

Thought & Talk

The Newsletter of the Department of Linguistics & Cognitive Science

Newsletter #2

February 2011

Welcome to the second newsletter of the Department of Linguistics & Cognitive Science. The news will be divided into the following sections: (1) undergraduate program news, (2) graduate program news, (3) general departmental and faculty news, and (4) news from former students.

(1) UNDERGRADUATE NEWS

1a) Undergraduate majors on the rise....The existing undergraduate program in cognitive science at the University of Delaware continues to strengthen. We now have (roughly) 150 students in the major and (amazingly) over 40 of those joined us in Fall Semester 2010. Information about the major and the various concentrations within the major can all be accessed from this website. Thanks to Robin Andreasen for posting all the undergraduate documents and organizing the FYE class for First Year majors, and for her advising efforts.

1b) New B.A. program in Linguistics approved..... a new B.A. in Linguistics will be available for the first time ever, beginning in Fall 2011. This new major is as follows (plus the other General University and College Requirements which can be found in the University Catalog). (See Appendix)

1c) Winter Session in Italy...Lou Arena led another successful Winter Session in Italy with students taking Ling 101, Ling 480, and Engl 312. Students learned phonology, morphology, field methods, and syntax and spoke in English, Italian in several dialects in the cities: Venice, Siena, Florence, Rome and Sorento.

1d) Summer Session to Uganda....Irene Vogel has a Summer Session course planned for Uganda. Irene and her daughter visited Uganda last summer and made a number of important contacts and now has a terrific course designed and ready. In addition to learning a lot of linguistics, students will also learn to make a documentary film, while in this class. It sounds very interesting and like a lot of fun.

(2) GRADUATE NEWS

2a) Top Honors for our graduate program....The big news of the graduate program last Fall Semester was our NRC rankings (National Research Council). The department doctoral program placed in the top five graduate programs of the University of Delaware (and one of only two top-ranked programs in the College of Arts & Sciences). The department received high praise in

being ranked equivalent to the programs at such prestigious institutions as MIT, Stanford, and Ohio State. As Vice President Joe Biden might say, "This is a big...ahem....deal," and attests to the high academic quality of our graduate program at UD. Please read more about it on our webpage.

2b) Graduate Student Presentations forthcoming at WCCFL (The 29th West Coast Conference on Formal Linguistics at the University of Arizona, April 22-24th, 2011)

"Evidence for Classifying Metathesis Patterns as Subsequential"

Jane Chandlee, Angeliki A., and Jeffrey Heinz

"Computational Characterizations of Vowel Harmony Patterns and Pathologies"

Brian Gainor, Regine Lai, and Jeffrey Heinz

2c) Graduate Student Presentations at the Austronesian Formal Linguistics Association meeting, Harvard University, March 4-6

"Kana Constructions in Kota Kinabalu Malay"

Lan Kim, Yugeong Park, Peter Cole, Gabriella Hermon

2c) MaryEllen Cathcart...one of our graduate students, received an NSF dissertation grant to do field work in South America on the Quechua language.

2d) New Cognitive Science Certificate Program approved....together with other cognitive science departments at UD, we will now offer a new Graduate Certificate in Cognitive Science. The program is described below and is set to begin in Fall 2011, pending final approval. (See Appendix)

2e) Cognitive Science Conference... the 11th annual cognitive science conference sponsored by our department was held this Spring Semester on Friday, February 18th. See below. (Once again, it was very successful. To see the program details and who presented what, see our webpage)

University of Delaware

**Cognitive Science Graduate Student Conference 2011
Friday, February 18, 2011**

Call for Papers: Every Spring semester, graduate students from the Cognitive Science community at University of Delaware get together for a one-day informal event, for the purpose of sharing research results from both on-going and completed projects. We seek to bring together young researchers from all cognitive science related departments, to present their work in a cross-disciplinary atmosphere.

Abstracts are solicited for oral and poster presentations. Topics can be from any area relating to cognitive science including (but not limited to):

- * Linguistics (semantics, syntax, morphology, phonology, phonetics)
- * vision/spatial cognition
- * artificial intelligence
- * speech recognition and perception
- * mental development
- * language learning
- * computational modeling

Oral presentations will be allotted 20 minutes followed by 10 minutes for discussion. Poster presentations will take place during lunch.

