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Education

Fall 2004-Present

Indiana University Bloomington, IN, USA
Graduate student pursuing PhD in Philosophy with minor in cognitive science.
Degree expected August 2010
Dissertation Title: Learning from Mistakes—a Neo-Dretskean Theory of Content
Chair: Colin Allen

Fall 1999-Spring 2004

Texas Tech University, Lubbock, TX, USA
BS in Computer Science with Highest Honors, May 2004
BA in Philosophy with Highest Honors, May 2004
Thesis: “Answer Sets as Possible Worlds: An Analysis of P-Log”
Directors: Michael Gelfond (computer science) and Rob Rupert (philosophy)

Areas of Specialization

Philosophy of mind, philosophy of cognitive science

Areas of Competence

Philosophy of science, artificial intelligence, computational logic

Grants

- NEH Digital Humanities Grant for 2009-2011 with Colin Allen (PI) and Mathias Niepert (co-authored awarded proposal) \$400,000
- NEH Digital Humanities Initiative Startup Grant for 2007-2008 with Colin Allen (PI) and Mathias Niepert (co-authored awarded proposal) \$29,800
- IUB New Horizons Grant for 2006-2007 with Colin Allen (PI) and Mathias Niepert (co-authored awarded proposal) \$43,000

Awards and Fellowships

- IUB College of Arts and Sciences Dissertation Year Fellowship, Fall 2009-Spring 2010

- Nelson Dissertation Fellowship, IUB Department of Philosophy, Fall 2008-Spring 2009
- Travel grant from DAAD (German Academic Exchange Service) to attend International Center for Computational Logic Summer School on Computational Logic and Cognitive Science, Dresden, Germany August 23-September 6, 2008
- IUB Philosophy Department Oscar R. Ewing Memorial Essay Award for “Inherence, Paronymy, Transitivity: Mountains and Molehills in the *Categories*”, 2005-2006
- IUB Philosophy Department Award for Graduate Academic Excellence, 2005-2006

Scholarly Publications

Refereed

- Buckner, C.**, Niepert, M., & Allen, C. (Forthcoming). From encyclopedia to ontology: Toward dynamic representation of the discipline of philosophy. Forthcoming in *Synthese*.
- Niepert, M., **Buckner, C.**, and Allen, C. (2009). Working the Crowd: Design Principles and Early Lessons from the Social-Semantic Web. In Proceedings of the Workshop on Web 3.0: Merging Semantic Web and Social Web at ACM Hypertext, Turin, Italy, 2009.
- Allen, C., **Buckner, C.**, & Niepert, M. (2008). The World is Not Flat: Expertise and InPhO. First Monday [Online], Volume 13 Number 8 (20 August 2008).
- Niepert, M., **Buckner, C.**, Murdock, J., & Allen, C. (2008). InPhO: A System for Collaboratively Populating and Extending a Dynamic Ontology. In *Proceedings of the 8th ACM/IEEE Joint Conference on Digital Libraries (JCDL)*, Pittsburgh, Pennsylvania, page 429, ACM Press, 2008.
- Niepert, M. **Buckner, C.** & Allen, C. (2008). Answer set programming on expert feedback to populate and extend dynamic ontologies. In *Proceedings of 21st FLAIRS*. AAAI Press; 500-505.
- Niepert, M., **Buckner, C.**, and Allen, C. (2007). A dynamic ontology for a dynamic reference work. In Rasmussen, E.M., Larson, R.R., Toms, E., and Sugimoto, S. *Proceedings of the 7th ACM/IEEE-CS Joint Conference on Digital Libraries*, Vancouver, BC, Canada, June 18-23, 2007, pp. 288-297.

Invited

- Weinberg, J., Gonnerman, C., **Buckner, C.**, and Alexander, J. (Forthcoming). Are Philosophers Expert Intuiters? Forthcoming in *Philosophical Psychology*. (Author order reverse alphabetical).
- Buckner, C.**, Shriver, A., Crowley, S. & Allen, C. (2009). How ‘Weak’ Mindreaders Inherited the Earth. Commentary on Peter Carruthers article, How we know our own minds: The relationship between mindreading and metacognition. *Behavioral and Brain Sciences* 32 (2):140-141.
- Buckner, C.**, Niepert, M., and Allen, C. (2007). InPhO: The Indiana Philosophy Ontology. In the *American Philosophical Association Newsletter on Philosophy and Computers*, Spring 2007, Vol 6, No. 2.
- Buckner, C.** (2005). The Guessing Game: Teaching Computer Studies in Savusavu, Fiji. *The Successful Professor*, Volume 4, Issue 2, April 2005.

