exploring a biological factor is beneficial for two reasons. The first is to prove by sheer quantity and variety of converging evidence that this factor exists at all (Pinker, 1994). The second is to give us a reason to look for other factors. Keeping in mind that FLB is wide-ranging, exploring the extent to which these mechanisms infer the existence of FLN can provide direction for interdisciplinary research concerning the sorts of functions that may be specific to our use of language and the cognitive mechanisms underlying them.

The interconnectedness of language with other faculties leaves a small section of function and neural architecture for the narrow faculty (FLN), and is more than likely not confined to one area of the brain. It must be so narrow as to appear to us to be based off of multiple other blueprints with their own specific functions, but broad in the sense that it is not just one function that is completed solely for language. Hauser, Chomsky, and Fitch (2002) suggested that recursion, the embedding of language elements within elements of the same kind (Pinker & Jackendoff, 2005), is the only property unique to language use. However, Pinker and Jackendoff (2005) responded with a systematic refutation of this claim. Based on investigations of differences between humans and other primates and how that may imply what is unique to the language faculty, the two authors suggest that aspects of our conceptual basis, speech perception, speech production, phonology, words, and syntax comprise FLN.

§ 2.1. FLN and concepts

A concept is any mental representation produced by cerebral processes taking into account sensory input, emotional experiences, imagination, and memories accumulated from individual or social learning. Concepts are stored in a semantic network, connected to other concepts by our categorization systems. Though much overlaps with other primates, areas of human conceptual structure are most assuredly unique to humans (Pinker & Jackendoff, 2005; Jackendoff, 2002). Jackendoff (1996) suggests there are "domains of human concepts which are probably unlearnable without language" (cited by Pinker & Jackendoff, 2005, p. 7). The two authors suggest that at the very least it would not be possible to acquire these concepts if they could not be transmitted through language. The most compelling examples they suggest pertain to culturally acquired concepts such as the supernatural, "human-specific kinship systems," and social roles. Additionally, the most obvious concepts acquired only with the use of language are concepts concerning language itself.

§ 2.2. FLN and speech production

There is a significant amount of overlap in the use of the speech apparatus with multiple functions, such as breathing, eating, and drinking. However, though the speech apparatus may not have initially evolved for communication, strong evidence supports modifications to it that not only aid speech, but compromise other functions in favor of speech; therefore, it is suggested these traits were selected for the benefit of speech production (Pinker & Jackendoff, 2005).

The uniquely human trait of speech production might be attributed to a capacity for imitation, yet humans do not possess such a capacity; just consider a human attempting to recreate an environmental sound or a foreign accent. Instead, Pinker and Jackendoff (2005) propose that speech production be understood as a capacity to produce speech, which can be attributed to humans' ability to infer and recreate mental representations as we receive linguistic input. We would not be able to reproduce the speech of others in our social environments without perceiving and recreating these mental representations.

§ 2.3. FLN and speech perception

Most of our auditory system is shared with other primates and was certainly evolved from our ancestors, showing that much of this system is not particular to language (Pinker & Jackendoff, 2005). However, humans can perceive word and phoneme boundaries without practice or instruction, despite hearing a continuous stream of speech devoid of cues (such as pauses between words) and despite phenomenon such as coarticulation, vocal differences between speakers and dialects, and many other distractors (Fitch, 1997; Ingram, 2007; Pinker & Jackendoff, 2005).

Neuroimaging techniques and brain-damage studies "suggest that partly distinct sets of brain areas subserve speech and nonspeech sounds" (Pinker & Jackendoff, 2005, p. 8). Furthermore, that infants prefer speech sounds even when their properties are similar to nonspeech sounds suggests pre-wired cerebral activity behind the bias, not a learned component (Pinker & Jackendoff, 2005). Surely that which allows us to detect word boundaries is a combination of our abilities to receive sensory input, perceive it as speech, and represent it mentally, which would necessarily be a preconfigured aspect particular to FLN.

§ 2.4. Monitoring and parsing ability

We are constantly inferring rules from ambient speech (Pinker, 1994), and the accumulation of the inferred representations of these rules creates a system of monitoring (Chomsky, 1965). This phenomenon most likely integrates with the same neural architecture that allows us to perceive speech, with the purpose of interpreting what the speaker is saying (Ingram, 2007). This parser "analyzes sentence structure during language comprehension" and tells us if what we are saying or what we are hearing from another speaker conforms to our dialect's norms (Pinker, 1994, p. 197).

This system, referred to as *language competence* (Kempe & Brooks, 2016), follows the criteria that make up the grammatical, phonological, and pragmatic rules of an individual's dialect or language, additionally taking into account vocabulary choice and shared cultural concepts. We begin to form this competence during language acquisition and continue to make slight adjustments throughout life. Though cultural input is essential to attune our ability for language competence to the environment, the learning and monitoring mechanisms themselves are suggested to be part of FLN. It is what allows us to monitor the utterances of other speakers and our own by inferring representations with a low level of conscious effort.

