The Problematic Nature of Chomskyan Approach to Language Acquisition

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1 THE DEBATE ON LANGUAGE ACQUISITION

My purpose in this paper is to examine the debate between Chomsky (and his followers) and his opponents which largely includes developmentalists and constructivists. As is well known, Chomskyans have tended to argue that the innate structure is most important in deciding the outcome of developmental processes. The environmental input, for them, is nothing more than a mere 'trigger' to kick-start the innate mechanisms responsible for the developmental outcomes[1]. One of the reasons, among others, for this preference is that an 'unconstrained learner' – the learner who is not biased in any way either in favour or against any probable solution to the given problem - cannot arrive at the right kind of solution within realistic time constraints. That is, s/he is not able to take a step towards the solution of the problem in the normally expected time frame (Gold, 1967; Laurence & Margolis, 2001). The developmentalists and their constructivist cousins, on the contrary, consider environment to be playing a crucial role. In so far as the outcome of developmental processes is concerned neither the Chomskyans consider these to be entirely resulting from innate mechanisms nor do their opponents consider everything to be resulting from environmental influences. Researchers belonging to both the camps recognize the role of innate mechanisms as well as the environmental inputs. That is, none of the groups holds an exclusive and exhaustive position with respect to the two -- the innate mechanisms and the environmental factors. What still distinguishes them and fuels the controversy is 'the extent of control', and the importance that each group is willing to grant to any one of these two factors (Karmiloff & Karmiloff-Smith, 2001)[2]. The controversy, therefore, has boiled down to the relative influence of environment and genetic endowment on developmental processes or to specifying the process by which any such account may actually work: mechanisms, representations, learning algorithms, constraints, biological processes that deliver the constraints.

In the case of language acquisition, it is for instance argued by the Chomskyans that since children can muster their ambient language with 'little effort', it is only appropriate to assume the existence of some innate language acquisition device. This is clearly reflected in Chomsky's likening of language acquisition to the growth of bodily organs (Chomsky, 1975). But for the opponents of Chomskyans (i.e., developmentalists and constructivists), this is hardly an acceptable solution. According to them, the problem would remain unresolved unless Chomskyans "specify exactly what is innate and how the innate ability allows the child to parse words from any of the thousands of languages to which she might be exposed as her native tongue" (Kuczaj, 1999, p. 134). The Chomskyan claim appears unreasonable as taking five years to learn syntax can hardly be treated as swift.

In this regard, Chomsky and his followers perpetually appear guilty of arguing by analogy but never constructing the analogy itself. The brain is fundamentally different from all other organs

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[1] The notion of 'trigger' over the decades in Chomskyan oeuvre has however largely remained very vague lacking in any scientifically testable content.
[2] The problem at times is also referred to be concerning "the quality and richness of innate structure" (Laurence & Margolis (2001, p. 219).

in that it is an informational device rather than biochemical regulator or biomechanical effector. This has been well documented in the area of cortical development where the debate is usually articulated in terms of protomap (e.g., Rakic, 1988) vs protocortex (e.g., O'Leary, 1989). That is, while Chomskyans lay emphasis on maturational factors, the developmentalists argue for a more 'involved role' for the environmental input (Huttenlocher & Dabholkar, 1997; Johnson, 1999). On the nativist view the brain matures and reaches the stage of 'steady state' primarily with the passage of time. Time, therefore, is the most crucial factor in the development and growth of brain cells and its other structures.

For the developmentalist, on the contrary, the brain structures emerge not just with the passage of time or ageing process but through an interaction between the developmental processes and the environment in which they are set. The far-reaching effects of the environment on brain development and resultant representational plasticity as well as changes to the germ cell epigenome have also been well documented by researchers emphasizing thereby on the gene-environment dynamism rather than unidirectional influence of genes on the phenotype (Bale, 2015, Bidleman et al., 2014, Bidleman & Alain, 2015, Yusa et al., 2011). The developmentalists therefore argue that calling some phenomenon innate in no way constitutes its explanation. For them, the products of development are epigenetic in nature. That is, the outcome of developmental processes is probabilistic rather than being predetermined. The developmentalists consider it more appropriate to articulate their position in terms of coaction of gene-environment rather than their interaction (Gottlieb, 2003 & 2007, Dupre, 2014). Consequently, they treat effects of genes to be indirect[3].

