Article

Theorizing Language Evolution Using NCT and Conlangs: An Etiological Study

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Abstract

An extensive amount of scholarly work has displaced traditional and positivist assumptions of the separation of the cognitive and cultural domains as two separate entities. Notably, the interventions of scholars prominent in linguistics, and hence those such as Bouchard, Arbib, and Odling-Smee, have effectively positioned or displaced this older and more archaic thinking.

In this paper, we posit that the propensity for constructivism in human languages has not been sufficiently studied. We propose a framework with which to address this gap. We also juxtapose *natlangs* (natural languages) with *conlangs* (constructed languages), in order to clarify the effectiveness of each. To facilitate this discussion, we propose the following points: Conlang origins are well-known, the study of conlangs has tangible evidence of manipulation of language, and the study of conlangs can further our understanding of natlangs. We thus draw on multiple fields to effect this anthropological study.

The literature in this paper has invited a use of Bouchard's concept of Offline Base Systems to respond to questions of the characteristics and mechanics of language vis-à-vis ethnological work. For this, we turn to issues of embodiment and ideology, to then extend this to other consequences of and motives for developing conlangs, and hence language evolution, such as language disabilities and impairments, a field which is still in its infancy. A focus on language

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construction using conlangs to test OBS suggests a new potent avenue for the exploration of language evolution.

Keywords: *Conlangs, language evolution, natlangs, niche construction theory, linguistic anthropology*

Introduction

Records of constructed languages (conlangs) have existed since the 12th century C.E., at a time when Hildegard von Bingen's *Lingua Ignota*, as well as *Bal-a-i-Balan*, whose date of creation and creator are still debated (generally attributed to either Fazlallah Astarabadi or Muhyi Gulseni), were created to signify holy inspiration. European language inventors of the Renaissance period had more philosophical intentions, that is, to develop a language which they deemed perfect, in their pursuit of a universal truth. The 19th century saw a rise in comparative philology, and the emergence of a next generation of language inventors who occupied themselves with creating languages which had increased effectiveness as practical unifying world languages, that is, as international auxiliary languages (IAL).

Natural languages, 'natlangs,' are so named as they evolve naturally, that is, culturally and organically (Peterson 2015). Constructed languages, 'conlangs,' however, are products of an 'artificial' conscious design, so long as the intent and the result of the creation process result in a fully functional linguistic system. The umbrella term 'artificial' includes pidgins, creoles, languages that are reinvented or revived, such as Cornish and Hebrew, programming languages (C++), controlled languages (e.g., Ogden's Basic English), as a planned simplification of a language, philosophical languages, (e.g., John Wilkins' language, Dalgarno's Lingua Philosophica), artistic languages (e.g., Valyrian, Sondiv), and IALs.

Discussions and treatment of conlangs have surged over the past few decades. The availability of personal computers in the 1970s and 1980s, and the ease of access to the internet in the early 1990s, revolutionized the digital era, yet a movement which largely began in the 1950s. Throughout the latter part of the second half of the 20th century, technology and its global society facilitated the coming together of a diverse set of people with shared interests, to form new respective and purposed communities. Among these communities, which were facilitated by the newly developed and revolutionary internet, was a reflexively purposed community of language creators, the conlangers, a group of people who were largely covert until the creation of 'Conlang Listserv.' This listserve platform was as a platform catering to inventors of language, and was housed at Brown University, in the United States (Peterson 2015). Gobbo (2005) presents the opinion that the internet has played a highly significant role in promoting the use and cause of

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conlangs, and discusses the linguist John Lyons who arranged languages in varying degrees of 'naturalness' (Gobbo 2012), as a motive for understanding the difference between conlangs and natlangs. What began as a study solely rooted in 'linguistics' was soon seen to ramify and integrate with a host of other disciples with diverse philosophical underpinnings, such as anthropology, mathematics, philosophy, psychology, medicine, the range of computer sciences, and so forth.