Deadline: December 3, 2010 @ 5:00 pm

Submission Guidelines: Graduate students are invited to submit abstracts in PDF format via email to 2011 CSGSC (2011csgsc@gmail.com). Abstracts are limited to 500 words with an additional page for data and references. Please also include a title, your name, department, and email address. Additionally, please indicate whether your abstract is intended as an oral presentation or a poster presentation.

Notification Date: Dec 17, 2010

2f) Fall 2011: Cognition and Neuroscience Workshop...In Fall 2011 the department will sponsor a workshop which will include scholars from UD and from around the world. (See Appendix)

(3) News from the Department

3a) FACULTY News

Frederick Adams became journal editor or advisor to three international publications

Logos & Episteme – An international Journal of Epistemology <http://www.logos-and-episteme.projectsbc.ro/>

Revista Veritas - philosophical journal of the Program of Graduate Studies in Philosophy of the Pontifícia Universidade Católica do Rio Grande do Sul
<http://revistaseletronicas.pucrs.br/ojs/index.php/veritas>

Science Committee **Kínesis** (www.marilia.unesp.br/kinesis) State University of São Paulo - Campus of Marília

Jeffrey Heinz Assistant Professor received funding from the NSF for his collaborative project "Efficient Control Synthesis and Learning in Distributed Cyber-Physical Systems" led by Dr. Bert Tanner (Mechanical Engineering, UD). The project also involves Dr. Calin Belta of Boston University. Among other things, the group plans to integrate the subregular learning models Heinz has developed for natural language into paradigms for robotic planning and control.

Roberta Golinkoff received the 2011 Urie Bronfenbrenner Award for Lifetime Contribution to Developmental Psychology in the Service of Science & Society. Roberta was also co-founder of **The Ultimate Block Party** in Central Park (Funded by NSF, this is a movement to restore play and playful learning to children's lives...a yearly event in cities in the U.S. and Amsterdam and elsewhere). Roberta also now serves as **Associate Editor for the journal, *Child Development***. And last, but not least, Roberta has a new project "Word Play" examining how infants identify words and learn language, as well as some helpful tips for parenting. (See Appendix)

Anna Papafragou received a grant from the National Science Foundation to study the acquisition of linguistic evidentiality and the relationship between evidentials and the ability to reason non-linguistically about sources of information. Anna also received the Peter Jucsyk Best Paper Award from the journal 'Language Learning and Development' for her 2010 paper 'Lexical and structural cues for the acquisition of motion verbs' (co-authored with Stathis Selimis).

Nancy Schweda-Nicholson...is having a productive sabbatical year leave from UD. She directed an independent study student, published three chapters in edited volumes of *The Routledge Handbook of Forensic Linguistics* and in the *Oxford Handbook for Applied Linguistics*. In addition, she was keynote speaker at the Upper Midwest Translator's and Interpreter's Association conference at Century College in White Bear Lake, Minnesota. She is currently involved in forensic linguistic analyses of the Thomas Capano trial and sentencing court records.

(4)NEWS FROM FORMER STUDENTS

4a) **Stewart McCauley** graduated from our program with an M.A. in Linguistics and Cognitive Science Spring 2010. He is now a doctoral student at Cornell in psychology working with Morten Christiansen on the evolution of language, language acquisition and second language acquisition. He has recently developed a computational model that makes predictions about psychological plausibility and efficacy of storing multi-word phrases as distinct units of mental lexicon. The model faces two challenges: 1) "comprehending" the text of large corpora of child-directed speech by segmenting multi-word chunks of text, and 2) "producing" syntactic utterances by relying on its lexicon of chunks to incrementally predict upcoming words in corpus-derived child utterances.

Here is how Stewart describes his model:

My model makes use of backwards transitional probabilities between *words* to segment out non-overlapping phrases. That infants are sensitive to backward transitional probabilities has been established (ref, ref) in the word segmentation literature. Thus, my model enjoys previous support for the idea that the same sources of information are used by infants to learn about language at more than one level (ref). The model is scored against a “shallow parser,” a complex tool employed in machine learning approaches to natural language processing. That my current model places phrase boundaries with 76% precision and 82% completeness is non-trivial, given its psychological plausibility and reliance on a single source of distributional information (backwards transitional probability between words). The “production” side of the model is useful in that it can measure the benefit of storing phraselevel chunks and its impact on the model's implicit knowledge of syntax. Here, the model is scored on its ability to incrementally sequence randomized bags-of-words to match corpus-derived child utterances, from which the words in the bag are taken. The advantage of this approach is that it allows the model to be tested on a typologically diverse set of languages, even using corpora which are untagged. The model performs better than baseline models on a variety of languages, including Japanese, Welsh, Polish, German, and French. Over a dense corpus of English, the model predicts 82% of child utterances with total accuracy, compared to 51% for a model based on forward transitional probabilities between individual words, and 58% for a model based on various other cues.