The picture of developmental processes that emerges from the developmentalist camp is the one in which "genes appear as one among many contributors to a complex network of interaction" (Johnston & Edwards, 2002, p. 26). The mapping from structure to function to behaviour, for the developmentalists, is many-to-many (Li & Lindenberger, 2002). In their view, the role of learning, for example, is clearly demonstrable in brain development. This is considered to be evident from the findings of studies on activity-dependent synaptogenesis. One of the important findings of these studies in the present context is their discovery of how a living system develops the capacity for modifying its computational architecture as a function of its involvement in a particular problem space. The organism's environment is not passive but engaged, i.e., specified by the organism's proactive engagement, querying, and results in playing a very significant role in the construction of new representations. The existence of a strong correlation between increases in structural complexity vis-à-vis increases in representational power tends to substantiate the truth of this interpretation. For the developmentalists and their constructivist cousins, the environment and the nature of input (i.e., experience) thus shape the very nature of the processing mechanisms and affect the direction of developmental processes in profound ways (Elman et al., 1996; Karmiloff & Karmiloff-Smith, 2001; Quartz, 1993; Quartz & Sejnowski, 1997; Plunkett & Schafer, 1999; Thomas & Karmiloff-Smith, 2003). That is, the genes and the environment are thought to be "interacting and inseparable shapers of development" (Lewontin, 1995, 72; Dupre, 2014, p. 3).

A further impetus to the developmentalist approach in terms of enhancing our understanding of human cognition is provided by studies of atypical cognitive development. Recently, through a series of studies including connectionist modelling, Thomas & Karmiloff-Smith (2002a&b; 2003) have argued that Chomskyans, keeping in line with their larger theoretical orientation, have tended to unquestionably adhere to what they have come to term the "assumption of Residual Normality" (Thomas & Karmiloff-Smith, 2002a, p. 729) -- the thesis that some fault or malfunctioning of some components of the system would still leave the rest

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[3] For a detailed discussion of the mediating role of different factors affecting genetic activity and behaviour, see, Johnston & Edwards (20002).

of the system intact[4]. For Thomas & Karmiloff-Smith, such a move glosses over the fact that the mapping from some genetic deficit(s) to resultant behavioural impairment(s) is far too complicated and not as straightforward as is usually assumed by the Chomskyans. For them, the characteristics of development and of cortical gene expression both currently appear to mitigate against highly domain-specific outcomes in adulthood. It appears that for the time being we have to content ourselves with this because at the current stage of our knowledge it is not possible to pin point with any degree of finality any gene that can be treated as responsible for later cognitive and/or behavioural deficits (Karmiloff-Smith, Scerif & Thomas, 2002a). Despite some confusion about the very meaning of innateness (Griffiths, 2002), even a cursory look at the mechanisms subserving cognition reveals interconnectivity between different brain regions as well as neuronal groups to be the hallmark of brain anatomy. And this interconnectivity appears to be more of a distinguishing feature of brain functioning than modular compartmentalization. The evidence for representational plasticity even in the case of adults as evidenced from the study of accidental cases is also too strong to be ignored without being dogmatic (Ramchandran, 1999).

The developmentalists have therefore tended to argue that the proponents of the static picture of cognitive system (read Chomskyans and modularists) tend to overlook the fact as to how certain gene level abnormalities may change the performance of low-level processing mechanisms. These changes are not considered to be limited to changes in the processing mechanisms alone but may also involve changes even in their computational role and abilities. It is also considered possible that they may have a cascading effect so as to make the organism opt for an alternate developmental trajectory. These changes, however, are not a mere higher-level tinkering with the normal adult system (Thomas & Karmiloff-Smith, 2003). It is argued that the cascading effects of genetic/low-level deficits/malfunctioning on other functional components are usually lost sight of by the Chomskyans. That the effects of low level atypicalities can be 'knock-on', qualitative and/or quantitative only complicates the situation further. It is by keeping in view such difficulties with the Chomskyan picture of human cognition that the developmentalists have proposed that the structures in representational systems be taken to be emerging as a consequence of "the system's dynamic interactions with its environment" (Thomas & Karmiloff-Smith, 2003, p. 647). In my opinion the recognition of this complexity combined with the realisation that genetic changes/deficits can result in "wide spread atypicalities across cognitive domains" has considerably strengthened the theory of human cognition proposed by the developmentalist alternative over nativist and modularist renderings of these processes (Thomas & Karmiloff-Smith, 2003, pp. 648-49). The debate between Chomskyans and developmentalists is thus not just about the interaction between innate factors and the experiential and environmental input. It is about the exact nature of this interaction (Elman et al.,1996; Aslin, Saffran and Newport, 1999).