With many conlangs now gaining visibility through the interest they have received in research, through their use, through their formidability as popular cultural references, and also as part of creative writing courses, we deem it necessary to conduct a scholarly investigation and interrogation of these constructed languages. To create a framework conducive to understanding such designed languages, which would include an archeology of conlangs, we put forward the notion of discussing both the involvement and the interaction of several fields of linguistics, in the production of the conlang.

In this paper, we discuss our ethnography of conlangs. For this we will, in part, revisit the use of these conlangs, and their applicability in current society. We approach this discussion by analysing existing research on the relationship between human languages and the, at least partial, embodiment of these languages. We include in this research, Bouchard's Neo-Saussurean approach, which employs a theory of Offline Base Systems (OBS), and Odling-Smee's Niche Construction (NC) Theory of evolution, which we apply to Tomasello's theories of language evolution. Here, despite the fact that we do consider an evolutionary approach, we consider such an evolutionary dimension, not only at the macro level, that is, over for example millennia, but also, at a micro level, throughout the process of a discursive interaction, or at least, during the process of the development of an interpersonal relationship.

Such an analytical review points to a multidisciplinary approach, central to which is our attention to anthropological aspects of natlangs and conlangs. This approach contributes to our framing of an etiology as a plausible method for shedding light on the origins of language in humans, both in the historical sense and in the Foucauldian archeologically recurring sense. As such, we centrally consider that these natlangs evolve and initially emerge from an interaction of social ideology and language, to thus become symbolically grounded. We thus include in the paper a discussion of classifications of artificiality and non-artificiality of languages. For this we draw on work from David Peterson (2015) and Ida Stria (2013), who both classify conlangs according to their functions, that is, as IALs, artistic languages, engineered languages, planned languages, and also through their sub-divisions. Specifically, Stria's classification of artificial languages suggests ways in which the natural and artificial dichotomy in languages can be at the very least ideologically blurred and overlapping. Here, we consider a meta-representational view of language, where the sign systems of the individual form either during the use of the language,

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that is, through percept, or prior to the use of the language, and hence in the artificial formation of the language, that is, through concept.

To develop the paper, in the second section, we first review several prominent studies on language properties that have operated to uncover the uniqueness of human languages. We draw on these in order to determine the most suitable method with which to investigate the embodiment and subsequent development of the symbolism and appropriation of language. Included in this, we draw data from the proceedings of the 9th International Evolang Conference (Kyoto, Japan 2012; McCrohon et al. 2012). We then present and discuss several models and their applicability to the research. Finally, we conclude the paper with notes on the relevance of the study to larger society, and suggest ways for extending on this work.

Language Theories and Conlang Studies

Despite the extensive amount of work that has appeared on language origins, a review of this literature can, and quickly does, reveal a need for more scholarship on the origins of language. Several studies have recently emerged that further encourage such work; for example, Pinker and Bloom's (2013) work on the shaping of language by natural selection, Pinker and Jackendoff's (2005) work on language evolution, and Bickerton's (2018) work on language evolution. However, in addition to work on the origins of oral languages, work on other language categories, such as non-verbal language and hand gestural language have also long been proposed, and have thus contributed to the understandings of how the semiotic systems within languages may have evolved. Rather than debating the predominance of either one as the intermediary between primate communication and the evolution of our current language, scholars such as Kanero (2014) have proposed a study merging these two branches.

Yet much of this work still exists as speculation on origin and developmental processes. Addressing the challenge to move beyond speculation theories, interdisciplinary collaborations frequently shed light on factors that can describe origins (Blasi et al. 2016, 2019; Berkeley Engineering 2014; Evans 2013; Fitch 2017; Majid et al. 2018), both in the historical sense and in the Foucauldian archeological sense. Such work has proven beneficial for the improvement of current work on language evolution. Yet this combination of a variety of disciplines has exposed several certainties, such as the fact that iteration produces predictability in language (Kirby et al. 2008; Reali and Griffiths 2009; Giudice 2012).