We can surmise that rules are being inferred because of a process called reanalysis, the misinterpretation of an intended mental representation of language (Pinker & Jackendoff, 2005; Pinker, 1994). Reanalysis occurs because we infer the simplest linguistic representation that can account for what we hear, and sometimes that inference differs from others' mental representations (Boyd and Richerson, 2005). This further differentiates thought and language: though the speaker's message is understood (the same concept is reached), we perceive deviation from our language norms (a different linguistic representation is reached)

Our parsing and monitoring system is most likely what causes us to notice cases of reanalysis (Pinker, 1994), and by noticing we can therefore infer the monitoring device's existence. We are automatically alerted to other dialects or the mistakes of second language learners because they do not conform to the rules our monitoring and parsing device is attuned to. We can see on brain scans that a part in the back of the brain lights up when vocabulary use is perceived as incorrect, and a part in the front left of the brain lights up when something is perceived as ungrammatical (Atchison, 2016). But this does not necessarily mean that we have the skill to describe why our brain has flagged a use; indeed, we may know how we would change the deviation according to the rules followed by the monitoring system, but the skill to describe the rule underlying it is, in most cases, absent. We must first learn these rules through conscious effort, which is a skill akin to riding a bike.

Becoming consciously aware of a language's conventional algorithm (its generative grammar, its phonological rules, etc.) is a learned skill that permits us to derive rules and properties from distinct languages (Van Kleeck, 1982) to study, learn, and monitor them. This learned skill is called *metalinguistic awareness*, which helps us to see the commonalities among and complexities within languages. Perhaps what we fail to acknowledge is that our consciousness also necessarily plays a part in our spontaneous acquisition and use of language; the main difference between this and attaining metalinguistic awareness seems to be in amount of conscious effort employed.

It becomes increasingly clear that there must be a component of the language faculty, in part an attribute of FLN, that monitors and parses speech without conscious effort, and most likely others that allow us, *with* conscious effort, to reflect on the development of our mental representations to access metalinguistic awareness. We most likely do this through reasoning, which uses multiple faculties whose functions are not to understand the functions of other faculties (McGinn, 1993). For this reason, what we acquire are secondary representations of linguistic representations (representations of representations). To depict secondary syntactic representations, for example, we may use formulas that look similar to formal logic. However, multiple stacked representations are necessary in order to understand the totality of what may be represented in the mind (Jackendoff, 2002); creating them allows us to glimpse the structure of the mind's representations for language.

With additional effort, then, we can infer the limits of linguistic representations governed by the language faculty.

§ 2.5. FLN and phonology

Phonology has its own rule-governed system that does not seem to be used for any other cognitive function and that creates a duality of patterning in conjunction with syntax (Pinker & Jackendoff, 2005). Although the system follows patterns tacitly decided upon by each language community, no one teaches children to speak this way; through inference of mental representations in the minds of other speakers, they acquire the rules that generate patterns of phonemes, which are stored in the mental lexicon, are activated during speech recognition and production (Eulitz & Lahiri, 2004), and tune our monitoring devices.

Though not recursive, phonology does display properties of discrete infinity, meaning that it uses a limited set of sounds to create an infinite number of combinations (Pinker & Jackendoff, 2005). Phonology independently forms language structure; for example, contractions are phonologically one word, but syntactically two (Jackendoff, 2007). Of course, an interface connects these two systems which allows them to work together (Jackendoff, 2007). This connection, along with its link to speech perception (Ingram, 2007), its combinatorial structure, its specific components (the phonemes tacitly chosen by the community), and the processes dialects use to adjust speech (such as allomorphs, contractions, and abbreviations) seem to be elements of FLN (Pinker & Jackendoff, 2005).

§ 2.6. FLN and words

The rate at which words (and language in general) are learned suggests a preconfigured device and understanding that speakers share a code (Pinker & Jackendoff, 2005) that permits this. Prelinguistic children seem to connect words to their meanings after a single exposure (Pinker & Jackendoff, 2005): they learn a new listeme every two hours (Pinker, 1994; Ingram, 2007). Children even learn words when adults are not intending that they do, from speech not directed toward them, when the concept referred to was not present, and in situations where the child could have easily confused what was being referred to with another item (Tomasello, 1999; Pinker &

Jackendoff, 2005). Children seem to tacitly expect words to be attached to and to evoke meanings and mental representations (Ingram, 2007).

Though our brain reserves a large amount of storage for this vocabulary, if their acquisition were simply due to memory, it would follow that children would learn general facts and other information with the same speed and accuracy, which does not occur; it would take a significant amount of time to learn and memorize all of that vocabulary (Pinker, 1994). Furthermore, words "cannot be identified with the conceptual database that makes up general world knowledge", such as facts (Pinker & Jackendoff, 2005, p. 14).