Scholarly Presentations

Refereed

“How I Learned to Stop Worrying about Mental Causation and Love the Hippocampus”—
Presented at the 2009 meeting of the **North American Association for Computing and Philosophy**, June 16, 2009, Bloomington, IN.

“Heuristics Are a Natural Kind”—Presented at the 2009 meeting of the **Society for Philosophy and Psychology** (SPP), delivered on June 13, 2009, Bloomington, IN.

“Identifying Psychology’s Kinds: A Case Study in Why Neural Mechanisms Matter”—
Presented to the **Midsouth Philosophy Conference**, Memphis, TN, April 17, 2009.

“Intentional Explanation and the Sciences of Animal Behavior” – Presented at the 2008 meeting of the IUB **Center for the Integrative Study of Animal Behavior** (CISAB), Bloomington, IN, April 2008.

“A Dynamic Ontology for a Dynamic Reference Work”— With Mathias Niepert, presentation at **Joint Conference on Digital Libraries 2007** in Vancouver, June 20, 2007.

“The Role of Rationality in Cognitive Science” – Poster at the 2007 meeting of the IUB **Center for the Integrative Study of Animal Behavior** (CISAB) April 2007.

Invited

“Learning from Mistakes: A Neo-Dretskean Theory of Content”—Annual Nelson Lecture, presentation delivered to the **IUB Department of Philosophy**, Bloomington, IN, April 24, 2009.

“How I Learned to Stop Worrying about Mental Causation and Love the Hippocampus” –
Presented to the **Indiana University Coglunch lecture series**, Bloomington, IN, March 25, 2009.

Comment on Marcello Guarini’s presentation “Fodor’s Analysis of Neural Network Behavior” at the 2008 meeting of **North American Conference on Computers and Philosophy**, Bloomington, IN, June, 2008.

“An Introduction to the Indiana Philosophy Ontology Project” –Presented at the 2007 Meeting of the **North American Association for Computers and Philosophy**, Chicago, July 28, 2007.

“Inferential Heuristics: Modeling the Mind’s Good, Bad, and Ugly” – With Leah Savion, Philosophy Department Colloquium at the **University of Cincinnati**, February 2005.

“Concerning a Point of View on Heuristics” – With Leah Savion, Presentation to the **Experimental Epistemology Laboratory**, Indiana University, November, 2005.

“The Motley Crew of Inferential Heuristics” – With Leah Savion, Presentation to the **Indiana University Logic Group**, December, 2004.

Teaching Experience

- Instructor (full course responsibilities)
 - Introduction to Philosophy: Appearance and Reality—Large enrollment (90 students) with duties supervising 2 assistants (Spring 2008)
 - Introduction to Ethic (Fall 2007)

- Associate Instructor
 - Introduction to Symbolic Logic (Savion)
 - Fall 2006, discussion sections and grading
 - Introductory Symbolic Logic (Kaplan)
 - Spring 2006, grading
 - Introduction to Philosophy (Leite)
 - Fall 2005, discussion sections and grading
 - Fall 2005 (8 week course) grading
 - Introduction to Ethics (Shapshay)
 - Spring 2005, grading
 - Fall 2004, discussion sections and grading

Volunteer Teaching

Current Volunteer Activities

- Volunteer at PALS (People and Animals Learning Services) non-profit Equestrian Therapy for children and adults with physical, learning, cognitive, and/or emotional disabilities. Assist with riding lessons and horse grooming/training, May 2008-present.

Previous Activities

Summer 2005

- Volunteer Teacher, Savusavu Secondary School, June 2005-Aug 2005.
 - Taught two computer studies courses, grades 11-12 U.S. equivalent, assisted other instructors with assignment and lecture design.
- Volunteer Teacher, St. Bede's College, June 2005-Aug 2005.
 - Taught two computer studies courses, grades 9-10 U.S. equivalent.

Summer 2004

- Volunteer Teacher, Savusavu Secondary School, June 2004-Aug 2004
 - Taught two computer studies courses, grades 11-12 U.S. equivalent.