It appears to me that improvement in our understanding of this interaction, besides giving us a better insight into the functioning of different cognitive mechanisms would also result in giving a more precise meaning to innateness. For example, the future research in this area can help us to identify and fix the role of postulated innateness. That is, whether it operates at the level of capacities, or at the level of the mechanisms involved in realizing such capacities of the organism in question, or knowledge/representations that the organism is usually thought to be endowed with. In the case of language, for instance, the controversy usually boils down to whether the knowledge of grammar is some kind of biological endowment or result of developmental activity. The controversy between the Chomskyans and the developmentalists

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[4] That is, Chomskyans hold on to the static model of cognitive development. That they further use it to advance a modular picture of the cognitive system is yet another important issue that can be explored in its own right. In this static picture, the modularity is seen not to be resulting from developmental processes but viewed as an integral part of our innate cognitive system.

is in a way about the direction of the influence of the maturational factors and the influence that the environment has on resultant cognitive structure. It is in fact not clear whether development and learning are separate things, rather than points on a multi-dimensional continuum of adaptive change.

But Chomskyans still require a developmental account, though may be a more constrained one. It is this missing component that is problematic about their theories. Its absence encourages the idea that Chomskyans are not providing an explanation but adopting a tactic that serves to block further explanation: 'here are the primitives I wish to include in my theory, for which I need no explanation'. The point is, even though different fields (psychology, neuroscience, biology) can be studied independently, it does not mean that they are independent. Primitives in psychological theories of development have to be consistent with what biological development can deliver. Perhaps worse than that, when other researchers do try and implement the aspects of Chomskyan proposals that appear obvious and simple (e.g., triggering), it turns out they don't work or are far more complex in practice.

Though the assessment of the usefulness of the continued engagement with nativist-developmentalist debate varies from extreme rejection (Pinker, 1998) to its profound usefulness (Spelke & Newport, 1998), there appears to be very little hope of ending the controversy in near future. This is especially so because our knowledge of cognitive systems and other allied areas has reached a stage where each of the positions appears to be empirically testable. In a way the debate is no longer confined to 'empty' philosophical arguments (for example, between rationalists and empiricists), but is aimed at determining the precise nature of interplay between these two sets of factors (i.e., the innate and the environmental). Instead of looking at the phenomenon of language acquisition, for example, in a dichotomous manner (i.e., nature vs nurture), the focus of researchers is now shifting to investigating the nature of processes involved in language acquisition. The linguists and psycholinguists these days increasingly appear motivated to unravel how some of the domain specific characteristics of many of the brain regions responsible for handling linguistic tasks could be a function of experience.

In the present essay an attempt has been made to assess the status of Chomskyan position in the context of language acquisition. There are several reasons for limiting the exercise to language acquisition alone. Firstly, the early experiences in the process of language acquisition may have long lasting consequences on human cognition as it may be colouring subsequent cognitive capacities. The effects that the process of language acquisition may have on our subsequent behaviour cannot thus be ruled out a priori. Secondly, language acquisition is one area of research where the "nature-nurture debate plays itself out with perhaps no greater fury than in the area of language acquisition" (Aslin, Saffran, & Newport, 1999, p. 361). Before assessing and taking sides in the debate let me begin by first giving a brief description of the Chomskyan thesis about language acquisition.

2 CHOMSKYAN THESIS ABOUT LANGUAGE ACQUISITION

While dealing with the topic of nativist thesis about language, it is important to take into consideration the larger understanding of the mind/brain that nativists in general and Chomsky and his followers in particular rely upon in the articulation of their position on what they consider to be the nature of language (Jenkins, 2004). Chomsky, for instance, believes that the sensory input and resultant behaviour cannot be studied without taking into consideration the mind/brain states. Mind/brain for him is a representational device which is postulated to be endowed with some resources of its own (Chomsky, 1993). The sensory inputs undoubtedly have a role to play in our perception of the world but we perceive the world in ways that we actually do, not just because our senses receive a certain kind of input, but because in some

important sense the output is "a consequence of the organizing activity of the mind" (Chomsky, 1993, p. 515). That is, we always perceive things in terms of concepts that we are endowed with.   In the case of language, the significant question is: "What is the system of knowledge incorporated in the mind/brain of a person who speaks and understands a particular language?" (p. 517). Chomsky's answer is: "a system of knowledge incorporated in the mind/brain" (p. 517). And by a 'system of knowledge' he means s "a rule system of some sort" and its knowledge is "knowledge of this rule system" (p. 527). These rules form mental representations and govern our linguistic behavior. But language is a system of rules whose initial state is "genetically determined" because of which "the class of attainable languages" (pp. 519 & 522) is restricted. This is supported by the fact that though there is infinite number of possible rules and hence possible class of languages, in reality the number of actual human languages is relatively very small (Hornstein & Lightfoot, 1981). As Chomsky says: "[While] there are too many possible rule systems…there are only finitely many languages" (1993, p. 528-529).

