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LING 635 Syntax Seminar
Language Faculty Science: Its conceptual articulation and experimental illustration
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The main thesis of this course is that language faculty science can be pursued very much like physics. The purpose of the course is to discuss what is meant by this[1] and illustrate the proposed methodology for language faculty science based on actual on-line experiments dealing with English and those dealing with Japanese, as well as the designer-informant experiment.

The course should be of interest to anyone who is striving to pursue rigorous testability in research that aims at discovering the properties of the language faculty and also to those who have doubts about how that is possible. In addition, the discussion in the course about how we can pursue testability-seeking research should be useful to anyone who wants to pursue their own research based on solid empirical "facts," regardless of particular "theoretical orientations."

What "actual" activities the students will be engaged in will depend upon the interests of the students. Among the possible tasks for the students is to address how rigorous testability can be pursued in what they are working on. Such a task does not have to address the main theme of the course directly although it can be related to it. Another, and more ambitious, task for the students is to address how their research can be related to the detection of LF c-command effects; see below.

The course tries to elaborate on my "Galileo's Other Challenge" (a response to Chomsky's "The Galileo's Challenge"). The elaboration is both conceptual/methodological and empirical/experimental. The basic idea is presented in Hoji 2015[2], but in a rather simplified manner. I am trying to undo the simplification in Hoji 2015 in my forthcoming book (henceforth Hoji 2018, for simple exposition), and this course will include the undoing of the simplification.

The "elaboration" in Hoji 2018 is based on the recognition that it is not possible to obtain informant judgments in line with our definite predictions in a reproducible manner, even within a single informant, for example, for the designer him/herself, unless we consider *correlations* of judgments, at least in Japanese, contrary to what is suggested in Hoji 2015. The result of a multiple-non-researcher informant experiment in Japanese (about 200 informants), conducted in the spring of 2017, provides experimental support for the viability of this more "elaborate" methodology. In the meantime, the result of multiple-non-researcher experiment in English (400+ informants), conducted for the past 4-5 years at USC, provide support for the viability of the less "elaborate" methodology proposed in Hoji 2015.[3] We will address why we observe the difference between Japanese and English.

The conceptual and methodological discussion about language faculty science can be presented based on its goal and its general method. As the name suggests, the subject matter of language faculty science is the language faculty. Since the language faculty is internal to an individual's mind/brain, the language faculty scientists are strongly committed to the internalist perspective. As a general research

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[1] Obviously, there are differences between physics and language faculty science. For example, in the former, what is deduced from hypotheses are definite numerical values while in the latter what is deduced from hypotheses are categorical in nature.

[2] *Language Faculty Science* (2015, Cambridge University Press) is available on-line at the USC Library and its accompanying website is here. Its Chapter 1 and Chapter 8.2 should give one the basic research orientation despite its shortcomings.

[3] One important point to note here is that the purpose of conducting a multiple-informant experiment is to see if we obtain *definite* experimental result in a *single-informant experiment* in accordance with our definite predictions, and in a reproducible manner. We are *never* interested in the "average" of the responses of the group of informants, except when that is clearly indicative about the responses of *individual* informants.

method, I assume that, as long as it is possible, one should aspire to follow the spirit of Feynman's "The sole judge of "scientific truth" is experiment" and his "Guess-Compute-Compare." "Guess-Compute-Compare" means deducing definite and testable predictions and trying to obtain experimental results precisely in accordance with such definite predictions. Coupled with the strong internalist perspective, this leads us to the view that we aspire to deduce definite and testable predictions about *individuals*.

Given Chomsky's conception of the language faculty in his "The Galilean Challenge," we expect to be able to detect the effects of LF c-command. A major, and perhaps the most fundamental, task for the language faculty scientist is therefore to build an experimental device for detecting the effects of LF c-command. It took researchers many years to compute the exact consequences of Einstein's General Relativity regarding the gravitational waves in a testable form, and it took them even longer to design and build a device that was actually able to detect the gravitational waves precisely in accordance with the predictions.[4] A successful detection of LF c-command effects likewise requires that we first *predict* observable effects of LF c-command, then design and conduct an experiment to test the predictions, while constantly trying to enhance the precision of the experimental device. We can thus understand that the immediate goal of the language faculty scientist is to build an experimental device for the detection of LF c-command effects.

