

**Alireza Dehbozorgi**  
**alirezadehbozorgi83@yahoo.com**

**March 19, 2022**

## Temporality in grammar and cognition: A conceptual approach towards linearization and hierarchy

### **Abstract**

The Universal Grammar has undergone various modifications with regard to division of labor when it comes to different modules of the narrow syntax since the birth of the generative enterprise. The aforementioned fluctuations mainly are justified as simplicity, Chomsky 2021, elegance, computational efficiency, etc . Despite some insights within the realm of theoretical linguistics, the results rarely influenced the other neighbouring bio- and engineering sciences.

### **Introduction**

The research on the central role of syntax, both narrow and broad, Chomsky 2015, and the uncertain position and functioning of the interface modules, and place such as morphology, Embick 2015, Bobaljik 2012, Baunaz et al 2018, among

others), features and feature bundles, such as agreement ,Koenenman and Zeijlstra 2014,, and the uncertainty about Roots and Lexical insertions, Bárány et al 2021, 3 vols., has led to the inconsistencies between lexicalization, Wiland 2019, Uriageraka and hierarchical grammar and how and when exactly the core syntax transfers its components the grammar. As the spell-out algorithms abundant in the literature rarely contingent with the non-symbolic nature of sensory-motor properties, Hagoort 2019, the aforementioned algorithms may not be capable of converting discrete symbolic grammatical features into fuzzy discontinuous acoustic cues and vice versa, as required by the auditory system in human.

### **Necessities of Research:**

- The theoretical linguistics community, must have a much more active role in and to make much more significant contribution to the cognitive neuroscience of language. Thus said, the interdisciplinary integration on our behalf is absolutely vital for the survival of linguistics in the near future. Being inspired by other sciences would be treasured, but inspiring other sciences within leading
- As recent research results in cognitive psychology and neuroscience are undermining the language faculty supremacy in the cognitive domains in favour of other cognitive modalities, such as vision, Hutmacher 2019, Cavanagh 2021, and Schrimpf et al. 2021, in spite of invaluable restatements in favour of

language as the highest cognitive human mankind, Cassirer 2020, Coopmans et al. 2021, and Beljon et al. 2021, among others.

### **Research Questions:**

- How does non-discrete properties of language-external modules such as time and space can interact with the binary discrete feature[bundles] in narrow syntax.
- Do the multimodal encoding and decoding interactions, if any, make core grammar heavier and lighter and to what extent and if so, how much do they influence the basic grammatical components, such as Merge, Movement, islands and their constraints, other structural configurations, be it head or phrasal, whether relatives minimality the existential status of roots and functional categories in grammar.
- As time and space are continuous, or better rephrased, fuzzy phenomena, and therefore probabilistic in nature, Ziomek 1995, and Keener 2021, Nichols 1992 among others, how can such fuzzy and dynamically-chaotic phenomena, influence or being influenced by discrete and profoundly algebraically symbolic elements of language the language faculty?

### **Methodology:**

- The following research will implement both qualitative methods as well as quantitative corpus studies. As for quality, typological variety investigations will be adhered to as much as the quantitative limitations of the research are not violated. Limitations such as shortage of time, hard- and software resources, the cost are major obstacles which, due to my previous experience in such interdisciplinary projects, can be overcome as optimally as possible.
- In accordance with the previous statement, the languages and language families recommended are to be several West-Germanic languages, with special focus on Dutch, some Romance languages, and a few Semitic languages, in this case Arabic and Modern Hebrew and last but not least, an Indo-Aryan language, namely Persian as spoken in Iran. The reason behind the selection is the abundant availability of both published and annotated resources, i.e. spoken and written corpora for these languages. The same also holds for the grammatical structure. In other words, the structural properties, similarly, will be limited to the agreement phenomenon and some movement phenomena such as wh-movement, feature manipulations, and api-grammatical linear concepts such as word order, unless further support, both technical and financially are provided, in which case the areas under investigation can be both enhanced and improved from both qualitative and quantitative perspectives, respectively.

- Although the focus will be mainly on synchronic parts of language, diachronic analyses are not out of question and language variations, i.e Roberts 2007, 2019, Viti 2015, Ledgeway and Robert 2017, and Hock 2021, among others, both theoretically as well as in practice, will be covered within the scope of the above-mentioned limitations. An finally, although generative linguistics form the basis of analysis, mainly the minimalist program, I will do my best to adhere to theory-neutrality by integrating instances of a restricted sample from almost every non-generative approaches.
- As far as the aforementioned shortages allow, the research hypothesis is estimated to be completed between 3 to 5 years with all dedication and perseverance.