Such a restriction on the number and variety of languages is accounted for by the thesis of initial state which is "a genetically determined species character" (Chomsky, 1980, p. 38; Piattelli-Palmarini, 1980). It is a state that is "prior to experience" and "fixed for the species". It is owing to certain properties of the initial state (for example, specified subject condition) that the range of hypotheses that a learner is likely to entertain in transition from the initial state to the steady state (i.e., the grammar of a mature adult) is severely restricted. The hypothesized knowledge of language that such an initial state is endowed with is termed as Universal Grammar (UG) by Chomsky and refers to "that aspect of linguistic competence which is due to the human genetic endowment" (Jackendoff, 1983, p. 8). UG, as hypothesized by Chomsky, is "a highly structured and restrictive system of principles with certain open parameters" (Chomsky 1980, p. 38). Because of such a restrictive mechanism at work the possible variety of languages is limited by rules of universal grammar. It outlines rules that universally hold for all natural languages. It is because of restrictions imposed by UG that children don't have to "evaluate the full range of grammars that would be logically possible" (White, 1981, p. 242). UG restricts the range of possible hypotheses that a language learner can entertain. It provides a basis for learning without itself being learnt (Jackendoff, 1997, p. 6). That is, children never try out "structure-independent hypothesis" but are "constrained to work within the framework of structure-dependency" (White, 1981, p. 243). However, the UG rules are "not learned, but…[are] part of the conditions for language learning" (Chomsky, 1975, p.33). "We do not really learn language; rather grammar grows in the mind. We may think of Universal Grammar as…the genetic program, the schematism that permits the range of possible realizations that are the possible human languages" (Chomsky, 1980, p. 134 & p. 234). As regards the question why languages differ from each other, Chomskyans believe that "the 'equations' linking sound and meaning allow of several equally good solutions… [That the] conditions imposed by the general architecture of the mind/brain…can be met in various ways" (Smith, 1999, pp. 123-124). In the vocabulary of the principles and parameters theory, this means that we have a possible humanly attainable language "for each arrangement of switch settings" (Chomsky, 1993, p. 529).

As for the enigma of 'the probable ease' with which children seem to acquire the language of their primary care givers, Chomsky believes that children are born with the knowledge of language, i.e., knowledge of a system of rules[5]. But what is initially lacking is the maturation of other mechanisms (attention and memory for example) that "bring principles of universal grammar into operation on some regular schedule in a manner to be described and accounted for in a genetic theory" (Chomsky, 1993, pp. 530-531). The contribution of genetic factors is

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[5] However, unless we have a scientific way to measure the supposed 'ease' in infants and young children, this doesn't mean anything significant.

very important in Chomsky's scheme of things because for him universal grammar or "the initial state of the language faculty determines possible rules and modes of interaction" (p. 527). It is because of such a restrictive role of UG in making the options available that despite the impoverished and unstructured nature of the input, the language learning can proceed. That is, "the knowledge acquired in language acquisition far outstrips the information that is available in the environment" (Laurence & Margolis, 2001, p. 221). One of the implications of such a restrictive role of UG is that it in many ways limits the possible contribution of experience. The role of experience is limited in the sense that children's exposure to language(s) merely brings the input to the critical point where the use of innate knowledge becomes possible. Its function is to account for the transition from the initial state to the steady state.

But the contribution of experiential input in not totally neglected as the transition from "the initial state to the steady state of mature knowledge is, to some extent, data-driven… The environment determines how the options left unspecified by the initial state of the language faculty are fixed, yielding different languages" (Chomsky, 1993, p. 519)[6]. As White clearly remarks, "a priori principles cannot be apparent unless one has data that are relevant to them" (White, 1981, p. 246)[7] This is because the task of structure-preservation does not make much sense in the absence of relevant triggering experience[8]. So, the grammar that we postulate the child to be working with has to be appropriate for the data available to the child. Such a rendering of the structure-experience relation has far reached consequences. For instance, if children are thought to be constructing their 'working' grammar that is appropriate for the data that they are exposed to, then they would not only be working with different grammars at different stages of life but even their perception of data will be changing with time9. As White states: "Despite apparently similar input data at different stages, the child's intake actually varies… The child's perception of the data is different from the adults. The grammar that he comes up with will be optimal for his own perception of the data, i.e., the relevant triggering experience" (White, 1981, pp. 247-248). While on the face of it such a reading of language acquisition in terms of "data-driven" grammars may give an impression as if experience has been given prominent role than is usually allowed by the Chomskyans, this is in reality not the case. What is emphasized by such a reading is not the role of the input, but the actual intake of the child. So, simplifying of the input to the child is not be of any consequence for the Chomskyans. As White very forcefully argues: "…the fact that the speech that mothers address to children is different from the speech they address to adults does not mean that it is better for language learning" (White, 1981, p. 271 n.5)[10]. Consequently, there will be different optimal grammars for different stages and we cannot speak in terms of simpler and/or complex inputs[11].

