Cognitive Science Colloquium Series
Fall 2015

Krieger Hall 111, starting at 3:30
Refreshments are served at 3:15 pm

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<th>Thursday, September 24, 2015</th>
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<td>Christopher Potts, Ph.D.</td>
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<th>Thursday, November 5, 2015</th>
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<td>Matthew Wagers, Ph.D.</td>
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<td><a href="mailto:mwagers@ucsc.edu">mwagers@ucsc.edu</a></td>
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<th>Thursday, December 3, 2015</th>
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<td>Jonathan Cant, Ph.D.</td>
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<td><a href="mailto:jonathan.cant@utoronto.ca">jonathan.cant@utoronto.ca</a></td>
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The topic and abstract for each talk will be released the week preceding the event.
The most current information can be found on http://cogsci.jhu.edu/events.
Cognitive Science Colloquium Series
Spring 2016

Krieger Hall 111, starting at 3:30
Refreshments are served at 3:15 pm

Thursday, March 24, 2016
Kristen Syrett, Ph.D.
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Thursday, March 31, 2016
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Thursday, April 21, 2016
Timothy Brady, Ph.D.
Assistant Professor
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The topic and abstract for each talk will be released the week preceding the event.

The most current information can be found on http://cogsci.jhu.edu.
Embedded implicatures as pragmatic inferences under compositional lexical uncertainty

Joint work with Daniel Lassiter, Roger Levy, and Michael C. Frank

How do comprehenders reason about pragmatically ambiguous scalar terms like 'some' in complex syntactic contexts? In many pragmatic theories of conversational implicature, local exhaustification of such terms ('only some') is predicted to be difficult or impossible if the result does not entail the literal meaning, whereas grammatical accounts predict such construals to be robustly available. Recent experimental evidence supports the salience of these local enrichments, but the grammatical theories that have been argued to account for this evidence do not provide explicit mechanisms for weighting such construals against others. We propose a probabilistic model that combines previous work on pragmatic inference under 'lexical uncertainty' with a more detailed model of compositional semantics. We show that this model makes accurate predictions about new experimental data on embedded implicatures in both non-monotonic and downward-entailing semantic contexts. In addition, the model's predictions can be improved by the incorporation of neo-Gricean hypotheses about lexical alternatives. This work thus contributes to a synthesis of grammatical and probabilistic views on pragmatic inference.


Code and data: https://github.com/cgpotts/pypragmods
How language comprehenders keep ahead of the input – evidence from morphological processing in Chamorro

During language processing comprehenders seem to entertain representations that are richer than what is justified by the partial input alone. However it remains not very well understood what sorts of words or features in the input can induce such predictive coding. Do comprehenders use any valid contingencies they may have stored to implicitly “complete” the input? Or are certain grammatical relations privileged? In this talk, I will explore what we can learn about this issue from how comprehenders are, or are not, guided by morphological information.

My focus will be the language Chamorro, which is a verb-initial Austronesian language spoken in the Mariana Islands. Two features of Chamorro’s rich morphological system make it well-suited to addressing the question of how comprehenders extend their interpretations beyond the actual input:

i. *Wh-Agreement* – in displacement constructions, like questions or relative clauses, the verb has a special kind of agreement to indicate the grammatical role of the displaced argument (Chung, 1998).

ii. the Chamorro *Person-Animacy Hierarchy* – paradigmatic gaps in the morphology block particular combinations of arguments; e.g.: a non-pronominal subject absolutely cannot co-occur with a pronominal object in an ordinary transitive clause (Clothier-Goldschmidt, 2015).

Comprehenders who have learned these constraints could extract information from particular word forms to predict the interpretation of the sentence *before* definitive bottom-up input.

I will present a series of language processing experiments in which my colleagues and I have shown that Chamorro speakers indeed actively leverage both positive evidence, like Wh-Agreement, and negative evidence, like the Person-Animacy Hierarchy. I will further show that, on the one hand, some robust contingencies are ignored despite providing information similar in quality to the morphology. And on the other hand, even a completely reliable morphological constraint can be sometimes (erroneously) be overruled by a strong pressure to identify the grammatical subject.

In short, Chamorro presents a strong case that the representations comprehenders project on the basis of partial input are more strongly controlled by what grammatical relationships need to be licensed than by knowledge of what continuations are probable.