Courses I am Prepared to Teach

- Introductory undergraduate courses
 - Introduction to Philosophy
 - Introduction to Ethics
 - Introduction to Symbolic Logic
 - Thinking and Reasoning
- Intermediate or advanced undergraduate courses
 - Philosophical Foundations of Cognitive Science
 - Philosophy of Mind
 - Philosophy of Science
 - Wittgenstein's Philosophical Investigations
 - Minds, Brains, and Machines
- Advanced undergraduate/graduate courses
 - Contemporary Theories of Mental Content
 - Heuristics and Rationality
 - Philosophical Foundations of Cognitive Science

- Philosophy of Psychology
- Animal Cognition
- Experimental Philosophy

Courses I Could Teach with Advance Notice

- Philosophy of Language (advanced undergraduate)
- Kant's Ethics (advanced undergrad)
- History of Comparative Psychology (advanced undergrad/grad)
- Advanced Symbolic Logic (undergrad/grad)
- The Wisdom (and Madness) of Crowds (outreach course)
- What Is Rationality? (outreach course)

I am also interested in team-teaching courses with faculty from psychology, neuroscience, business and finance (e.g. "Money and the Brain"), and communications (e.g. "The Rhetoric and Psychology of Advertising").

Graduate Coursework (* indicates audited)

Philosophy

- P730: Philosophy of Mind (O'Connor)
- P570: Naturalism and the Mind (Weinberg) *
- P570: Experimental Philosophy (Weinberg)
- P520: Truth and Vagueness (Weiner)
- P730: Truth and Words (Ebbs)
- P590: Wittgenstein's Philosophical Investigations (Leite)
- P570: Nature and Nurture in Philosophy of Biology (Stotz)
- P505: Logical Theory (Weiner)
- P515: The Medieval Problem of Universals (Spade)
- P512: Aristotle (Morgan)
- P540: Contemporary Ethical Theories (Toh)
- P540: Kant's Ethics (At Texas Tech University) (Schaller)

Cognitive Science

- Q540: Philosophical Foundations of Cognitive Science (Allen)
- X755: Animal Cognition (Allen)
- Q700: History & Philosophy of Comparative Psychology & Ethology (Allen)
- Q700: Analogy and Cognition (Hofstadter)
- L546: Formal Semantics (Moss)
- Q560: Experimental Methods in Cognitive Science (Jones)

Organizations and Professional Service

- Associate, Behavior & Brain Sciences (2009-present)
- Member, American Philosophical Association (2009-present)
- Member, International Association for Computing and Philosophy (2008-present)
- Texas Action Group, 2007-present
- Reviewer, North American Association of Computers and Philosophy (NA-CAP) 2009-present.

- President of IUB Graduate Association of Student Philosophers (GASP), Fall 2008-Spring 2009
- Graduate student representative for Philosophy Department Graduate Curriculum Committee, Fall 2007-Spring 2008
- Experimental Epistemology Laboratory, Indiana University, Group Leader Jonathan Weinberg. Spring 2005-Present
- SPACKLED - Study group for the Philosophy/Psychology of Animal Cognition, Knowledge, Learning, Evolution, and Development Spring 2005-Present
- IUB Philosophy of Mind Reading Group, organizer 2007-2009

Work in Progress

“Heuristics Are a Natural Kind”

Abstract: Research on inferential heuristics stands out in current cognitive science as being both highly successful and in very little agreement about the nature of its central posits. When scientists enter into ontological disagreement about the nature of their phenomena of interest, it can be useful to ask whether any of their candidate definitions succeed in picking out a natural kind. I thus approach old debates about heuristics from a new perspective by asking the question, “Do heuristics form a natural kind?” A review of current neuroscience of category learning allows us to locate homeostatic processes which reliably produce representations possessing a set of characteristic properties. Similarity assessments operating on these representations will in turn possess the suite of properties typical of heuristics: speed, computational efficiency, a focus on small sets of ecologically-valid cues, and a small but usually manageable bias. These homeostatic processes satisfy Richard Boyd’s criteria for natural kinds, and thus support my central claim: that at least some heuristics, which I dub natural heuristics, form a natural kind. The implications of this claim for existing debates are then briefly explored.