This work has also suggested a link between cultural transmission and the encoding of a language. Griffiths and Kalish (2007), Kirby and Hurford (2002), Kirby et al. (2014), Christiansen and Chater (2008), and Deacon (2007), all suggest that the possibility of such encoding indicates ways that human biases could have influenced the origins and the development of such cultural

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semiotic systems for communication, and have thus aided in the adaptation of communication systems to new environments. In the quest to locate such a correlation between cultural transmission and language encoding, we would do well to investigate unique aspects of particular languages, and to determine to what extent these properties also coincide with unique and general characteristics of the cultural dimensions of a population or ethnicity. Hauser et al. (2002) propose 'recursion' as a way with which to explain the uniqueness of language through a correlation of this uniqueness with cultural aspects, beyond current conventions of culturally emic language appropriation.

Such work has led to the development of integrative models, thus providing a range of frameworks with which to understand natural-language socialization, as well as language origins and evolution. Yet this work has until recently excluded conlangs. These integrative approaches include, but are certainly not limited to, for example, sociocognitive approaches to comparing music and language socialization, non-vocal learning in humans vis-a-vis non-human primates, vocal imitation in humans and songbirds, the relation between functions adapted for auditory and speech encoding in humans, and so forth. Through such work, the research has attempted to determine how and why either part of these cultural-cognitive binaries can or cannot be reconstructed for use by the human, as a conlang. Such is the case during the Kyoto Evolang conference, where participants have convened to discuss increasing developments in examining language evolution theories, and how these developments have structured new methodologies combining empirically grounded research, which could in turn thus lead to an idealized approach to the effectiveness of conlangs. Throughout the conferences, participants engage in discussion on social structures, language diffusion, interaction, and so forth.

One such methodology that drew our attention was incorporating conlang study into Niche Construction Theory (NCT) and Offline Brain Systems (OBS), using methods of sociocognitive constructivism. The methodology builds on Piaget's Constructivism work, where, according to Piaget, individuals learning a language create mental models using schemata to (re)conceptualize the world. In broadening this beyond the scope of learning theory, we suggest that a theory of constructivism can further accredit the human with an ability to construct signs with which to form relations between percepts and concepts. Constructivism, thus, as a framework, may integrate emergent work on conlangs with NCT and with other works such as Bouchard's neo-Saussurean approach to signs.

Current Research on Cognition, Society, and Language

Inquiry into the representation of language in the individual has produced much literature, where researchers have described parallel levels of information encoding, processing, and connections, during language socialization. Technology since the 1990s has greatly contributed

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to work on language processing, both social and cognitive. Methods such as MEG, fMRI, EEG, ERP, have assisted in our understandings of the complexity of cognition and language encoding, and have thus challenged very positivist traditional interpretations of socialization, embodiment, and cognition (c.f. Broca and Wernicke).

Despite this work and progress, the study and understanding of language encoding remains in its infancy. Taking a neo-Saussurean approach, the work of Bouchard (2013) has sought to interpret signs in such a way so as to suggest that these signs are the arbitrary links between percepts and concepts, yet are not so much the links between sounds and meanings. Of all the debates on uniqueness of language, this one serves our purpose, in that it addresses the meta representational aspects of language, and similarly the aspects of language that render it meta-representational. For this, we consider signification, either at the precognition or pre-embodiment stage, that is, the development of concepts while constructing and planning the language, or at the metacognitive stage, that is, the development of percepts during the use of the language (Bouchard 2013). Bouchard explains this phenomenon by using the OBS. Here, Bouchard proposes a theory on how signs emerge, emphasizing substantial [and hence semiotic] properties rather than computational properties of a language. In the neo-Saussurean approach that he propounds, the OBS provides sociocognitive links that connect percepts and concepts without the presence of real-world objects with which to develop signs. Abstraction takes place, even in the absence of external events (Tomasello et al. 2005; Tomasello 2019), an abstraction that arises through a detachment from immediate external events, thus symbolically facilitating the ideological construction of categories to form concepts. Bouchard (2013) describes that, as humans ideologically link elements to form signs in meta-representation processes, the process is one of self-organization, through which we see combinatorial properties of signs.

