Department of Cognitive Science - Krieger Hall - Johns Hopkins University

COGNITIVE SCIENCE COLLOQUIUM SERIES –
Fall 2014

Refreshments at 3:30 pm
Presentation at 3:45 pm in room #111/Krieger Hall

Thursday, October 30, 2014
Dr. Justin Bledin, (jbledin1@jhu.edu)
Johns Hopkins University
Philosophy Department

Thursday, December 4, 2014
Dr. Sean MacEvoy, (sean.macevoy@bc.edu)
Boston College
Psychology Department...............CANCELLED

*View our colloquium announcements on the web at: http://cogsci.jhu.edu/events
COGNITIVE SCIENCE COLLOQUIUM SERIES – Spring 2015

Thursday, January 29, 2015
Dr. Josh McDermott, (jhm@mit.edu)
MIT
Department of Brain and Cognitive Sciences

Thursday, April 2, 2015
Dr. Grant Goodall, (goodall@ling.ucsd.edu)
UCSD
Department of Linguistics

Thursday, April 16, 2015
Dr. Meredith Tamminga, (tamminga@ling.upenn.edu)
University of Pennsylvania
Linguistics Department

Thursday, April 23, 2015
Dr. Karin James, (khjames@indiana.edu)
Indiana University
Psychological and Brain Sciences

Thursday, April 30, 2015
Dr. Dave Barner, (dbarner@ucsd.edu)
UCSD
Department of Psychology

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Dr. Justin Bledin  
Johns Hopkins University  
Philosophy Department  

“Modality with Content”

Abstract: In his *Begriffsschrift*, Frege famously holds that necessity modals do not affect semantic content but only carry an evidential signal, indicating that the speaker has established the prejacent claim via an indirect inference rather than on the basis of a direct observation or trustworthy report. Though this view has fallen outside the mainstream, I show that Frege's insights fit comfortably in a modern expressivist framework where informational modal talk does not serve to describe reality. In particular, I argue that a speaker who asserts that it *must* be raining does not describe the weather but still expresses propositional content by virtue of the communicative impact of her speech act, the same content that would be expressed by instead asserting that it *is* raining. Moreover, I propose that the inferential signal transmitted with the modal assertion stems from its purely expressive nature.
Humans infer many important things about the world from the sound pressure waveforms that enter the ears. In doing so we solve a number of difficult and intriguing computational problems. We recognize sound sources despite large variability in the waveforms they produce, extract behaviorally relevant attributes that are not explicit in the input to the ear, and do so even when sound sources are embedded in dense mixtures with other sounds. This talk will describe my recent work investigating how we accomplish these feats. The work stems from two premises: first, that understanding perception requires understanding real-world sensory stimuli and their representation in the brain, and second, that a theory of the perception of some property should enable the synthesis of signals that appear to have that property. Sound synthesis can thus be used to probe phenomena inaccessible to conventional experimental methods. I will discuss two related strands of research along these lines, one addressing the perception of sound textures (as produced by rain, swarms of insects, or galloping horses) as a window into the auditory system, synthesizing textures from statistics of biological sound representations as tests of the perceptual relevance of different acoustic measurements. The second strand uses naturalistic synthetic sounds to reveal new aspects of sound segregation. Together they indicate that simple statistical properties of auditory representations capture a surprising number of important perceptual phenomena.
Thursday, April 2, 2015
Presentation at 3:30 pm, room #111 Krieger Hall (light refreshments in room)

Dr. Grant Goodall
UCSD/California
Department of Linguistics

“Grammar vs. working memory: How experimental syntax can help us tell the difference”

The use of formal experiments to measure sentence acceptability, known as “experimental syntax”, is able to capture many fine-grained grammatical contrasts, but it also captures effects that have long been thought to be extra-grammatical, such as those induced by increased cost to working memory. This ambiguity in the source of acceptability is a problem in some ways, but experimental syntax itself gives us some useful tools to address it. I show this through a series of case studies of constraints on wh-dependencies, including the role of intervening arguments, finiteness, D-linking, and islands. These cases suggest that grammatical and working memory constraints can be usefully distinguished, with the former sensitive to intervening hierarchical structure and the latter sensitive to intervening referents.
In this talk I discuss motivations and methods for treating linguistic variability as a dynamic speaker-level, rather than static group-level, phenomenon. I begin with a brief discussion of the group and the individual in the sociolinguistic literature, suggesting that the progress made in sociophonetics when considering individual-level production data encourages us to take up such analyses systematically in the realm of morphophonological variation as well. I then discuss two lines of work that illustrate the potential that such an orientation offers. First, I look at persistence, the tendency to repeat a recently-used variant, across and within the grammatical categories of two classic morphophonological variables. On the basis of this data I argue that different cognitive mechanisms come into play with variation at different grammatical levels. Second, I suggest that generalized additive models fit to sequential data from individuals may allow us to differentiate the persistence effect from broader temporal fluctuations in the target probability of discrete variables. This tool thus opens to door to the investigation of how sociostylistic and psychophysiological factors simultaneously affect whether a given speaker will produce a given variant of a variable in an actual instance of use.
Thursday, April 23, 2015
Presentation at 3:30 pm, room #111 Krieger Hall (light refreshments in room)

Dr. Karin James
Indiana University
Psychological and Brain Sciences

“How Handwriting experience changes visual processing in the pre-literate brain”

One of the best predictors of reading acquisition in elementary school is letter knowledge in pre-school. Nonetheless, we know very little about how letters are learned and the neural substrates and circuitry that underlie typical and atypical letter learning. Our functional Magnetic Resonance Imaging research has transformed our understanding of letter learning by showing that letter ‘reading’ by pre-school children recruits the same neural substrates that are used for word reading in adults – but, of key importance, only if the pre-schoolers have previous experience printing letters by hand. This same adult network was not recruited for letter reading when pre-schoolers practiced letters through typing, tracing, or seeing/hearing. Further, another key outcome has been that functional neural connections between the sensory/visual ‘reading’ network and fine motor-control networks are enhanced with handwriting practice, but not other forms of practice, suggesting that the mechanism for development to an adult-like reading network involves sensorimotor plasticity that may be optimized during printing. Thus, these studies suggest a crucial role for handwriting in the development of reading systems in the brain. Current and future work is addressing how sensorimotor connectivity is created through handwriting – that is, what aspect of the writing experience changes letter processing. Preliminary data suggests that the variability of self-generated visual input produced during handwriting (the variable written letter form) may be the key to the effectiveness of handwriting over other learning modalities. These studies are the first to explore how handwriting affects letter processing and why this effect occurs.
Over cultural history humans have developed rich symbolic representations that encode number, culminating in formal mathematics. In this talk I will discuss the cognitive origins of this human capacity for symbolic number representation by taking a developmental approach. In particular, I will focus on the role of natural language in the acquisition of the positive integers. I will argue that children's first number words, "one", "two", and "three" are acquired much like grammatical markers of number, akin to singular, dual, and trial. In support of this, I will present evidence that singular and dual marking selectively speed the acquisition of the numbers "one" and "two" cross-linguistically. Following on this, I will argue that the real domain-specific cultural innovation that led to the development of mathematics was not representing number per se, but instead the creation of the verbal count list, which grew out of culturally constructed one-to-one tally systems. As part of this argument, I will present evidence from bilingual learners who are exposed simultaneously to two counting systems, and will show that learning the counting procedures in one language transfers to the other, whereas the meanings of small number words - i.e., one, two, three - does not. Small number words are represented as language-specific, whereas counting procedures are language-general. Also, I will show how learning the counting procedure sets up learning of higher order mathematical concepts like the successor function and the concept of infinity.