## **Conclusion**

The results of this research will have both insightful and thought-provoking contributions for both linguistics from most, if not all, frameworks, and other neighbouring sciences, instances can be cognitive psychology, neuroscience, and Artificial Intelligence in almost all of its branches, including ANNS, deep learning, and machine learning. The sole difference will be the direction of inspiration, as linguistics as the foundational source, and not the other way round.

## **References**

- **Bárány, A, T. Biberauer, J. Douglas, M. Sheehan** (2021), *Syntactic architecture and its consequences*, 3 vols., Berlin: Language Science Press.
  
- **Baunaz, L., K. de Clerk, L. Haegeman, E. Leader,** (2018), *Exploring Nanosyntax*. OUP Press.
  
- **Beljon, M., D. Joosen, O. Koeneman, B. Ploum, N. Sommer, P. de Swart, V. Wilms,** (2021). *The effect of filler complexity and context on the acceptability of wh-island violations in Dutch*. Linguistics in the Netherlands Volume 38 (2021), pp. 4–20. <https://doi.org/10.1075/avt.00047.bel>
  
- **Bobaljik, David. J.,** (2012), *Universals in Comparative Morphology: Suppletion, Superlatives, and the Structure of Words*. MIT Press.
  
- **Cassirer, Ernst.** (2020). *The philosophy of symbolic forms, volume 1: Language*, Routledge.
  
- **Cavanagh, Patrick.** (2021). *The Language of vision*. **Perception**, Vol. 50(3). 195-215. DOI: 10.1177/0301006621991491

- **Embick, David.** (2015). *The morpheme: A theoretical introduction*.  
Berlin: Mouton- De Gruiter.
- **Chomsky, Noam.** (2015). *The Minimalist Program: 20th Anniversary Edition*. MIT Press.
- — (2021). *Simplicity and the form of grammars*. Journal of Language Modelling Vol 9, No 1 (2021), pp. 5–15
- **Coopmans, C., H. de Hoop, K. Kaushik, P. Hagoort, and A. E. Martin** (2021). *Hierarchy in language interpretation: evidence from behavioural experiments and computational modelling*, *Language, Cognition and Neuroscience*, DOI: 10.1080/23273798.2021.1980595
- **Hock, Hans. H.** (2021). *Principles of historical linguistics*. (3rd Ed.).  
Berlin/Boston: De Gruyter.
- **Hutmacher, Fabian.** (2019). *Why is there so much research on vision than any other sensory modality?.* Front. Psychol., 04 October 2019 | <https://doi.org/10.3389/fpsyg.2019.02246>

- **Jenny, M., P. Sidwell, & M. Alves,** (Eds.) (2020). *Austroasiatic Syntax in Areal and Diachronic Perspective*. Leiden/Boston: Brill.
  
- **Keener, James. P.,** (2021). *Biology in Time and Space: A Partial Differential Equation Modeling Approach*. Providence, Rhode Island : American Mathematical Society.
  
- **Koenenman, Olaf & Hedde. Zeijlstra,** (2015). *The Rich Agreement Hypothesis Rehabilitated*. Linguistic Inquiry, Volume 45, Number 4, Fall 2014 571–615. doi: 10.1162/ling\_a\_00167
  
- — *Morphology and Pro Drop*. (2019). in **Aronoff, M.,** (ed.), *Oxford Research Encyclopedias of Linguistics*. OUP Press.
  
- **Ledgeway, Adam & Ian Roberts** (eds.). 2017. *Cambridge Handbook of Historical Syntax*. Cambridge: Cambridge University Press. 746 pp. [https://doi.org/ 10.1017/9781107279070](https://doi.org/10.1017/9781107279070).
  
- **Nichols, Johanna.** (1992). *Linguistic diversity in space and time*. The University of Chicago Press.



- **Roberts, Ian.** (2007). *Diachronic syntax*. OUP.
- — (2019). *Diachronic and Comparative Syntax*. Routledge.
- **Scrimpf, M., I.A. Blank, G. Tuckute, C. Kauf, E.A. Hosseini, N. Kanwisher, J.B. Tenenbaum & Evelina Fedorenko,** (2021). *The neural architecture of language: Integrative modeling converges on predictive processing*. PNAS 2021 Vol. 118 No. 45 e2105646118. 1-12.  
<https://doi.org/10.1073/pnas.2105646118>
- **Uriagereka, Juan.,** (2012). *Spell-Out and the Minimalist Program*. OUP.
- **Viti, Carlotta** (ed.) (2015). *Perspectives on historical syntax*. Amsterdam/Philadelphia: John Benjamins Publishing Company.
- **Wiland, Bartosz.** (2019). *The spell-out algorithm and lexicalization patterns: Slavic verbs and complementizers*. Berlin: Language Science Press.
- **Ziomek, Lawrence. J.** (1995). *Fundamentals of Acoustic Field Theory and Space-Time Signal Processing*. CRC Press, Inc.