So, while Chomsky and other linguists working in the generative grammar tradition do rely on presentation of "appropriate data" (Chomsky, 1993, p. 513) for language learning to be possible, the role of linguistic input is treated as very limited in nature. It can merely "trigger" or "fine tune" what is otherwise an "internally controlled process". The language faculty develops "in accordance with fixed genetic instructions" for Chomsky (1980, p. 32 & pp. 39-40; 1981). That is, the process of language acquisition is deterministic in nature. It is acquired

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[6] For Chomsky, this in no way means that children are merely born with some simple principles the details of which are filled later in life. For him, there appears to be adequate evidence to suggest that children "select very complex rule systems and systematically…avoid much simpler ones" (1993, p. 528).

[7] Nothing is however said about how relevance is tested by the system.

[8] But can triggering as a concept be deployed so readily as if everyone knows how it works. It's an assumption that learning will be fast and rely little on the structure of the input, but not a mechanism of learning that has been demonstrated to work.

[9] This of course largely applies to 'stages' before steady state is reached.

[10] This is a hypothesis to be tested, not a fact to assume. Either way, needs to be evaluated in terms of explicit learning mechanisms.

[11] Scholars not belonging to the Chomskyan tradition have however not found such arguments to be convincing. Apart from the burgeoning literature on the role of child-directed speech, the researchers have also highlighted the causal role of iconicity on children's language development (Perry *et al.,* 2021).

by "a process of selection of a rule system of an appropriate sort on the basis of direct evidence. Experience yields an inventory of rules" (Chomsky, 1993, p. 527). This means that though the nature of the environment is not treated as totally irrelevant, its importance is considerably downplayed. The reason for such a downplaying of the role of input and acceptance of the thesis of innate knowledge seems to be the evidence for the existence of some definite knowledge. In this context Chomsky cites the behaviour of the slave boy in Plato's Meno as evidence. The Chomskyans feel compelled to postulate innate linguistic knowledge in the form of universal grammar because, for them, the resultant effects in terms of the mastery of language of one's primary care givers go far beyond the input; because children can master a complex system like language with very little effort in a very short period of time. Expressed otherwise, the existence of an innate mechanism is considered necessary because of children's fragmentary and impoverished experience, and the intricate nature of the knowledge of language that they come to be endowed with (Hornstein & Lightfoot, 1981; Clahsen, 1996). That is, children end up knowing much more than they have been taught. For Chomskyans, the stimulus is too impoverished to explain the ability that humans come to have[12]. The linguistic input "fails to provide the data needed to induce many principles and generalizations manifested by the mature state" (Lightfoot, 1991, p. 3).

The other reason that seems to guide Chomskyans in their postulation of innate knowledge is the lack of negative data (Hornstein & Lightfoot, 1981; Smith, 1999). The support for this comes from children's lack of information about ungrammaticality of sentences. That the children of immigrant parents who have poor knowledge of the language of the country to which they have migrated develop normal grammar is often cited as important enough evidence to demonstrate the truth of Chomskyan thesis (Crain & Lillo-Martin, 1999; Lightfoot, 1991)[13]. For these and other related reasons, learning of a language is treated as "something that happens to the child, without awareness for the most part" (Chomsky, 1993, p. 521). In Neil Smith's words, "everything the infant needs to find out about the language it is exposed to is already innately specified; all it needs to do is make the right choices from the items listed" (1999, p. 44). If so viewed, acquisition of language turns out to be selecting of a particular rule system by children; a kind of "setting of switches"; of determining the position of switches for one's language; "of choosing among a set of pre-specified possibilities… fixing of parameters" (Smith, 1999, p. 118 & p. 123; Chomsky, 1993, p. 528)[14]. That is, experience with a language merely triggers pre-specified options. It helps the child "discover the local realization of universally specified principles and parameters" (Karmiloff & Karmiloff-Smith, 2001, p. 5). Such a setting of switches is, however, no mean task in the sense of its repercussions later in life as a "slight change in switch settings can yield complex and varied phenomenal consequences" (Chomsky, 1993, p. 528). Chomsky's principles and parameters theory thus advances a conception of universal grammar that postulates "an invariant network and an associated set of switches" (p. 523). While the former (invariant network) is something that all humans are born with, the latter (setting of switches) requires some linguistic exposure to get going.