Our experiment deals with a particular I-language. The experimental device in question is therefore, necessarily, in relation to a particular I-language. The specific properties of an effective experimental device for the detection of LF c-command effects may well be different among different I-languages. In addition to establishing an effective experimental device for the detection of LF c-command effects for a particular I-language (e.g., I-languages of native speakers of so-called Japanese), we should therefore aspire to articulate the general properties of an effective experimental device for the detection of LF c-command effects "applicable" to any I-language.[5]

Given our subject matter, the basic questions include:

(1) a. What can or should our predictions be about?
b. How can we deduce definite and testable predictions based on hypotheses about the language faculty?
c. How can we design an experiment to test our predictions and expect to obtain definite experimental results in line with such definite predictions in a reproducible manner?

Hoji 2015 provides answers to each of these questions, along with an experimental demonstration of the viability of the methodology outlined there, also addressing different "levels" of reproducibility.

We can consider the following "equation" as representing the structure of prediction deduction.

(2) ps-LF + FO(a, b) + R(A, B) = Predicted Schematic Asymmetry
(Let us refer to this as "A+B+C=D.")

(3) a. ps-LF: hypotheses about the correspondences between a phonetic sequence and its LF representations (This used to be pf-LF-correspondence hypotheses in Hoji 2015).

b. FO(a, b) is a formal object at LF whose conditions include a c-commanding b. (FD(a, b) in Hoji 2015 and earlier works is one instance of that.)

c. R(A, B) is a dependency interpretation pertaining to two expressions A and B such that R(A,

[4] https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.116.061102

[5] This can be meaningfully pursued only after we have attained some minimal understanding, based on experimental illustration, of the properties of such a device for I-languages that are significantly different from each other.

B) is possible only if there is FO(LF(A), LF(B)), where "LF(alpha)" stands for the LF object corresponding to alpha. (BVA(A, B) in Hoji 2015 and earlier works is one such example.)

I will discuss this "equation" in the context of trying to detect LF c-command effects.

The experimental results suggest that in English we can assume that (the specific instances of) A, B and C (that we consider) are all valid and hence we deduce D based on A, B and C, where:

ps-LF is about SVO and OSV.
FO(a, b) is FD(a, b).
R(A, B) is BVA(every N, pronoun).

In the case of Japanese, however, C remains to be a variable, so to speak. Hence, we have two variables in the equation in (2), i.e., C and D. Hence, D cannot not deduced from A+B+C in Japanese. The definite predictions we can deduce in Japanese is about the correlations of judgment across BVA(A, B), Coref(A', B) and DR(A, B'), where:

Coref: Coreference
DR: Wide-scope distributive reading

Among the other "features" of the course are:

(4) a. Illustration of how D in (2) is deduced in English.
b. Illustration of how the correlations of judgments are deduced in Japanese.
c. How the results of the experiments provide support for what we are pursuing. In relation to Japanese, the illustration is based on how I account for my own judgmental fluctuation; the discussion about this is quite involved and you will get to see how the language faculty scientist checks his own judgments, comes up with hypotheses, and tries to replicate the results of the designer-informant experiment in a multiple-non-researcher-informant experiment.

In addition to BVA (bound variable anaphora), Coref (coreference) and DR (wide-scope distributive reading), our discussion directly addresses the so-called scrambling construction in Japanese. If there is time, I will discuss how the proposed methodology can be applied to Negation-related "phenomena" in Japanese, which will address additional "dimensions" to the so-called scrambling construction (including so-called A and A'-scrambling and resumption), to illustrate how rigorous-testability-seeking research can be pursued beyond the empirical domains that will be addressed in the early part of the semester.

If you have any questions about the course, please email me at: hoji@usc.edu.

References include the following in addition to the two essays mentioned above:

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Hayashishita, J.-R. 2004. *Syntactic and non-syntactic scope*, Doctoral dissertation, University of Southern California, Los Angeles.

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Hoji, Hajime. 2015. *Language Faculty Science*, Cambridge University Press. (Its accompanying website is: http://www.gges.org/hojiCUP/.)
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Ueyama, Ayumi. 2010. "Model of judgment making and hypotheses in generative grammar," In: Iwasaki, Shoichi; Hoji, Hajime; Clancy, Patricia; and Sohn, Sung-Ock (eds.), *Japanese/Korean Linguistics* 17, CSLI, Stanford, CA: 27-47. (Available at: http://www.gges.org/hoji/research/hp-Ayumi.cgi).