Words must be stored in the lexicon with essential syntactic information, or categorical flags, in order to be used in a generative grammar (Pinker & Jackendoff, 2005). Moreover, it is suggested that certain words could not be learned without the use of syntax, such as functional words that mark the sentence for syntactic category instead of being used to call forth a representation of an object or an action. These ties to syntax make it hard to separate words from FLN.

Recall that there are concepts that would be unlearnable without language; likewise, there are words that must be unlearnable without language. Children know that words they learn are generic (but do not assume this is true with facts) and understand words' unique relationship to other words in the lexicon: they form organized sets and avoid true synonyms (Pinker, 1994; Pinker & Jackendoff, 2005).

§ 2.7. FLN and syntax

As the above implies, language use cannot be reduced to imitation or memorization. Pinker (1994) shows that it is impossible for children to imitate and memorize every conceivable sentence, yet they rapidly and accurately acquire language without explicit lessons: children spontaneously reinvent (infer without practice or effort) and use syntactic structures not heard in *motherese*; they overgeneralize rules; and they insert grammatical complexity while acquiring a creole from a pidgin or a sign language from second-language signers. Moreover, Pinker points out that there are some cultures in which parents do not speak to their children until their children begin speaking to them, indicating that a straight-forward exchange of language need not be present to begin using linguistic structures. Thus, children in various acquisition environments must infer rules by tapping into the language faculty.

The implied poverty of the input (Pinker, 1994; Jackendoff, 2002) suggests that children have access to a kind of blueprint for syntactic structure through a preconfigured language acquisition device (Jackendoff, 2002) that activates during the critical period of language learning and would explain the inference and reinvention (Chomsky, 2006) of syntactic rules governed by FLN. It infers an underlying mechanism that permits variety, but also permits that commonalities emerge among generative grammars (Chomsky, 1965). Often this is referred to as Universal Grammar (UG).

Jackendoff (2002) describes UG as "the 'initial state' of the language learner; it is conceived of as the aspect of the human mind that *causes* languages to have the features in common that they do" (2002, pp. 69-70), and Chomsky (2006) suggests that a search for UG "tries to formulate the necessary and sufficient conditions that a system must meet to qualify as a potential human language" (2006, p. 24), also implying that this can be attributed to a genetic basis (2006). Though this author agrees, to call the genetically preconfigured neurophysiological basis for languages a "grammar" confuses the mental representation with the cerebral mechanism. The use of the term *UG* is a stretch for the cerebral mechanism. It would serve to distinguish the biased potentiality in the brain (FLN) from what it permits: the cultural acquisition of a mental representation (generative grammar) that shows the limits of the potential's bias. Therefore, UG better refers to the limits of what can be *produced* by the cerebral mechanism of FLN, inferred by (though not overtly present in) the syntactic representations themselves.

Taking the above reworking of the term, Chomsky's assertion (1965) that a generative grammar deals with "mental processes that are far beyond the level of actual or even potential consciousness" is unlikely (1965, p. 8). The biological potential complemented by a cultural generative grammar causes a set of mental representations to occur in the mind, or at a conscious level; representations are not cerebral. Through reasoning with effort, then, we should be able to illustrate the limits (according to the potential's bias) of this set of mental representations and the supervenience between the two: (1.) the limits of a UG potential, or the preconfigured cognitive faculty's bias toward certain symbolic systems; and (2.) a fully-formed generative grammar. However, as stated in section 2.4., whatever code we were to discern would represent this representation of what is happening on a cerebral level.

Jackendoff (2002) explains a misconception of UG as "those features that all languages have in common" (2002, p. 69-70), which more accurately describes *linguistic universals*. Syntactic structures that languages can employ create an extensive list (Pinker & Jackendoff, 2005), as the meeting of FLN with environmental linguistic input can give rise to a number of distinct combinations, thus generating the variety present in human languages and the difficulties in finding true universals. What is more, only around 500 of the world's 5-8,000 languages have been studied, and many of those by a small group of people (Evans & Levinson, 2009). This makes proposing a theory of UG problematic; it must permit the wide variety of syntactic structures that has been recorded, while simultaneously showing their fundamental commonalities through the limitations set by the potential's bias.

Confounding the issue further, all human languages need not use every element that the cerebral potential allows. Universals can be found among many languages, but as soon as a language is exemplified that does not adhere to even one of the supposed universals in a theory, the notion of UG is discarded altogether (Evans & Levinson, 2009). Recall the recursion-only hypothesis of FLN proposed by Hauser, Chomsky, and Fitch. The most obvious claim against this hypothesis is that, though many languages use recursion to varying degrees, the example language given (Pirahã) does not seem to use recursion whatsoever (Pinker & Jackendoff, 2005).

But Pirahã does use other human language syntactic devices (Pinker & Jackendoff, 2005). What seems to be more plausible, then, is that each language can use any number of the potential devices regulated by FLN, thus displaying the variety we see. The above example and others like it do not disprove that recursion, or whatever other device, is one of the potential structures within the UG bias. We observe languages that use the same devices because the possibilities are limited, but they do not ultimately need to overlap; structures merely cannot transgress FLN's parameters. Indeed, evidence shows that a symbolic system that violates the UG bias cannot be acquired in the same fashion as one that does not, and so far, of the world's languages that have been researched, none of their devices violate UG (Smith, Tsimpli, & Ouhalla, 1993; Pinker & Jackendoff, 2005). It is therefore imperative to abstain from a limiting theory and instead suggest one that permits diverse combinations of structures.