Conlangs have not been deemed mainstream, to the extent where they could adopt current theories of language, despite being studied for various mainstream purposes: To determine their qualities as a supposedly perfect, ideal language; to facilitate a search for universal languages (Eco 1997; Knowlson 1975); to advocate the study of created languages as a distinct genre (Meyers 1980), to understand the factors that contribute to such creations (Yaguello and Slater 1991); and to present the importance of invented languages in a variety of literary genres, such as in science fiction (Cheyne 2008). Yet through these artificially constructed language systems, researchers have been able to conduct extensive research on, for example, language correlates (Gobbo 2011), a development of comparative terminology in conlangs (Libert 2010), lexical derivatives leading to complex vocabulary (Libert and Moskovsky 2015), and also a variety of ethnographic methods to be applied during the classification of symbols (Libert 2018).

Furthermore, several studies have attempted to elaborate on understandings of ways in which conlangs in literature (created for artistic purposes and hence also known as *artlangs*) have

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(socio)linguistic tenets (Klingon dissertations by Wahlgren 2004; Wyse 2019, to name a recent few). For example, Tolkien scholars have also demonstrated some ways in which the writing systems of Tolkien appear to display a linguistic sophistication that resembles, on close inspection, almost all of the intricate and complex characteristics of existing languages, and in this case, a phonetic language (see Bratman 2016; see Gilman 2012). Yet such a language can be grounded in a list of factors that substantiate its practicality. Another example is Blanke Detlev's (2009) work on an international auxiliary language (IAL) such as Esperanto, which claims that the utmost proof that a language is developed and is near natural is the emergence of its speech community.

Categorizing Conglangs

Categorization offers a step towards organising and of course understanding these languages. One such way to categorize conlangs is to apply a scale of artificiality. This scale includes factors such as 'the purpose of the language,' 'the origin of the language,' 'the community of speakers of the language,' 'the native speakers of the language,' and so forth. On this scale, a programming language would score the highest, pidgins and creoles would score the lowest (as one cannot attribute these languages to an inventor or two multiple inventors), and the IALs would fall somewhere in the middle. Stria (2015) suggests that there is no binary opposition for natural vs. artificial language, yet there is what we call a continuum of 'deliberate influence.'

   In what follows, we provide a representation of the scale of artificiality, where the number '10' signifies the most artificial level, and the number '1' signifies the least artificial level.

10				1
Programming languages	Conlangs (Klingon, High Valyrian, etc)	IAL (Esperanto)	Pidgins/ Creoles	Natlangs
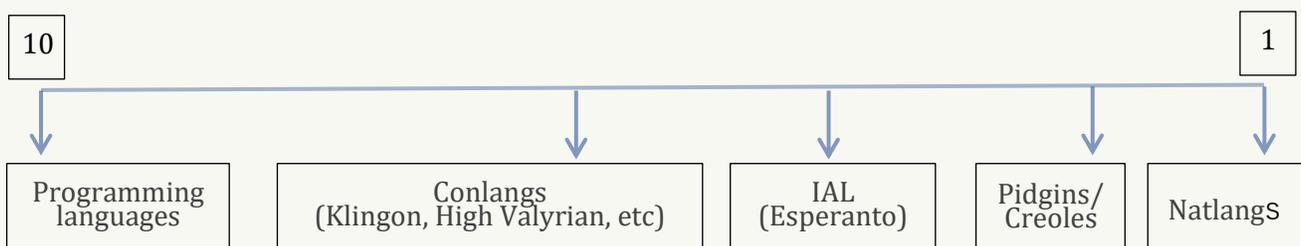
   Fictional and other artistic constructed languages were argued to not serve a purpose as practical as machine languages and, hence, did not receive the same attention, yet these languages are highly symbolically pragmatic, and thus, do serve a significant purpose. Yet, with the many conlangs now increasingly becoming visible for purposes of pilot research, as popular cultural references, and as a part of creative writing courses, we turn to the significance of conlangs in this manner.