3 THE CHALLENGES BEFORE CHOMSKY AND HIS FOLLOWERS

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[12] For Culicover (1999), however, "our inability to imagine how something can be learned is not sufficient for us to conclude that it is wired in. Nor can it be a matter of stipulation that certain things that are plausibly not learned are a matter of innate syntactic knowledge rather than being a projection of the requirement of some other type of representation, e.g. semantic" (p. 11).

[13] Yet another factor that seems to motivate Chomskyans in the direction of postulation of a "special design"/ mechanism for language is that the language faculty, for them, constitutes "a separate module" (Smith, 1999, p. 19).

[14] Culicover (1999) has, however, offered powerful arguments against Principles and Parameters Theory by pointing out that explanation of linguistic variation in terms of variation in parameter values does not amount to an explanation of how the parameters are actually set.

Given this distinction between invariant core and controlled variation at the periphery, several issues arise that need to be looked into. The first concerns identification of aspects of grammar that require more/less elaborate triggering experience in conformity with principles and parameters theory. Since UG is part and parcel of our genetic endowment, it is expected that core rules of grammar would not require very elaborate triggering experience. Following this logic, the triggering experience in the case of non-core rules would have to be more elaborate and the suggested movement within this category has to be from least marked rules to most marked ones. This means that while least marked rules would be the easiest and first to be acquired, the most marked ones would be the hardest and last to be acquired. Related to these is the issue of whether children embark on grammatical development with adult-like linguistic competence. That answers to these issues are far from satisfactory is clear from the controversies within the nativist camp as exemplified by two approaches within the generative grammar tradition, namely, the full competence hypothesis, and lexical learning hypothesis (Clahsen, Eisenbeiss & Penke, 1996). Moreover, support and reasons for embracing a position that grants availability of adult-like syntactic structure to children are rather negative in nature (Tomasello, 2000, p. 235). Acceptance of this thesis is considered to protect the advocates of this position from difficulties surrounding learnability theory[15]. It is children's lack of maturation of some other cognitive capacities that is supposed to account for their initial lack of productivity and not availability or non-availability of grammatical knowledge. In what follows, an attempt is made to assess the extent to which many of the claims made by Chomskyans are tenable in light of ongoing empirical research.

In the context of language acquisition, work of Patricia Kuhl and her coworkers on infants has been particularly noteworthy as it has attempted to develop a perspective that addresses the nativist-developmentalist controversy by showing how language input is not a mere trigger but radically modifies perceptual mechanisms (Kuhl, 2000 & 2004, Ramírez et al., 2017). In fact, many of her studies are very self-consciously directed at demonstrating how linguistic input "goes beyond setting the parameters of prespecified options" (Kuhl, 2000, p. 101). Kuhl's strategy has been to study infants who are just hours old to document linguistic sensitivities that they are born with so that we can determine which of their capacities are innate. She has then followed up the development of infants raised in different linguistic environments to determine how infants' experiences with a particular language influence the very nature of their perceptual mechanisms required for processing language of their primary caregivers. That is, how infants' perceptual abilities "begin to diverge as a function of experience with a particular language" (Kuhl, 2000, p. 100). What is interesting about Kuhl's results is the extent to which infants' very early experiences are found to colour their perceptual abilities for life (Kuhl, 2004). Her findings are striking because they demonstrate how the nature of our perceptual abilities is an outcome that comes into being more as a result of developmental processes rather than being their cause (Kuhl, 2000 & 2004, Ramírez et al., 2017).

In this context, the data made available by researchers adopting socio-pragmatic approach also appears quite significant in the sense that it also tends to challenge the Chomskyan assumption that children are endowed with adult-like linguistic competence. For instance, studies reviewed by Tomasello and his coworkers tend to go against Chomskyan claims because they entail those children use many cognitive strategies that are not specific to learning of language (Ibbotson & Tomasello, 2016). The Chomskyans have also been found to have grossly overestimated children's early linguistic competence (Goldberg, 2006, Ibbotson et al., 2012, Ibbotson & Tomasello, 2016, Tomasello, 2000). Tomasello's review of data shows that "young children's early language is more concrete and item-based" than is usually admitted by the

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[15] We may recall here the Chomskyan belief that no plausible learning theory exists that has "significant empirical support" (Chomsky, 1975, p. 20). Also see, Atkinson (1996) and Poeppel & Wexler (1993).

