IIIT Hyderabad, Introduction to Linguistics - I

Assignment 4

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A Perspective on Chomsky's Views on Language

Chomsky is often described as having brought about a revolution in linguistics, in terms of formalising the field. He also brought up the idea of innate development, in opposition to the then popular behaviourist theories of Skinner. Chomsky's views were rationalist, as opposed to Skinner's, which were more on the empiricist side – the latter characterised language as essentially a "habit", and compared it to the reinforced responses of a rat in a "Skinner box". Chomsky identified several shortcomings in this view and presented his own: that language is a "native" characteristic of human beings, independent of cultural affiliation, and that it possibly has a genetic component to it.
In my opinion, his views are, in principle at least, based on sound reasoning and valid observations (creativity and poverty of stimulus). Creolisation may also be construed as a point in favour of his theory, but many counter-points to this idea have been posited.
However, it is possible that they are stretched a little further than is probable; specifically, the extent to which the universal grammar is "pre-loaded", as it were, in a human brain is entirely debatable. I find it more plausible that the innate component should be the absolute bare-bones of language, i.e., the fact that language is structure-dependent, and possibly nothing else. This is given the variability that is plainly observable among human languages.

References: The Articulate Mammal (Aitchison, 1976), The Language Instinct (Pinker, 1994), Wikipedia

Criticism – The Great Automatic Grammatizator (Morpheme)

The presentation starts with a brief overview of the theories of B.F. Skinner regarding the nature of language and its acquisition, and his experiments in this connection.
Here, Skinner's theory is described as based on "reward and punishment"; however, no mention was made of punishment in the given reference. It appears that Skinner only made use of positive reinforcement in his work. Also, in Chomsky's theories, the point about deaf children seems to be in regard to the development of Nicaraguan Sign Language, though it was not mentioned.
Of the two theories, Chomsky's appears to be more plausible. This opinion is borne out in the later points.
We then see in detail the contrary view espoused by Chomsky, and observe the fundamental difference between the theories, i.e., nature vs. nurture. A description of the "Skinner Box" experiment and Chomsky's criticism of its relevance follows.
The indeterminacy of the response and the flawed notion of response strength are very valid counterpoints to the experiment's relevance, in my opinion. The idea that language is "just another habit" can be dismissed, in light of these points.
The example of the Martian is given, to illustrate the structure-dependent aspect of language. A more detailed exposition of Chomsky's views in this regard, regarding the two levels of structure and the idea of slot-filling, along with the creative aspect of language is presented, followed by an experiment verifying the psychological representation of sentence structure.
It is noted that structure independence is computationally far simpler and more efficient, yet children do not seem to go through a phase of testing the structure-dependence of language during acquisition. A reasonable conclusion from this is that they somehow "know" it is structure-dependent, and build on this innate knowledge.

The experiment presented, however, appears extremely convoluted, and it does not seem that the results are strong enough to justify the conclusion drawn. The mere shift of the perceived position of the sound looks, in my opinion, like an unsatisfactory basis. It may be premature to criticise it without details of the exact distribution of the results, however.
The points presented regarding the creative aspect of language appear justified by simple observation, and, when one notes the poverty of stimulus, they lend support to the idea of innateness.
The presentation concludes with two possibilities of how humans develop internal grammars. Of these two, the innateness hypothesis appears more valid. The second idea would imply that the efficiency language acquisition is related to the IQ or general intellect, which is plainly not the case.

Criticism – A Sneaky Theory of Where Language Came From (Chimichangas)

The presentation begins with a discussion of Chomsky's and Berwick's views, that language, being unique to human beings, must have emerged very suddenly and must be genetically "hardwired". The differences between this rationalist view and the opposing empiricist view are then listed. We then see the views of Chomsky on the innateness and universality of language, which were dealt with at length in the previous presentation as well.
The rationalist view dismisses the idea that non-sequential tool-making could have been behind the brain's capacity for language, or vice versa. Also, the rationalist rebuttals to the empiricist view that language is learnt by experience are 1) that a virtually infinite number of sentences can be produced, not any fixed repertoire, and 2) the concept of poverty of stimulus.
Next, we see Chomsky's opinions on the relation between animal and human communication. Due to the Cognitive Revolution, he says, the two are far from comparable. This view seems reasonable, considering the various features (Hockett's design features) absent from the former. Chomsky's justifications are then presented, including the genetic component.
Then the views of Kolodny and Edelman, with respect to "hijacking" of cognitive mechanisms in the development of language, are presented. A distinction is made between the formalist and functionalist approaches to language, and how this lines up with the difference between Chomsky's and Kodolny's perspectives. The theory that language arose through the "exaptation" of existing pathways is undeniably novel, but a thorough knowledge of neuroscience appears to be needed to judge its feasibility.
An exposition of the Cognitive Coupling Hypothesis follows. The idea that language is efficiency-centred, like locomotion and other bodily functions, seems like a dubious notion; it is plain that language in its current form (which has remained roughly unchanged for ~10000 years) is far from efficient, especially in view of characteristics like ambiguity (inherent in many day-to-day utterances). Further, the development of writing as a form of representation for language has been anything but efficient, with complicated and chaotic spelling systems arising all over the world.
The social aspects acquired by language during this period are, on the other hand, probable, and we see them persisting in today's usage as well.
Kolodny and Edelman's objections to the formalist view appear, without further justification, to be poorly founded.