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Methodical Framework

In line with the discussion above, we note that language evolution cannot be studied in isolation from its extensive semiotic context, largely owing to the complexity of language, complex language use, and its symbolisms, traits that linguistic anthropology and the ethnographic stance of such a field firmly endorse at every level (Arbib 2012; Durante 1992; Malinowski; Kroskrity 2000; Irvine and Gal 2019). As such, current work on language has logically moved away in part from work by, for example, Chomsky and Halle (1968). Prescriptivist studies argue for the characteristics of language rather than its mechanics. To this, we take a descriptive and highly situated approach to the use of language (Bouchard 2013).

We posit that the prior examination of natural languages largely neglected constructivism, and hence adopt Odling-Smee and Laland's work on Niche Construction Theory (NCT) to address this gap. Here,

> niche construction is the process by which organisms bring about changes to their local environments, many of which are evolutionary and ecologically consequential.
>
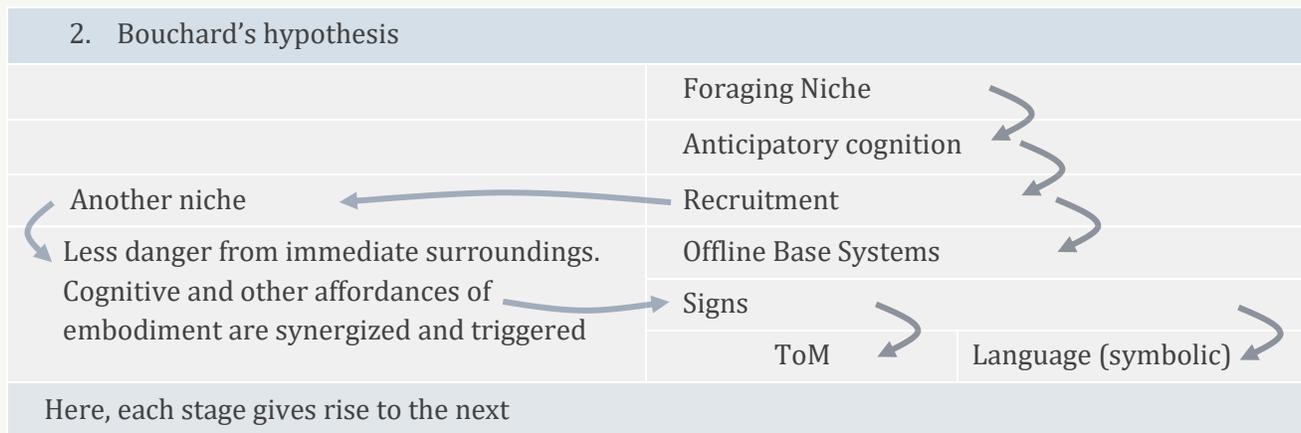> (Scott-Phillips et al. 2014, p. 1231)

Notions of NC appear in work as early as Lewontin (1983), who notes that organisms actively construct and modify the conditions of their environment, which, in turn, influence other environmental sources rather than passively adapting to natural selection, becoming a form of reflexivity. To expand on such a definition, we turn to and draw on Odling-Smee, Laland and Feldman's introduction to Niche Construction (2013). The authors describe NC as present in the actions of all organisms, which interact with their environment, and in the process, actively contribute to both the construction and deconstruction of their own and each other's niches. As such, we argue that it is probable that NC can be appropriated to the field of language and its communities and contexts. We also hypothesize that, through NC theory, a language analyst working on conlangs can integrate social factors, situated factors, embodied factors, larger ideologies, and so forth (c.f. Kendal et al. 2011). Our own hypothesis concerns the embodied aspects of language, and we thus draw on data to support our work on the forms of conlangs and their significance in the current era.