Within a position in favor of FLN, the present work proposes that we have two equally plausible inferences for how FLN permits cultural syntactic diversity. The first is that FLN directly generates a variety of specific syntactic structures (as mental representations, detached from meaning) that are inferred and used by linguistic communities, with or without accessing generalized parameters. The second is that FLN allows us to use a large variety of culturally created, transmitted, and acquired syntactic structures, within the limits of FLN's biased potential. Taking either view, FLN is governing the ability: in one sense, by generating a broad but finite range of syntactic devices produced by genetically preconfigured cerebral mechanisms, and in the other sense, by analyzing cultural input against what the narrow faculty's biased potential will allow. The exact relationship is unclear, but the fact that FLN regulates it is undeniable.

Evans and Levinson (2009) ask how "children learn languages of such different structure, indeed languages that vary in every possible dimension" (2009, p. 5). When the full range of language diversity is appreciated, we simply acknowledge that the principles supporting our neural blueprint for language regulate the possible structures we can acquire culturally. Furthermore, languages do not vary in every possible dimension, namely because there are limits, they can be mentally represented by any human, and they must be able to convey any concept any human hopes to convey; this means these representations are produced biologically, no matter to what extent culture is involved. Because humans' common neural architecture dissects the world in similar ways, the propositions we hope to communicate must be communicable in all human languages.

It is beneficial to consider that our categorizing linguistic structures in order to compare them properly may not occur until we observe more languages. For this reason, it is imperative to maintain theories that are open to combinations of known devices and the addition of new ones in order to give us a firm look at the limits of the syntactic element of FLN. Confining a theory to a single cultural syntactic device, suggesting that use of a syntactic device dictates a finite state grammar, or proposing that some languages disallow a cultural syntactic device are all limiting theories. A feature need not be universally present to be used by languages, and a theory that permits this can still be supported by a biological mechanism.

The toolkit analogy applies here (Jackendoff, 2002), but it is possible that the concept of UG might just need reworking: Universal Grammar, conceived of as the initial mental representation of language produced by the language faculty, represents what is biologically usable and acquirable (and possibly in part created) through cultural means, and by default is dictated or permitted by FLN; whichever the case may be, although transmitted culturally, these devices need to pass through the FLN "gates" to be utilized. If a device cannot pass, it is a structure not admitted by FLN or does not adhere to what can be initially mentally represented by FLN (UG). In this sense, a theory of linguistic diversity no longer requires that UG overtly display all features in all languages, contrary to Evans and Levinson's implications (2009). Instead, UG simply governs cultural syntactic structures. This differentiates language from learned skills in that there is no device that governs bicycle riding. To acquire this skill one must learn it through explicit instruction, repetition, and practice.

The perceived differences between "races" based on skin color and other features of outward appearance turns out to be the largest source of variation across our species (Templeton, 2013). Likewise, we see languages, even dialects within languages, as inherently different from one another. It doesn't serve to investigate generative grammars and propose superficial grammatical counterexamples. The mere fact of being able to observe features among languages that might be identified as completing the same function is enough to justify that human languages share a similar biological basis (Chomsky, 1965; Pinker, 1994). What is more, these potential syntactic devices, including those we might yet see, not only share a biological basis, but are likely specific to language, as there does not seem to be any other function they would serve (Pinker & Jackendoff, 2005).

§ 3. Culture: the essential complement

The brain is not completely pre-wired because it either takes up too much space in the human genome, or the environment presents too high a degree of unpredictability (Pinker, 1994). To account for this, many instincts (such as language) provide a learning mechanism that must be met with certain environmental stimuli to complete their potentials; due to these learning mechanisms, the same brain can complete its potential with different stimuli (Boyd & Richerson, 2005). Indeed, the same brain that can learn English can also learn Pirahã. Therefore, the required environmental stimuli for language is cultural linguistic input.

According to Boyd and Richerson (2005), "culture is information that people acquire from others by teaching, imitation, and other forms of social learning" (2005, p. 3). This acquired information not only reflects present culture, but also the accumulated modifications of that information throughout a culture's history (the ratchet effect) (Tomasello, 1999). No solitary human can accumulate cultural information because social learning is a collective process (Tomasello, 1999), and we can infer that language relies on social learning because children deprived of linguistic input during the critical period grow up to be severely language impaired (Pinker, 1994).

