



Mini-course: Innateness in language: still a viable hypothesis?

Lecturer: Prof. Iris Berent, Dept. of Psychology, Northeastern University

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In the middle of the last century, Noam Chomsky championed a radical idea: he suggested that the human capacity for language arises from a set of innate rules of language, known as universal grammar (UG).

The hypothesis of UG is one of the most controversial proposals in cognitive science; despite decades of research, scholars (linguists, psychologists, computer scientists, neuroscientists and philosophers) have failed to resolve the UG debate. In fact, many reject the question itself.

Does the notion of UG have any merit? Is it even coherent? What evidence can help decide on this issue?

This seminar revisits the UG debate. To this end, we will closely consider each of the two major entailments of UG hypothesis: (a) linguistic productivity arises, in part, from a set of algebraic rules; and (b) some rules of language are innate.

One set of lectures will examine the notion of **rules** (including constraints, as in Optimality Theory). We will define the notion of “rule” and consider how one can capture linguistic productivity without relying on rules (e.g., Rumelhart & McClelland, 1986). We will review computational and experimental tests that seek to adjudicate between these two competing positions.

A second set of lectures will consider the notion of **innate knowledge**, generally, and innate linguistic rules specifically. Some of the questions we will ask include (a) Is the notion of innate knowledge (e.g., of language) biologically plausible? (b) Do language universals arise entirely from domain-general pressures, or partly from innate linguistic (i.e., domain-specific) knowledge? And (c) Why is the question of innate knowledge so difficult for us to settle?

Finally, we will examine how language shapes non-linguistic abilities, such as reading and dyslexia, on the one hand, and numeric cognition, on the other. The capacity of human brains to scaffold new cognitive systems by recycling language offers further evidence that language is a system of core knowledge.

DETAILS

Dates and venues

Lectures:	March 14, 16, 21	12:00-16:00	Tel-Aviv University, Gilman 496
	March 23, 28	12:00-16:00	The Hebrew University, LLCC
Workshop:	March 30	10:00-18:00	The Hebrew University, LLCC

Prerequisite: Solid background in cognitive sciences (e.g. linguistics, psychology, philosophy)

Course credit: 2 hours

Course requirements: • Attendance
• A short (3500 words) research paper (details TBA)

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The lectures will be in English. Questions can be asked in Hebrew or English.

Date	Topic	Synopsis	Background readings	Papers
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Unit 1: What is (natural) language? Is “language” a natural kind: are there features that define all human languages and only human languages? How does language arise in humans—does it require learning from experience, or can language arise spontaneously? What systems of the mind/brain support the human capacity for language?				
March 14	<i>Knowledge of language</i>	There is so much you know about language. And what’s funny: you never even realize it...	Pinker, 1994: chapter 1-2	
	<i>Language on a desert island?</i>	If a group of children were to be raised on a desert island, would they spontaneously come up with a language, similar in kind to English? Home signs and emerging sign languages offer some answers.		• Goldin-Meadow & Mylander, 1998 • Senghas, Kita, & Ozyurek, 2004
	<i>Modularity, innateness</i>	Chomsky has famously argued that the human capacity for language is innate. What does innateness entail? What are some the general arguments in favor of an innate language module/instinct and against it? And why is innateness such a hard question for us to settle?		• Chomsky, 1980 • Elman et al., 1996, chapter 1 • Berent, 2021

Unit 2: Rules rule? Many linguists assume that language relies on abstract principles, which they call “rules” or “constraints”. What do they mean by a “rule”? Are rules necessary to form novel forms? Here, we ask whether rules play a role in natural language processing. Whether some rules are innate is a separate question we discuss next.				
March 16	<i>Rules vs. statistical learning: Introduction</i>	Productivity is clearly the defining property of language. How does productivity arise? We first define the notion of rules (as opposed to statistical learning) and examine their role in artificial language learning by considering evidence from infants. We also ask whether these results can be captured by “eliminative” connectionist networks and modern deep learning systems.		• Saffran, Aslin, & Newport, 1996 • Marcus, Vijayan, Bandi Rao, & Vishton, 1999 • Marcus, 1998
March 21	<i>Rules of language: the case of morphology</i>	Having defined “rules”, we can examine whether rules play a role in <i>natural</i> language. Morphology presents a classic test case. The question here is whether <i>rats</i> (regular plurals) and <i>mice</i> (irregular plurals) are the product of two different systems of the mind and brain—rules vs. lexical association. The debate is quite heated!	• Pinker, 1999, chapters 1 & 4	• Haskell, MacDonald, & Seidenberg, 2003 • Berent & Pinker, 2007



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Unit 3: The UG hypothesis. Now that we know what we mean by a *rule*, we can finally ask whether some rules of language are innate and universal. We contrast competing views on the topic using evidence from phonology. Most people believe that phonological preferences arise from sensory and motor constraints: if we *blog* (not *lbog*), it's because *lbog* is hard for us to hear and say. The evidence from brain and behavior suggests otherwise.

March 23	<i>Phonological universals: the case from sonority</i>			• Berent, Lennertz, Jun, Moreno, & Smolensky, 2008 • Gómez et al., 2014 • Berent et al., 2015 • Berent et al., 2014
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Unit 4: Language and beyond. Here we examine how language interacts with nonlinguistic capacities. We examine the link between phonology and reading ability and disability. Pending time and students' interest, we might also consider the role of language in promoting numeric cognition.

March 28	<i>Reading, phonology, dyslexia</i>	It is commonplace to conflate phonology and reading—many people think they are one and the same. But illiterate people routinely use language (and phonology), whereas verbal humans are genetically predisposed to develop dyslexia. These links offer interesting insights on phonology as a system of core knowledge; reading “recycles” this core system to build a new cognitive capacity.	Berent, 2013	• Van Orden, Johnston, & Hale, 1988 • Berent, Vaknin-Nusbaum, Balaban, & Galaburda, 2012
	<i>Numeric cognition</i>	It is well known that speakers of different perform differently on numerous cognitive tasks. But whether this really reflects profound effects of language on thought is far less evident. To sort things out, we consider the effect of language on number cognition—in hunter gatherers, and deaf home signers. The findings demonstrate that language can have some pretty profound effects, but such effects are only found in a small number of restricted areas.		• Gordon, 2004 • Spaepen, Coppola, Spelke, Carey, & Goldin-Meadow, 2011



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