Much work suggests that the evolution of language has been consequent to forces which are both internal to and external from the language system, that is, the syntax. Such work attends to the significant role of language in social competition (Jablonka and Lamb 2005; Locke 2009; Wharton 2009), the ways in which language adapts and develops, so as to accommodate contextual and other forces (Christiansen and Kirby 2003), the Mirror System Hypothesis (Arbib

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2012, 2005), social grooming and mating preferences (Dunbar 1998; Pinker 1995), and others. As such, one element we incorporate into our data is the language niche that uniquely triggers the transfer or use of symbolisms in communication. This follows Bickerton (2009), who opines that a niche that encourages the use of symbolisms which our early ancestors occupied led to foraging patterns, and for example, widely scattered and unpredictable food sources, and therefore a central operating ground to exchange information, thus in turn generating "the right selective pressures" (p. 73). This then led to information exchange using anticipatory planning, recruitment, and symbolic communication. Because NC requires feedback from the environment, or rather, a negotiation between the community and the environment, Bickerton's explanation positions NC as somewhat of a passive process. Such a description thus conveys the notion that language would have required feedback from its environment, because the 'fitness' of a recipient trait is largely predicated on feedback (Laland and Sterelny 2006). However, if we consider language as a product of a NC, we must also consider the existence of a rudimentary beginning that gave rise to a protolanguage, and which then led to the formation of language in discussion. Arbib (2010) in his review of Bickerton's work discusses a need for further description on this matter.

The 'triadic niche' framework (Iriki and Taoka 2012) suggests that the appropriation of the environment evolved with the existing tool usage niche, that is, the affordances of the tool, expanded alongside the increase of skill in using the tool for each purpose, in a seeping (of sorts) across affordances of sorts. Here, the human advanced the use and domain of the niche, within which the human increasingly made use of the abstraction process. Arbib (2010) discusses the need to address this development of abstraction, particularly owing to changes in the prefrontal cortex, a growth which effected change in the appropriation of the symbolic world and hence the appropriation and manipulation of language mechanisms. The hypothesis by Iriki and Taoka (2012) thus becomes quite pertinent at this point, as does the significant work of Bouchard (2013), who makes great, and in our opinion, quite successful efforts to replace accounts of generative grammar with his 'sign theory of language.' Bouchard (p. 23) suggests then that "language did not emerge because hominids were in a new niche, but instead notes that hominids constructed a new niche with the help of language," thus enabling humans to accommodate the new ecological environments thereon. We build upon this hypothesis that human language evolved in the way that it did, largely owing to neurological adaptations that led to an emergence of the use of and realization of signs, in order for humans to navigate their new environments. Humans draw on the symbolic resources abundant in their niches, and consequently develop their affordances around these niches, to motivate their understanding of and their construction of signs, and by extension, to effect the formation of a language – be it artificial or natural.

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In the following diagrams, we present a highly simplified map of the hypothesis discussed thus far (in part 1) and the hypothesis on which this paper is built (in part 2). The map grounds the use of conlangs in a controlled environment, and thus informs or recorrects understandings of the development of signs. The, at times artistic, niche that a conlanger creates facilitates the production of a language that is supposedly appropriate to navigate that particular niche.

1. Bickerton's hypothesis
Foraging Niche
Anticipatory cognition
Recruitment
Theory of Mind
Symbolic communication
Here, each stage gives rise to the next

2. Bouchard's hypothesis	
	Foraging Niche
	Anticipatory cognition
Another niche	Recruitment
Less danger from immediate surroundings. Cognitive and other affordances of embodiment are synergized and triggered	Offline Base Systems
	Signs
	ToM Language (symbolic)
Here, each stage gives rise to the next	

Discussion

In line with discussions earlier in this paper, we draw on Peterson (2015, p. 18), who suggests the following:

> … any language that has been consciously created by one or more individuals in its fullest form is a conlang, so long as either the intent or the result of the creation process is a fully functional linguistic system.

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The construction of languages as artificial certainly does not constitute a new phenomenon. These languages were in existence in as early as the 12th century. The neglect that we have given conlangs has been largely a result of the sidelining or even the fully ignoring of these languages by mainstream linguistics, which has targeted these languages as not real. In order to discuss the significance, application, and development of constructed languages, it is crucial to understand that these conlangs function quite similarly to natural languages, and centrally, they similarly have the ability to appropriate signs. As such, conlangs are functional and acceptable as stand-ins (as it were), and thus allow for the application of OBS theory. Here, we can and do justify our use of conlangs in the following ways:

1	Their origins are well-known
2	The conlanger is identifiable (and can be studied)
3	Conlangs can become an object of study with tangible proofs of manipulation
4	Conlangs can be a prototype to further our understanding of natlang evolution