Social learning is a biological mechanism (Boyd & Richerson, 2005), and when it is activated for the language complement or other socially learned information, it likely involves mirror neurons, cells that fire when we perform actions or sounds, or when we are witnesses to the same actions and sounds (Hurford, 2002; Iacoboni, 2006). Often, mirror neurons are thought to be links to our concept and meaning basis as they are closely related to emotions, especially empathy (Hurford, 2004). However, they are more likely servants of imitative learning (the capacity to infer mental representations, linguistic or other), and anticipating an individual's intention behind a task (Iacoboni, 2006). Humans are not skilled imitators, but we are skilled at generating similar social behaviors after observing others' acts and inferring their intentions (Tomasello, 1999). This is essential for learning because "unlike genes, ideas are not copied and transmitted intact from one brain to another" (Boyd and Richerson, p. 429); the same is true of linguistic mental representations.

Though not specific to language, mirror neurons can give insight into other areas of the brain that aid in recreating linguistic representation, including cerebral architecture used for speech perception (Ingram, 2007) and our conceptual basis, and how those might be connected to our intentional system. Therefore, multiple cognitive mechanisms (social learning, mirror neurons, FLB) integrate to permit the rapid and spontaneous acquisition of language which occurs with minimal conscious effort, and without repetitive practice.

We can divide the cultural elements into two domains: primary factors and secondary factors. The primary factors include features of phonology, words and morphology, syntax, and concepts (pragmatic and semantic). The secondary factors include reading and writing, as these are clearly taught with explicit instruction (Ackerman, 1992; Pinker, 1994; Reynolds, 2009), and the use of sign language, as it is a cultural substitution in individuals who lack the ability to hear (Evans & Levinson, 2009; Pinker, 1994). The primary factors are explored below as essential complements attained through social learning.

§ 3.1. Cultural elements of phonology

As mentioned above, language use requires a finite repertoire of phonemes in order to display the discrete infinity seen in phonology (Pinker &

Jackendoff, 2005. The phonemes, as well as sequences of them, are conventionally yet tacitly decided upon by a social group, limited only by what the vocal tract and auditory system can create during speech production and distinguish during speech perception (Evans & Levinson, 2009).

A child reinventing these conventional phonemes and their sequences would simply have to be exposed to phonological input from his or her speech community in order to then create, categorize, and store inferred mental representations of the input (Fitch, 1997), dependent upon the tacit conventions present. The categorizations would be based on cues such as place and manner of articulation so they could be used by the interface of sequencing meaningless phonemes into meaningful morphemes. These culturally transmitted conventions, the restricted and admitted shortcuts in a language's phonological rules, and differences in word choice cause dialect and accent variety (Pinker & Jackendoff, 2005).

From what has been researched, languages' finite repertoires of conventional sounds can range from 11 to 144 (Evans & Levinson, 2009). Therefore, it seems likely that FLN only requires a culturally acquired set of any number of various phonemes. There is no need to constrain the possible sounds or patterns just to continue to be surprised by what we find in newly-researched languages; the constraints that speech perception and production put on the faculty of language are sufficient. Considering the acquisition of phonological representations in this way does not suggest a set of pre-wired parameters for phonology apart from these constraints. Conceiving of the brain's use of a culturally-acquired set of mental phoneme representations that are then sequenced into meaningful morphemes still gives the language faculty a task specific to language use while permitting the phonological diversity heard across human languages, made possible by cultural convention and historical change.

Finally, our monitoring and parsing system, though surely a mechanism within FLN, must be tuned to a speech community's set of conventional phonemes and sequencing rules, because "human speech perception necessarily reflects the effects of experience listening to a specific language" (Pinker & Jackendoff, 2005). When what we perceive deviates from our acquired cultural language norms (when we hear an accent, dialect, or language that differs from our own), the monitoring and parsing device makes us consciously aware, whether or not we can say with precision what constitutes the deviation.

§ 3.2. Cultural elements of words and morphology

We clearly see that "words above all are learned" (Pinker & Jackendoff, 2005). This is deduced from the fact that lexical items do not have strict attachments to their meanings, as the conventional signs are somewhat arbitrary. Though the rules combining meaningful morphemes and ordering them using syntactic devices are regulated by FLN, the combinations of phonemes and their attachments to concepts and meaning are a part of the culturally acquired conventions of a linguistic community. Likewise, some words arbitrarily and conventionally attach to syntax, as suggested above.

§ 3.3. Cultural elements of syntax

The syntactic element of FLN works like a complex puzzle (Pinker, 1994), where conventional constituents tacitly decided upon (such as phonemes and words) are organized into the conventional generative grammatical codes, also tacitly chosen from the wide variety regulated by FLN's biased potential. The history of each culture and how languages diverge, combine, take over others, or are reanalyzed by their own speakers cause even more variation among languages' syntactic devices (Evans & Levinson, 2009). Also due to cultural influence, generative grammars can gradually shift their devices to others permitted by FLN. Despite the slow nature of biological evolution, with each subsequent generation, vocabulary is added or adapted and grammar and phonology are reanalyzed by a speech community, and a single language "can become unrecognizably different within a few thousand years" (Deacon, 1997, p. 110). Through these cultural means, although at a given time in history a language can be described as predominantly isolating, fixed-word-order, accusative, or subject-prominent (such as English), languages can vary rapidly over time to display the opposite traits, or even make use of divergent traits simultaneously (Pinker, 1994).