Proposed future work with human subjects: Given the promising results encountered in the ongoing modeling work, the case for the initial premise is strong. The proposed work with human subjects will be aimed evaluating the predictions made by the current and future modeling work. Artificial grammar learning studies (ref) can be used to evaluate children's ability to segment out useful “chunks” in a controlled experimental setting. Other work will be aimed at evaluating implications for adult sentence processing. The event-related potential (ERP) technique is well suited to answering questions about the millisecond-to-millisecond time course of brain responses to linguistic stimuli, and in combination with simple reaction time studies, can be used to evaluate the impact of “chunk” frequency on depth of processing in adult subjects.

Broader impacts: While the primary motivation for this basic research is to illuminate the learning strategies employed by children, as well as aspects of adult language processing that stem from those strategies, it lends itself naturally to the applied research agenda of crafting highly effective new teaching strategies for second language instruction. Thus, second-language acquisition lies at the core of this research program's broader impacts. As my modeling work already suggests will be the case, further work with human subjects may demonstrate that the representation of multi-word “chunks” as distinct units imparts an advantage on children learning their first language. This would suggest that part of the “sensitive period” for language acquisition, reflected in the immense difficulty with which second-language learners progress towards competence, stems from the fact that adult learners make insufficient use of larger units. The typical approach adults take to learning (and, indeed, *teaching*) foreign languages may be too fragmented and fine-grained to be effective. Thus, this work has implications for second-language instruction, favoring a conception of teaching in which instruction about “parts” is likely to be less effective than immersion-based approaches which are structured in a way that maximizes the utility of “chunks.”

There exists tremendous potential to expand the present work in this direction: the possibility of offering an explicit, computational account of the effectiveness of various second-language instruction methods is vast (there exists, for instance, the International Corpus of Learner English). Improvements in second-language learning are being actively sought by a great many applied research projects. The problem of second-language learning has tremendous significance for individuals from across the entire socio-economic spectrum; millions of immigrants across the globe struggle to learn the languages used in their new settings, while government agencies actively seek breakthroughs in second-language teaching in order to better train diplomats, intelligence agents, and so forth.

4b) Catherine Bradley was de-facto lab manager for our colleague Professor Arild Hestvik for almost 2 years. She majored in cognitive science. Nearly a straight-A student, she did a terrific job running Hestvi's lab. She has now accepted a job as full-time lab coordinator at the Developmental Cognitive Neuroscience (DCN) Laboratory at Florida International University, Miami, FL.

Professor Hestvik notes: "I'm quite proud of that [Catherine's new position] and it shows that if undergrads work seriously in my lab, the experience qualifies them for research jobs and further entry into higher-level research education." He also mentions McCauley saying: "Stewart McCauley also did a study in my lab that I gave to him, and we got presentations out of it at several conferences (and he's submitting the paper); I am sure that work was critical for getting him accepted at PhD programs in psychology at both NYU and Cornell. I think it will be helpful if the grad students in linguistics realize that working in my lab and getting that experience will increase their chances, too, of getting jobs (especially postdocs) after they dissertate." Other cognitive science MA students working in Hestvik's lab include (currently, Antje Stoeher, Jihye, and Elizabeth Kurban- a straight-A 4+1 MA student). These students are truly interested in cognitive science.

4c) From Lauren Sparacino:

Hello, I am a former student of yours. I took your Philosophy of Mind class as part of my Cognitive Science major in the fall of 2009. I remember our class discussing how people think, whether or not beings without language can think, and if they can- how? I am reading a book titled "My Stroke of Insight" by Jill Bolte Taylor for a graduate course I am taking. It is the personal story of a neuroscientist who experienced a stroke, and completely lost language for a significant amount of time. She actually describes in great detail her thought process, and says that she began thinking in a different way. She says that instead of thinking in language, she thought in pictures (p. 78). I thought this might add to your discussion of the topic! The entire book is very interesting, and as the title suggests, it does give a great deal of insight into how our left and right brains work and process information. When I read it I thought of your class and just wanted to let you know about this resource! I hope you are doing well, and thanks for teaching a class that left such an impression on me! I am in graduate school at LaSalle University, for Speech Language and Hearing, but how the brain functions, thinks, and how it's all related to language is really a special interest of mine (which is why I found your class particularly interesting). Thanks for your emails, and I hope you and the department continue doing well!