Criticism – A Rule-Based System for the Transcription of Sanskrit to IPA (Pandas in Pandemic)

The presentation begins with the reasons for choosing Sanskrit – it is one of the oldest classical languages, has a rich literary tradition, and is recognised as a scheduled* language by the constitution of India. However, it is also stated that Panini is the "creator" of Sanskrit, which appears to be an error. Further, Panini having formulated ~4000 rules describing Sanskrit is also given as a factor, although it is unclear how this fact affects the choice of Sanskrit.

We then go into why a new transcription system is needed for Sanskrit. IAST and ITRANS, both used widely, are adequate for ordinary sound transcription; however, they have no provision for the marking of suprasegmental features such as stress. This causes discrepancies in the pronunciation of poetic texts. The inadequacy of more recent tools, though mentioned, is not elaborated upon – a list of the shortcomings of these systems might have been illuminating. Nevertheless, these points make clear why this algorithmic approach would be beneficial.
There follows an overview of Sanskrit phonology, and the mapping of individual Devanagari letters to IPA symbols, which is clearly explained.
Two facts are noted here. First, that sandhi does not need to be accounted for by this approach, since it is already taken care of in the original Devanagari and therefore has no further effect on the pronunciation. Second, that the pronunciation has had various versions over time, diverging from the Classical pronunciation; the latter is the form that will be represented by this system. The example of vowel duplication in the presence of the visarga is given; the original pronunciation, [-h], is used.
Next we see the algorithm itself. It starts with the transcription of the anusvara and the virama/halant – the former as the homorganic nasal in case it is followed by a stop, and a nasalisation of the preceding vowel otherwise, and the latter as the removal of the implicit schwa. The "default" case for the anusvara is given as [m]; this is not entirely clear.
The next step is syllabification, for which the WWG algorithm (originally for Sinhala) is made use of. Clusters of the form VCC...CV are used, where the boundary vowels are reused. The length of the consonant cluster determines the position of the syllable break; the rules for this are explained at length.
Finally, we see how weight is assigned to syllables. Special note is made of the difference in the assignment of weight to an independent syllable, versus a syllable that is part of a word.
The presentation concludes with an example run of the software implementing the algorithm.

***** The presentation says “official”.

Criticism – Grandmama's Teeth (Highbrow Herons)

We begin with a bird's-eye view of physiological and anatomical adaptations in various animals, which make them better adapted to their environment. This is the context in which we study the adaptation of the human body to speech and language. First, the vocal tract is discussed – the various organs of articulation, and the modification in the rate of breathing are mentioned. Second, the brain and the division of functions between the hemispheres is noted. The point is made that quality is more important than the quantity of brain matter. Examples are given in support of this fact.
We then see the various processes internal to the brain which are responsible for speech production. The dependence of various processes on different parts of the brain is illustrated by the different types of aphasia caused by damage to different places. The importance of coordination between areas of the brain, over the actual locations, is emphasised.
Several aspects of the complexity of the entire process of speech are then detailed – planned articulation (with respect to sounds as well as words), and the "beat" or rhythm of speech. Here it is stated that one-sixth of a second is the basic time unit; while this is supported by some studies, by conscious effort we can slow down or speed up the rate of speech.
Next, cases illustrating the independence of language and general intelligence are described. This, I feel, bears out the improbability of Possibility 2 (as listed in the presentation by Morpheme) with regard to the development of innate grammars in the brain.
We then see the factors language does depend on, as claimed by some studies. The (highly disputable, in my opinion) claim that women and men have consistently differing abilities in different areas is stated as an assumption; this is taken as the basis for the claim that language ability is affected by hormone levels. This, however, appears unlikely, at least at first glance.

The dependence of language on genetics is a little more established. The hereditary nature of dyslexia and the case of the KE family are given as illustrations of this. Environmental factors also probably enter into it; lack of exposure to language can severely hinder its acquisition. While Chomsky's principle of poverty of stimulus is well known, some stimulus is definitely needed; it is possible that a threshold of linguistic experience exists below which language acquisition is impossible. Other psychosocial factors such as home environment may have an effect too, although this is more debatable.

Finally, the possibility is explored that mirror neurons, which control empathy, play a fundamental role in acquisition as well, since the development of language in a child is dependent on observing others use it, as noted previously.