Using FLN to acquire the cultural syntactic code helps us to monitor the speech of others. Indeed, the inferred mental representation of any generative grammar that is used by a particular region, social class, or other speech community is the same codified representation that we use to utter and perceive speech and detect "errors," or deviations. This is the code on which we reflect with effort in order to become metalinguistically aware, which can only occur once our monitoring device has been attuned to our cultural language conventions.

§ 3.4. Cultural elements of our conceptual basis: semantics and pragmatics

Not only are people unwittingly synchronizing their speech traits and linguistic codes to others' in their linguistic circle, even our conceptualizations are tuned to those of others (Boyd & Richerson, 2005), though individual experience and subjectivity cause personal concepts and semantic networks to differ somewhat (Jackendoff, 2002), and we are certainly influenced by the categorizations that the brain instinctually makes. Variations between cultures, namely their environments, beliefs, and customs, cause linguistic groups to share separate conceptual bases in addition to those all humans share, which are reflected in the language of the group. Thus, due to group synchronization and culture-specific concepts, semantic systems of separate cultures may seem to "carve the world at quite different joints" (Evans & Levinson, 2009, p. 5). However, it is unquestionable that one linguistic group can acquire concepts from another, through the borrowing or coining of new terms. What is more, we must often consider the best way to express cultural novelties (ideas, artifacts, technologies) using the generative tools our own language offers or by integrating a linguistic expression used by another community of speakers into our lexis; the acquisition of these concepts is not epistemologically out of our reach.

The examples in section 2.1. of concepts that likely cannot be attained without language suggest an inherent integration of a cultural factor in language use. Pinker and Jackendoff (2005) mention the initial layers of conceptual basis and linguistic expression that must be in place in order for subsequent layering to occur. First, we have a conceptual basis we share with primate relatives, which is built upon by humans' unique conceptual structure. This accumulation of concepts could not have progressed to the extent that it has without the ratchet effect of culture and the emergence of a communication system (human language) that allows us to socially share these concepts. Then, from new linguistic elements we can continue modifying, sharing, and accumulating cultural information, and the language-concept cycle continues. Because of the layering of language and concept due to social learning and communication, it would then be understandable to mistake words and concepts as inherently connected, so much so that they are perceived as the same.

While syntactic recursion is not a linguistic universal, recursion is present in all human conceptual structure (Evans & Levinson, 2009). But language can account for novel concepts, hardly making a noticeable linguistic change due to its richness and flexibility (Boyd & Richerson, 2005, p. 320). The recursive conceptual structure is simply exhibited by using various syntactic devices (including recursion itself), varying only in the tacit adopted convention of a linguistic community. In other words, a single proposition can be uttered using many linguistic structures (Tomasello, 1999).

Speech acts display abstract human universals (Pinker, 1994) in that the purposes, intentions, meanings, or expected outcomes connected to utterances are certainly similar across the species. We synchronize pragmatic use of language in the same way that we synchronize linguistic structure and concepts. Every language has a way of expressing, say, politeness linguistically – it is just the way of doing so that differs. We infer these connections between meaning and syntactic structures or phonological combinations when we acquire language, and our speech acts reflect these connections as well as our inferences of the connections others have. Additionally, what is socially important in a culture can provoke changes in pragmatics, as humans look to identify with certain groups and distance themselves from others (Evans & Levinson, 2009). We do this by speaking similarly or distinctly from particular social groups, and these decisions about how to convey intentions can cause change in what has been tacitly but conventionally decided upon.

§ 4. The mysterious elements of language

Philosophical problems are mysteries to a being, in this case a human, when their answers cannot be attained due to cognitive constraints (McGinn, 1993). McGinn (1993) eloquently illustrates that "it is entirely reasonable to expect naturally based limits to human understanding" (1993, p. 5). Although we have no trouble considering that these cognitive constraints exist within other beings, we tend to ignore that humans are beings whose mental powers also exist within nature. McGinn's thesis of Transcendental Naturalism (TN), an anti-non-naturalistic alternative to other theories, proposes that "our epistemic architecture obstructs knowledge of the real nature of the objective world" (1993, p. 2). Just as there are limitations on actions we can accomplish, such as flying, there are limitations on our biology elsewhere, namely cognition. This becomes evident when there are times we can talk around a concept, but we cannot refer to the concept itself. Considering TN to be a valid option in the present discussion, it is easy to conclude that domains of epistemological mystery abound in language. Four of these are reviewed: consciousness, representation, meaning, and self.