Sincerely,
Lauren Sparacino

4d) List of Financial Contributions to the Department of Linguistics & Cognitive Science: In this section we wish to thank all those people who made financial gifts to the department during the past year. These donations are extremely important to the operations of the department. Among other things, these funds help us send graduate students to attend conferences and present their research and to remain current in their areas of research. Anyone wishing to make a gift to our department may do so by following the link at the college of Arts & Sciences and designating the Department of Linguistics & Cognitive Science as the intended recipient: <http://www.art-sci.udel.edu/MakeaGift/tabid/193/Default.aspx>.

As you know in these difficult times, financial gifts to the department are very much appreciated.

Appendix

1) New Major: Linguistics B.A.

Major Requirements

Total credit hours: 30

All of the following:

LING 101 Introduction to Linguistics 3

LING 403 Introduction to Phonology 3

LING 404 Structure of Language 3

LING 418 Meaning and Language Use 3

CGSC 485 Seminar in Cognitive Science 3

Five more courses drawn from LING or the following list: 15

PHIL 205 Logic, CGSC 170 Intro to Cog Sci, CGSC 496 Psycholinguistics

Four of these five must be 200-level or above.

A grade of C- or better is required in all LING major courses.

In addition, it is strongly recommended that the five elective courses include CGSC 496 Psycholinguistics and LING 471 Discovering Human Language.

- 2) Fall 2011 Cognition and Neuroscience Workshop to be held at UD, sponsored by the Department of Linguistics & Cognitive Science, the Office of the Dean of the College of Arts & Sciences, and the Program for Science, Ethics, & Public Policy of the University of Delaware (SEPP).

Dates: September 16th & 17th, 2011

Schedule

Invitees:

1. Frederick Adams – University of Delaware
2. Kenneth Aizawa – Centenary College of Louisiana
3. Michael Esfeld – University of Lausanne (Switzerland)
4. Carl Gillett – Northern Illinois University
5. Philippe Huneman – Institute of History and Philosophy of Science and Techniques (CNRS/Paris)

6. Thomas Polger – University of Cincinnati
7. Lawrence Shapiro – University of Wisconsin
8. Jacqueline Sullivan – University of Alabama, Birmingham
9. Sven Walter – University of Bielefeld (Germany)
10. W.F.G. Haselager – Donders Institute for Brain, Cognition, and Behavior, Radboud, Nijmegen (Netherlands)

Publication:

Papers from the conference will be collected and published in a volume edited by Gualtiero Piccinni , Associate Professor, Departments of Philosophy and Psychology, and Center for Neurodynamics, University of Missouri-St. Louis and published in the Brain and Mind series of Springer Publications <http://www.springer.com/series/6540>.

3) New Graduate Certificate in Cognitive Science

Graduate Certificate Program in Cognitive Science at the University of Delaware

Beginning August 2011

What follows is the proposal and description of the certificate program

Proposing Departments: Linguistics & Cognitive Science and Psychology

Proposing members: Fred Adams (Ling & Cog Sci), Anna Papafragou (Psych)

Participating departments: Anthropology*, Mathematical Sciences, Computer and Information Sciences, Education, Linguistics & Cognitive Science, Philosophy*, Physical Therapy, and Psychology. (*Contribute courses, but currently have no graduate programs)

Statement of Purpose

University of Delaware departments with graduate students interested in one or more aspects of cognitive science include: computer science, health & exercise science, mathematics, linguistics & cognitive science, psychology, school of education, and possibly some departments in engineering. Students attaining graduate degrees and applying for external funding in these departments would benefit academically because this would open opportunities that are currently available but not easily achieved without the lack of an administrative structure. A formal structure like this is good for students and faculty alike and could lead to students better attaining the breadth that will possibly broaden their research approach and certainly enhance their teaching breadth (good for jobs) – on the market it will make them better in their interviews with a broader set of researchers, and thus more competitive in that sense.