Chomskyans (2000, p. 211 & p. 237). What young children initially learn are individual constructions. If some pattern is discernible in adult usage of such constructions, then children make abstractions and tend to organize them in a hierarchical fashion. For Tomasello, the acquisition of language is largely usage based and the continuity in this process is continuity of learning and abstraction rather than that of linguistic structures. Young children's constructions are not found to display any evidence that young children possess "abstract syntactic competence characteristic of older children and adults" (Tomasello, 2000, p. 247 & p. 210). For him, "a large part of the task of language acquisition must be accomplished by means of some form of social or imitative learning" (Tomasello, 2000, p. 237).

The other shortcoming with Chomskyan account that Tomasello points out is Chomskyans' inability to provide any details of how young children go "about linking up item-specific linguistic knowledge with universal grammar… The problem is how children link their universal grammar – in whatever form that may exist – to the particular language they are learning" (Tomasello, 2000, p. 232). In this regard, Tomasello cites Slobin's (1997a&b) work that points to considerable variability across languages and poses insurmountable difficulties for the Chomskyan proposal that hypothesizes existence of innate linking rules. Similarly, to test the differing approaches of Chomskyans and constructivists (Chomsky, 2005, Tomasello, 2000) to language acquisition, Gervain et al. (2008) investigated eight-month-old Japanese and Italian infants in their study[16]. The primary focus of their study was to ascertain "whether young learners have a prelexical representation of the distribution of functors and content words in their native language" (Gervain et al., 2008, p. 67). This was significant as Japanese and Italian have opposite word orders. Given this fact about these languages, it was possible to test Chomskyan and constructivist intuitions. The study demonstrated infants' language specific sensitivity to exposed language input that tends to strengthen the developmentalist alternative.

In Tomasello's (2000) opinion, Chomskyans have no satisfactory answer to "the question of how the language learning child might link up the linguistic items and structures she is learning locally with the hypothesized innate universal grammar" (p. 235). Their proposal is also found to make wrong predictions about how certain structures are acquired within a language (p. 234). Yet another difficulty with the Chomskyan proposal, that has recently come to be highlighted by linguists from both within the nativist tradition and those opposed to it, is its inability to explain many aspects of linguistic competence that cannot be wished away as idiosyncratic. What the Chomskyan proposal is supposed to be good at is explaining certain "core" aspects of grammar leaving out vast areas "consigned to the periphery" (Tomasello, 2000, p. 236; Culicover, 1999; CulIcover & Jakendoff, 1999). Of late, the issue of core vs periphery has come to be increasingly probed because there seems to be no consensus about exactly where core ends and the periphery begins. Nor is there any agreement concerning the breadth of the periphery. Culicover and Jackendoff have termed these difficulties as two dogmas of the generative grammar tradition, namely, "shun the periphery", and "mirror semantics and covert syntax" (1999, pp. 543-545).

According to the first Chomskyan dogma only the most general and universal aspects of grammar that require minimum possible reference to language specific details are worth looking into since these alone are likely to be revealing about "the human capacity for language" (p. 543). This thrust of the generative grammar tradition has been reflected in the works of its leading advocates. It tends to concentrate more and more on most general aspects by ignoring idiosyncratic and language specific features. For Culicover & Jackendoff, such an understanding of syntax is too "narrow" as "an empirically adequate syntactic theory should be able to account for the full range of phenomena that actually exist in natural language" (p. 544). Such a demand does not appear all that out of place if we keep in view the fact that the

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[16] Also see, Gervain, de la Cruz-Pavía & Gerken (2020).

generative tradition, by its own admission, aims at understanding how children acquire language. The idiosyncratic features of different languages accordingly also need to be accounted for as young children acquire such aspects of grammar of their ambient language as much as other more general ones. A theory of language is expected to account for not only the mastery of the general and universal aspects of language but also acquisition of the non-universal, the exceptional and the idiosyncratic. Human language faculty has to be such that it is capable of handling the universal as well as what is idiosyncratic (Culicover, 1999; Culicover & Jackendoff, 1999)[17]. Moreover, as Culicover has rightly remarked, "the hard cases for the theory are the marginal and the exceptional ones, not the general ones" (Culicover, 1999, p. vi). The second dogma of the Chomskyan tradition is taken to consist in seeking "some non-surface (or covert) level of syntactic structure that directly encodes structural aspects of meaning" (Culicover & Jackendoff 1999, p. 544). The problem with such an approach, as pointed out by Culicover & Jackendoff (1999), is that it fails to satisfactorily explain many mismatches between syntactic and semantic structures. In this regard, the conditional correlative (CC) constructions in English are cited as the obvious examples of such a syntax-semantics mismatch (p. 551). These constructions are problematic because while they exhibit various characteristics that cannot be regarded as part of "core grammar", they are still learnt. (p. 569).