There is no doubt that cerebral mechanisms generate consciousness. That being said, we have no empirical form of identifying the supervenience between the two, and as such "the natural principles which mediate between brain processes and conscious states are inaccessible to human reason" (McGinn, 1993, p. 35). Whereas we can see how constituents of liquids, cultural language codes, or thoughts are combined and relationships between combinations generated, the CALM nature of consciousness escapes us (McGinn, 1993). Conscious states are therefore inaccessible except for the sliver we can access with the use of reasoning, but as stated above, "what comes easily to one faculty, for its limited purposes, may altogether defy the efforts of another faculty with *its* limited purposes" (McGinn, 1993, p. 22). Although the supervenience of consciousness presents a closure thesis, "to cease to talk in terms of consciousness would be to cripple our entire conception of ourselves and one another" (McGinn, 1993, p. 35).

Conscious states refer to subjective experiences of a self (1993), and since language evolved to communicate or share these subjective experiences, the mystery of consciousness permeates language. What is more, without the generation of several representational domains into our conscious states, language use would be impossible. From FLN arises a potential for a set of linguistic representations complemented by conventional linguistic input from the environment. Social learning provides access to the conventional representations that adhere to those potentials. This mentally represented linguistic information is combined with concepts, meaning, intention, and emotions almost immediately, and the connectedness of these domains through neuronal architecture permits their integrated representation in the mind. Indeed, John Tyndall notes that "a definite thought and a definite molecular action in the brain occur simultaneously" (cited by McGinn, 1993, p. 36); nevertheless, research in the neurosciences can only associate the process with the representation.

Representations, or mental concepts produced by cerebral processes, are constantly being generated and modified in a rapid back-and-forth manner between mind and brain. We know at least that there is a genetic or an innate basis for the acquisition or creation of these concepts, just as there is with language (Jackendoff, 2002). However, humans are trapped by the inability to conceive of certain concepts, such as pain, likes and dislikes, beauty, etcetera (Rivas, 2018), and we therefore lack words for them. Indeed, we first create representations of the external world, then encode them with linguistic representations shared through social learning (Ingram, 2007); without the concept, the word is nonexistent. Similarly, we lack explicit awareness of many linguistic representations that are required by language simply because of their conscious nature; the job consciousness completes is not made to reflect back on itself.

Jackendoff's Figure 1.1 of the levels of representation that make up a sentence (2002, p. 6) beautifully shows the mystery of representations: what is displayed in Figure 1.1 is a pictorial representation of the representations in the mind. But what do the mental representations represent? Surely concepts arise through reasoning's formation of semantic networks, as it acts on sensory input combined with memories accumulated through personal or social learning and united with an emotional experience. However, representations for language refer to the concepts they correspond to, the linguistic expressions themselves (such as phonological and syntactic information), and also to restrictions or limits on the sort of languages available to the child, dictated by the cerebral mechanism's potential. Our outlining of these representations is difficult due to cognitive limits. Yet, we may only have a cognitive bias away from the question, and can plausibly use other gadgets on the Swiss Army knife to diagram secondary representations, or translations, of them (McGinn, 1993).

We can speak of a concept without meaning only in a theoretical sense, as "meaning is central to everything human" (Jackendoff, 2002, p. 268). Beginning around the age of 2, children display an assumption that the sounds coming from speakers around them are attached to meaningful concepts and begin to interpret them as such (Pinker & Jackendoff, 2005). Our personal concepts are infused with meaning, and the two cannot be mentally separated. It might be suggested that our personal experiences, emotions, memories, intentions, and what we infer from others through social learning (including emotional inferences through the use of mirror neurons) all contribute to meaning. That being said, humans find it impossible to say what meaning actually is; although we can refer to it, we may never be able to understand it (McGinn, 1993). Contrarily, meaning things is "an effortless achievement" for us (McGinn, 1993, p. 62).

It is arguably beyond our human capacities to comprehend conscious-ness and the self; because of its centrality to both (Jackendoff, 2002), we cannot arrive at an understanding of meaning. Though we know well what we mean, we cannot transmit it directly to others, and instead must translate it into language and rely on others' inferences. Despite a desire to describe meaning in the sense of a connection between symbol and an interpretation of that symbol, or even a sum of its uses (McGinn, 1993), the separate systems for meaning and language make this simply a translation: syntax is attached to meaning by tacit convention; thus, we can only infer meaning through it, and we need context and a shared understanding to do so. Therefore, use of language directs the attention of others to particular intentions and meanings, since language does not directly represent the world (Tomasello, 1999). But if we cannot say for sure what meaning is, we cannot say for sure what language transmits and how we can access that transmission.

From cerebral mechanisms emerges consciousness, which creates a sense of subjectivity belonging to a self (McGinn, 1993). We can conceive the self as that which unifies conscious states (McGinn, 1993). What is more, consciousness, self, and meaning are inextricable: "selves are taken to be the original fount of meaning, and states of consciousness are its primary vehicle – intentionality is essentially the product of conscious subjects" (McGinn, 1993, p. 62). The subjective experience of a being relies on mental representations generated through the complex relationships between cerebral mechanisms and sensory input (information) received to the mind through social learning. However, Jackendoff (2002) suggests that "something does not constitute information unless there is something or someone it can inform", or a self (2002, p. 20). This includes linguistic information in addition to the information received *through* language. We even give meaning to the specific sets of speech structures a self chooses: we identify our selves through styles of speaking. The meaning we derive from this information in others' speech or intend behind our own is necessarily represented to a self, a necessary element of a person, which transcends our cognition.