The field of cognitive science cuts across all of the fields of the participating departments above. In addition, cognitive science can include interest from students in wildlife ecology and animal and food science (where many students are interested in animal cognition). Many of the most respected universities in the field of cognitive science have graduate certificate programs in cognitive science, including: the University of Buffalo, University of Colorado, University of Central Florida, Florida State University, Georgia Tech, Johns Hopkins, Indiana University, University of Maryland, University of Massachusetts, University of Memphis, UNC-Charlotte, Northwestern, Virginia Tech, and Rutgers. Stanford has a “symbolic systems” program which is their version of this type of program.

The study of cognitive science is inherently interdisciplinary. Novel research happening at the boundaries of the cognitive sciences is generated by certificate programs like these. While students working on Ph.D.s in their disciplines can in principle do cross-departmental research, without an added incentive, there is tremendous pressure to stay confined within one’s silo of expertise. A certificate program like this will provide the catalyst to inspire students to engage in research beyond their home program and learn new skills in the adjoining programs. This program would also enhance cross unit collaboration and interdisciplinary focus across faculty as well. These interdisciplinary ventures tend to inspire new ways of thinking for students and faculty and new avenues of experimental investigation, often unforeseen and often rewarding to both the home discipline and adjoining ones. The cognitive science certificate will promote such interdisciplinary investigation.

Proposed program structure and requirements

Matriculated graduate students in doctoral or masters programs in the departments listed above may apply for admission to the cognitive science certificate program. Applications should be submitted to the steering committee of the certificate program. This committee will be or be a sub-set of the existing cognitive science advisory committee.

*Requirements are completion of 15 credits of graduate level courses selected from the list below.

* Students will take 9-12 hrs outside home department.

* Student must, in consultation with his/her major advisor, submit a plan of study to the cognitive science certificate steering committee as early as possible. The student must have completed no more than six credits of course work towards the certificate when the plan of study is presented. The plan proposed must be accompanied by a cohesive rationale for the specific set of courses included in the plan. The plan must designate a member of the faculty from one of the relevant departments other than the student’s home department as certificate advisor, who must approve the plan of study. (Some grandfathering of current students may be possible as the new program takes effect.)

* The cognitive science steering committee must review each student’s accomplishments at or before the time the student receives the terminal degree in the home department, and if the student has fulfilled the requirements, approve the awarding of the certificate.

*The courses below are those that qualify for the program. Additional courses may be added to the list or removed from the list during each academic year, with oversight of the steering committee.

Administrative Structure

The cognitive science certificate steering committee will be comprised of one faculty member of each department involved in the program (listed above). Departments will select faculty for two-year terms of service. There can be consecutive terms of service. The steering committee will elect a committee chair, who will call meetings and co-ordinate activities. Departments not currently participating may petition the steering committee for inclusion and for inclusion of qualifying courses.

This program will require no new resources (though we would accept contributions by deans or departments for funds for activities, as appropriate). The participating departments will advertise the program on their web pages. Certificates will be awarded during departmental commencement activities each spring semester.

Sample format of plan of study:

Student Name:

Major Department:

Application date:

Expected date of receipt of terminal degree (masters or doctoral)

Proposed courses from list of approved courses:

Dept	Number	Title	If already taken	Semester	Grade	Date (to be) taken
1)	_____	_____	_____	_____	_____	_____
2)	_____	_____	_____	_____	_____	_____
3)	_____	_____	_____	_____	_____	_____
4)	_____	_____	_____	_____	_____	_____
5)	_____	_____	_____	_____	_____	_____

Rationale: Provide a rationale for the proposed courses, describing how they constitute a coherent approach to cognitive science. Provide course descriptions and justifications.

Major Program Advisor: _____ Department: _____

Certificate Advisor: _____ Department: _____

Signature of Certificate Advisor: _____ date: _____

Signature of applicant: _____ date: _____

List of Qualifying Courses for the Graduate Certificate in Cognitive Science

Anthropology

Anth 666 Independent Study

Computer and Information Sciences

CISC 618 Artificial intelligence

CISC601 Elements of the Theory of Computation

CISC681 Artificial Intelligence

CISC886 Multi Agent Systems

Education

- EDUC 821: Cognition and Instruction
- EDUC 823: Learning and Development
- EDUC 820: Contexts for Learning