To overcome such difficulties Culicover & Jackendoff (1999) offer an alternative perspective that is able to explain better such mismatches. According to them, different languages are distinct ways of expressing invariant aspects of innate conceptual structures that are common to all humans. "[S]yntactic structure" accordingly "has its own autonomous properties and…the syntactic structure of a sentence corresponds only partially to its semantic structure" (p. 544). This is possible because, for them, syntactic structures are projections of conceptual structures without there being any one-to-one mapping between these two levels of representations. This means that insofar as syntactic structures are projections of the invariant aspects of conceptual structures, they are likely to exhibit commonality across languages (Jackendoff 1992 & 1997). They are a kind of default assumptions. But correspondence between invariant aspects of conceptual structure and their projections into syntactic structures is not all that is there to these structures. The mapping between non-invariant aspects of conceptual structure and syntactic structure is likely to be "more or less arbitrary" and is reflected in idiosyncratic features of different languages (Culicover & Jackendoff, 1999, p. 568). So, those aspects of syntactic structure that are not projections of invariant conceptual structure are likely to be "autonomous and unpredictable" (p. 568). That is, universality of syntactic structures is only part of the story and not whole of it as is wrongly supposed by the generative grammar tradition. The latter thus appear to be guilty of reducing "all aspects of syntax to…[the] default situation" (p. 568). For Culicover & Jackendoff (1999), CC constructions are an example of how 'periphery' is not reducible to the 'core'. As opposed to the generative grammar tradition, Culicover & Jackendoff (1999) and Jackendoff (1992 & 1997) argue that the nature of the periphery and the problems that its existence poses as well as mismatch between syntax and semantics need to be carefully looked into as there is ample evidence for both of these[18].

4 CONCLUDING REMARKS

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[17] Culicover in fact entertains the possibility that there may be two learning mechanisms, one for setting of parameters and the other for learning of idiosyncratic and exceptional constructions (1999, p. 15-16).

[18] Jackendoff, for instance, clearly argues for this when he states that "syntactic categories do not correspond one to one with conceptual categories…[; that] the mapping from conceptual category to syntactic category is many-to-many " (Jackendoff, 1997, p. 33-34).

The preceding review of research undertaken in this essay in the context of acquisition of language by humans tends to considerably strengthen the developmentalist alternative vis-à-vis strict Chomskyan approach to the topic. Chomsky and his followers are found to be wanting in demonstrating how infants and young children come to link innate knowledge of grammar that they are postulated to be inheriting as part of their genetic endowment with the language of their primary caregivers. They are also found to be lacking in satisfactorily explaining how these language learners come to learn many idiosyncratic and non-core aspects of language. The lack of consensus about the boundary between the supposed core & invariant aspects and peripheral & idiosyncratic ones and the possible breadth of the latter seem to further weaken the Chomskyan proposal. As was pointed out in the preceding paragraphs, mastery of language specific features of one's ambient language is as much a part of human linguistic behaviour as those of more general and universal ones. The young children acquire such aspects of grammar of their ambient language as much as other more general aspects of grammar. A theory of language is expected to explain not only the mastery of the general and universal aspects of language but also acquisition of the non-universal, the exceptional and the idiosyncratic. Human language faculty has to be such that it is capable of handling the universal as well as what is idiosyncratic.

Furthermore, the review of literature focused on investigating the role of different perceptual mechanisms and biases that language learners bring to bear upon the task of language learning suggests that many perceptual abilities diverge as a function of experience with a particular language than being innate as postulated by Chomskyans. Consideration of all these factors necessitates that we recognise the role of developmental processes themselves as the key for deepening our understanding of the phenomena of language acquisition. This line of thinking is further strengthened by the empirical data from the developmentalist camp including studies of atypical cognitive development that tends to suggest that the gene-cognitive behaviour mappings are many-to-many and are turning out to be much more complicated and indirect than was initially supposed by the Chomskyans. In my opinion the recognition of the role of developmental processes in unravelling the riddle of language acquisition also has far reaching implications for the nativist-developmentalist debate in general and is likely to result in better articulation of the focus of future discourse. In the long run this may not only result in giving a more precise meaning to innateness and thus address the chief concerns of both Chomskyans and the developmentalists, but may also help us understand better how different developmental processes orchestrate their all too baffling outcomes.

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