Not only is there a personal subjective experience to language, but there is also a shared experience. The intersubjectivity of an experience helps us internalize and influence the perspectives and intentions of others (Tomasello, 1999), and we intrinsically know that use of language involves this. Intersubjectivity, then, infers a biologically preconfigured process (surely supported by mirror neurons) and an element of social learning. Likewise, the linking of symbols to a perspective, though instinctual, is also cultural in the sense that humans know those linguistic symbols and their perspectives are a shared experience that one can socially learn from or transmit. But there is nothing mystical about the process; its nature simply rests outside our cognitive limits.

In order for language to function, then, a self's conscious states must be presented with linguistic mental representations that are instantaneously attached to infinite, correct, and impalpable meanings (McGinn, 1993) based on shared and individual subjective experiences. We tacitly assume and act in accordance with the idea that others share this experience with us, and this assumption helps us to infer their intentions, influence their perspectives, and transmit meaning during communication, while simultaneously transmitting representations of cultural linguistic norms. The self also identifies with meanings that are conventionally attached to cultural linguistic structures in that the linguistic expressions we use are based on meanings our selves identify with. All of this is occurs during acts of human communication.

Finally, even the process by which genetic means preconfigure neural architecture that is then identifiable according to some function is a mystery to us. In other words, we can only *associate* cerebral mechanisms with, say, a faculty for language – the connection can never be fully substantiated. An interrelatedness of subjective conscious states (mind) and cerebral mechanisms (brain) is imperative for language use, especially with regard to meaning. While the supervenience of consciousness remains a mystery to us, the essence of the connections between our physical body and representations with meaning presented to our mental selves will remain mysteries as well (McGinn, 1993).

Conclusions

It is incontrovertible that multiple cerebral mechanisms are utilized for language (FLB). What is more, though a considerable amount of overlap with other cognitive faculties exists, human beings plausibly possess certain mechanisms that are exclusive to language use (FLN), including elements of speech perception and production, words, phonology, syntax, concepts, and a monitoring device. FLN can also be seen as a nexus within FLB, yet it almost certainly does not consist of only one area of neural architecture, due to its diverse components. Since our conceptual basis and language are separate, a person would organize his or her thoughts using a generative grammar (Chomsky, 1965; Pinker, 1994), and communicate using this and the remainder of a cultural linguistic code. Even if the possible codes are not directly generated by FLN but are instead produced by multiple cognitive abilities working together, they are regulated by FLN's biased potential, which causes human languages to have elements in common.

Our understanding of an environment and how we can communicate that understanding is limited by human cognition. Because of this, we cannot take the conversation of language out of the context of a pre-wired mind, but we also cannot complete the biological potential without social learning to complement it, which concerns both linguistic input and concepts. Also arising instinct (Pinker, 1994), social learning permits us to acquire cultural information (which is mental and therefore cannot affect biological evolution). What does not comprise the cognitive faculties used to understand, acquire, store, and use linguistic representations are thus acquired culturally. In this way, it truly is, as Darwin would say, an "instinctive tendency to acquire an art" (cited by Pinker, 1994, p. 20).

Our underlying cerebral mechanisms provide the potential for what we can accomplish and what we cannot. Some mechanisms are for specific functions, and the use of multiple mechanisms can help us to learn and accomplish skills through social learning. For example, we have a potential for learning skills such as reading right to left or bike riding, but we have an innate disposition to spontaneously learn language. Without the cognitive faculty preconfigured by instinct, the cultural phenomenon would not be possible; indeed, "learning is caused by complexity in the mind," not vice versa (Pinker, 1994, p. 125). However, we cannot learn something outside of our biological limits; for example, we cannot fly by merely conceiving of it – we can flap our arms as much as we want, but we can never achieve flight.

A key factor in language use is the brain's ability to mentally represent concepts, meaning, and linguistic expression, while simultaneously inferring a speaker's intention. These elements occur consciously, and thus require a self to be conscious of them. Since we cannot explain what our subjective experience is like or empirically study how it emerges from our neural architecture (they seem to have no connection), many of the interfaces within FLB remain mysterious to us. These mysteries that an exploration of language presents must be acknowledged whether or not understanding them is within our cognitive limits.

It ultimately serves those studying language to continue delving into the processes that occur within both mind and brain. Our comprehending language and its faculty depends on two research strategies coming together: (1) the neuroscience's inferences as to which functions associate with which neural and electrochemical processes, as well as the intricacies of how those processes relate; and (2) the use of reasoning to translate the many mental representations needed for language. However, even through reasoning with effort, we can never arrive at the understanding of the interaction between mind and brain used for language because human beings, due to cognitive constraints, cannot understand its supervenience.

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