- EDUC 848: Language Acquisition
- EDUC 802: Seminar in Reading
- EDUC 807: Writing Processes in Educational Settings
- EDUC 816: Literacy Problems
- EDUC 833: Research and Theory of Mathematics Learning
- EDUC 834: Research and Theory of Mathematics Teaching
- EDUC 835: Research and Theory of Mathematics Curriculum
- EDUC 817 Individual Intelligence Testing
- EDUC 870 Child Neuropsychology

Linguistics & Cognitive Science

CGSC 604 Animal minds

CGSC610 Embodied cognition

CGSC 611 Naturalized semantics (Pending)

CGSC 850 Topics in experimental methods

CGSC 618 Meaning and language use

CGSC620 Research methods in cognitive science

CGSC 650 Recent topics in the philosophy of mind

CGSC 651 Topics in cognitive science

CGSC 670 Elements of cognitive science

CGSC 671 Discovering human language: Introduction to field linguistics

CGSC 685 Seminar in cognitive science

CGSC 696 Psycholinguistics

CGSC 850 Topics in experimental methods

CGSC 890 Studies in Linguistics

LING 651 Logical Structures in Language

LING 604 Structure of language

LING 691 Semantics

LING 651 Logical Structures in Language

Physical Therapy

PHYT 623 Clinical Neuroscience

Philosophy

PHL 866 Special Problems

Psychology

Neuroplasticity PSYC467/667; now goes under NSCI631 Current topics
in Neuroscience

NSCI 631 Learning, Memory & Brain

NSCI 631 Developmental Behavioral Neuroscience

NSCI 631 Seminar on spatial cognition

NSCI 631 Stress and the Brain

Integrative Neuroscience I (NSCI629)

PSYC860 Psychological Statistics

PSYC809 Research Design

Psyc 806 (Social Cognition)

PSYC 642 Mental representation and memory

PSYC 667 Seminar on Language and Cognition

PSYC667-010 Seminar: Visual Cognition

PSYC 667 Early Perceptual-Cognitive Development

PSYC 867 Cognition, Emotion, & Individual Differences

PSYC 633 Cognitive Neuroscience (proposed)

4) Word Play—in the Infant Language lab

WordPlay

Word

Our laboratory focuses on the very origins of language learning. When infants hear a sentence, how do they know where one word ends and another begins? How do they learn the *meanings* of the words? How do they know whether a new word is the name for an object, a property, or an action? How can parents help their children develop language? These are just some of the questions that have fascinated us over the years.

Play

We are also interested in how children learn about their world through play. Play is a key tool in your child's development. We are asking a range of questions about the benefits of play. What do children learn about shapes from playing with toys like blocks? How do parents talk to their children about shapes? Do electronic toys help children learn more than traditional toys or are the manufacturer's claims unfounded?

This newsletter is dedicated to the thousands of families who have participated in our studies. Without you, none of our research would be possible! It is your support that allows our lab to

continue making progress in understanding how children learn language and how they benefit from playful interaction with you! We sincerely **thank you** for your visits!

Newsletter of The Infant Language Project

What Are We Doing?

Word

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Our New Grant

Shape Up: Preschoolers' Knowledge of Spatial Concepts and Future Mathematics Achievement is our new federal stimulus grant from the National Institutes of Health to study what preschoolers know about shapes like circles and squares. We plan to study about 150 preschool children over the next year. We want to understand how to better teach preschoolers about geometric forms in an engaging and motivating way by first probing what they bring to the table! Playing with puzzles and blocks – especially with your help -- feeds into what your child knows about shapes and space.

Current Research

Baby Statisticians!

How do babies make sense of the world? In this study, we show infants a starfish performing different actions for two minutes. We then show them groups of actions they saw, and groups they didn't see. Believe it or not, at 7 months, babies can find statistical patterns in what they see to figure out which groups of actions are new and which are old! You would have never guessed that you had a little statistician at home! This can only help children patterns in the language they hear.

Traveling Starfish

We show children two videos side by side of a starfish traveling across a screen. After momentarily disappearing behind a gray bar, both starfish reemerge. One starfish changes his action while the other continues to do the same thing. We want to see if babies prefer the continuous or the changing action. Turns out that infants look more at the changing action at 7 months! This is harder than it sounds, as the babies must be able to track the starfish as they move, know that they will emerge from behind the bar, remember what they saw before, and then notice that this is different! Sounds exhausting, but they can do it!

For more see www.udel.edu/ILP