These characteristics have led to a proliferation of pragmatic research, such as a controlled experiment to create a pidgin, employing *Ma'alahi* (a conlang with simplified Polynesian grammar) to investigate hypotheses on the ease of L2 language acquisition, the creation of a sustainable Interslavic conlang, and so forth. Conlangs are also included in courses and syllabi[1] in schools and colleges, and where they aim to facilitate an understanding of various grammatical aspects, such as typology, and cross-linguistic variations (Sanders 2016; Sanders and Schreyer 2020). Every one of these instances serves to narrow the chasm that divides conlangs from natlangs. Yet much further work and analysis are required in order to develop a firm understanding of the semiotics and of other mechanics of these constructed languages.

In the case of natural languages, every human being is born with a capacity for OBS; whether it manifests as language is largely predicated on the feasibility demonstrated by the embodied selves of the person. The synergy we spoke of earlier (in the flowchart) is expressed through spoken and written language when each individual language domain (phonology, syntax, and semantics) integrates to form one whole entity (Gleason and Ratner 2016). To determine the language process and its evolution, scholarship makes use of problems presented when language impairments arise in humans. Here, as an example, an aphasia review article by Ardila (2015) suggests that the internal representation of actions resulted in a grammar (action words – verbs) which formed the basis for higher-order meta-cognitive functions. This phenomenon supports the hypothesis that grammar, which is a rather relatively recent development among Homo sapiens, is tied to the evolution of complexity in the cognitive yet ideological and semantic faculties of humans. Studying language impairment brought on by focal brain damage assists to

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advance our complex and multifarious understanding of the ideological and semantic foundations for language origins and affordances (Deacon 2017; Code 2011; Arbib 2006; Rogalsky et al. 2013; Marcus and Rabagliati 2006), and assists in the design of solutions, while it also purports to provide rehabilitation to patients (Stockert et al. 2015; Lee and Man 2017; Rahul and Ponniah 2021).

Arbib (2020) lists out several studies, ranging from archaeology to neurophysiology, to propose how future research can be conducted across disciplines working towards a common goal. Such a goal includes the discernment of the core substance of what is language. Arbib also includes the need to move somewhat socioneurolinguistically in order to study a language-ready brain. Speakers' construction of the same reality with a different set of signs does not only present a contrast with language acquisition, that is, it is not the same as learning yet another language, but can also broaden the ways in which language origins in the brain are studied. An overall survey of popular conlangs suggests that these conlangs are created to lend authenticity to certain fictional realities envisioned by their creators – Tolkien's Middle Earth, GRR Martin's Westeros (popularized by David Peterson's conlangs), James Cameron's Pandora (in Avatar), Roddenberrry's Star Trek franchise (Klingon created by Marc Okrand), and so forth.

Conclusion

By studying conlangers, we can further conceptualize the extent to which it is beneficial to understand natlangs. The construction of language in the brain can be studied under MRIs in real time. Experimental research such as those conducted by Arbib and Pulvermuller can be designed to locate specific areas of action in the brain, to reflexively indicate how the development of the semantic system occurs. As conlangs serve as prototypes to natlangs, they become easy tools of manipulation to identify symbiotic links between percepts, concepts, and sign formation. Working with neurology and computational methods will provide graphs outlining brain behaviour during the creation of a conlang, which in turn will provide information with regards to language origins and subsequent evolution.

Experimental designs similar to the ones which we have discussed throughout this paper can open new windows to effect a stronger understanding of the rich structure of artificial languages, such as the ones we have discussed throughout this paper. Through such studies, one could theoretically conceive of an artificial system capable of triggering higher order thinking skills, or of triggering the generating of data without a continuous input from external factors nor events. As such, in this paper, we have delineated an etiological study that could contribute to understandings of the interactions between conlangs and mainstream linguistics, and in the process, we have suggested a tentative experimental idea that could benefit several if not many disciplines, and society as a whole.

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Endnotes

[1] Syllabus using conlangs as a pedagogical tool is available online at
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