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1. Chamorro Psycholinguistics na Project: Sandra Chung (UC Santa Cruz) & Manuel F. Borja (Inetnun Ânut yan Kutturan Natibu, CNMI)
The Flexible Nature of Visual-Feature Representation in Human Scene-Selective Cortex

It has previously been demonstrated that the scene-sensitive parahippocampal place area (PPA) is more active for judgments of the surface texture and material properties of single isolated objects, compared to judgments of object shape. On the surface, this appears inconsistent with the view that PPA is specialized for processing scenes, since the single objects were not presented in the context of a scene. However, surface texture (and the material-properties signaled by texture) is important in scene processing as it can be used to aid in image segmentation, can contribute to the recognition of scene identity, and can provide affordance-related cues relevant for navigation. Thus, the finding that attending to object texture and material activates PPA may be better interpreted as evidence that PPA utilizes multiple visual features, in addition to its well-known role in processing global spatial features such as structural geometry, when representing scenes. Building on this observation, in this talk I will present the results of several studies examining the contribution of different visual features to scene representation in human occipito-temporal cortex. Specifically, I will present results investigating: 1) whether scene-selective cortex is more sensitive to processing scene, compared with object, texture; 2) whether the processing of different scene features (i.e., scene geometry/layout and scene texture/material) is mediated by shared or distinct neuronal mechanisms in scene-selective cortex; 3) whether the importance of scene layout and scene texture varies according the type of scene category being perceived (i.e., open vs. closed scenes, and natural vs. manufactured scenes); 4) how task context influences the representation of scenes in occipito-temporal cortex; and 5) the relation between object-ensemble perception and texture perception in scene processing. Finally, given that we do not typically perceive scenes devoid of objects (and in turn, we do not perceive objects outside of the context of a scene), I will present some recent results investigating interactions between scene and object perception (i.e., does global/scene perception interfere with local/object perception, or vice versa?). Taken together, these results will demonstrate that multiple visual features are represented in human scene-selective cortex, and that this representation is flexible, as the importance of different scene features varies according to perceived scene category and the goals of the observer. Moreover, the finding that object-scene interactions are influenced by both global and local image features may explain how one is able to perceive both the “entire forest” and the “individual trees” from a visual scene.
Pluralities are typically construed as sets or sums of individuals. Certain lexical expressions, including distributive predicates such as *round* or *tall* and universal quantifiers obligatorily pick out these individuals, or atomic subparts, for predication or quantification. Other predicates obligatorily apply at the group level. And still others are flexible enough to apply at either the individual or the group level, depending on the context. Children must not only be able to represent groups conceptually in a way that allows for these levels of predication, they must also assign the correct semantic representation to these linguistic expressions when constructing their lexicon, and compositionally when interpreting sentences.

In this talk, I will review data from a range of experimental studies over the years, including recent work in my lab, demonstrating that children possess very early on the requisite conceptual structure fundamental to the understanding of pluralities. For example, they know that certain adjectives obligatorily apply at the individual level, and are also flexible enough in their interpretations of sentences with ‘mixed’ predicates to access both collective and distributive interpretations. Even so, their misinterpretations of certain sentences involving universal quantification – and most glaringly with *each* – persist well past the preschool years. I will consider both cognitive and linguistic expectations that could lead children astray. This discussion will shed further light on the tight connection between conceptual and linguistic representations in development, and the challenges facing the language learner when it comes to expressions involving distributivity.
How language shapes cognition: Insights from sign language

Sign language provides an interesting test case for understanding how language could affect cognition. Data presented in this talk will reveal the potential effects of sign language on (a) memory, (b) visual object representation, and (c) response selection. These findings suggest that language plays a critical role in representing sequences in visual short-term memory. Other results show that the acquisition of signs that encode specific object visual features (e.g., orientation) could affect how visual object representations are stored in memory. Furthermore, the extensive use of signs might lead to fast mapping of responses that involve hand stimuli but not other types of stimuli. Overall, these results show the exquisite adaptability of the human cognitive system, which adjusts gracefully to the demands of a visual-motor language.
The nature of visual working memory: Objects, scenes, and the role of semantic knowledge

In this talk, I'll make two points about working memory: first, I'll argue that we have a separate object working memory and scene/texture working memory system, which each contributes to visual working memory. Second, I'll argue that working memory, like long-term memory, has a capacity that depends critically on the semantic meaning of what you are asked to remember.

In particular, in the first part of the talk, I'll argue that one of the ways we recognize visual scenes is by treating the scene as a global texture and processing the distribution of orientations and spatial frequencies holistically across the entire scene, without recognizing any objects. In the second part of the talk, I'll argue that we can see reflections of this texture-based scene processing pathway in visual working memory; and that, in fact, visual working memory consists of separate scene/texture and object representations. I'll show evidence that even the simplest visual working memory experiment -- with just 3 colored dots -- actually relies on dissociable memory representations from the object system and scene system.

In the last part of the talk, I'll discuss some recent EEG work trying to understand the nature of visual working memory, and, in particular, how visual working memory is affected by knowledge. I'll show that brain measures of how much is actively being stored in working memory demonstrate a greater capacity for real objects than for simple stimuli. This suggests that working memory has no fixed capacity -- instead, our ability to remember new information depends critically on our existing knowledge.