“Identifying Psychology’s Kinds: A Case Study in Why Neural Mechanisms Matter”

Abstract: Edouard Machery has recently argued that concepts are not a natural kind, and thus that psychologists should instead focus on exemplars, prototypes, and theories. Machery’s approach, however, may appear problematic if these more basic posits are not themselves natural kinds. This paper investigates whether prototypes are a natural kind, considering two prima facie threats to this conclusion: that prototypes and ideal models grade smoothly into one another without a sharp dividing line and that significantly diminished analogues of prototypes may be acquired by subjects with hippocampal lesions. Hope for the conclusion that a type of representation very much like prototypes is a natural kind finds support, but attention to neuroscientific details proves critical.

“Forward-Looking and Backward-Looking Accounts of Misrepresentation”

Abstract: Naturalized theories of content have had a difficult time accommodating misrepresentation. Much of this difficulty stems from the fact that many of these theories have looked exclusively to the past to fix the content of representations. Focusing on Fred Dretske’s view, I briefly discuss three problems with his “backward-looking” account—that it fails to accommodate most examples of misrepresentation, that it ignores aspects of the organism’s present and future behavior which are relevant to determining whether

misrepresentation has occurred, and that it fails to predict and explain responses to errors. Finally, I sketch my own “forward-looking” account, drawn from current cognitive neuroscience of the hippocampus, which holds that content is determined by a revision trajectory in the hippocampal network and that talk of misrepresentation should be cashed out in terms of a mistaken tokening of a concept on the way to a more complete grasp of it.

References

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Dissertation Abstract

Learning from Mistakes: A Neo-Dretskean Theory of Mental Content

Suppose that the bananas are slightly out of reach, and Sally the chimpanzee stacks two crates on top of each other in order to reach them. Consider the following explanation of Sally’s behavior: “Sally stacked the crates because she desired the bananas and believed that stacking the crates would allow her to reach them.” In this explanation, it is because Sally has a desire to *reach the bananas* and a corresponding belief that *stacking the crates would allow her to do so* that she acts as she did. Following Brentano’s work on the intentionality of mental states, I will call explanations in which contentful mental states are critical “intentional” explanations of behavior, and the science which specializes in them “intentional psychology”.

Intentional explanations are routinely deployed in folk discourse, and have also found use in psychology and ethology. These explanations, however, have been met with skepticism by many philosophers and scientists. This skepticism comes from two main sources. For one, “meaning skeptics” (including philosophers such as Quine and Davidson and psychologists such as Heyes and Dickinson) have doubted the possibility of devising objective empirical methods to assign unequivocal semantic contents to mental states. On the other hand, “semantic causation skeptics” (most notably Stich)

have doubted the possibility that intentional explanations could be real *explanations* at all, since real explanations must identify causes. The problem is that *meaning* doesn't seem to be the sort of thing that could itself have causal powers.

Adequately addressing this skepticism about intentional explanations requires addressing its two sources, and thus can be broken down into two highly interconnected projects: to specify the natural properties or relations which constitute the content of a mental state, and to locate the causal relevance of that content to the production of behavior. I will refer to these two projects together as the problem of mental content.

Much of the work on the problem of mental content in the latter half of the Twentieth Century has been conducted under the auspices of a cluster of views I call Classical Computationalism (CC). CC answers the causal relevance question by holding that mental states have a syntax corresponding to their semantics, and then by positing computational processes of reasoning which operate on mental states in virtue of their syntax. These processes typically take the form of the classically-valid inferential procedures found in logic or decision theory. This approach is at odds with a large amount of work in human and animal psychology: despite extensive investigation, no nonlinguistic animal to date has demonstrated the ability to master a single rule of logic or decision-theory, and it appears the majority of the inferences of nonlinguistic animals (and linguistic humans as well) are driven instead by classically-invalid heuristics. Nevertheless, I contend, behaviors driven by heuristics demonstrate the kind of adaptive flexibility which merits intentional ascription. There is thus a strong drive to develop a model of "minimal intentionality" which does not rely on classical methods of "rational" inference.

Fred Dretske's (1988) approach to intentional explanation stands out in having no need for logic or decision theory. Dretske's approach is driven by several ingenious innovations. First, Dretske distinguishes "triggering" and "structuring" causes of behavior; *triggering* causes are the proximate neural events which cause the bodily movements in which the behavior terminates, whereas *structuring* causes produce the background conditions in which neural events of that kind cause movements of that sort. Second, he takes indication (in the sense that "smoke indicates fire") as the fundamental semantic relation. Finally, he interprets reinforcement conditioning as a process which is sensitive to the semantic properties of neural states, recruiting them to positions of behavioral control in virtue of their abilities to indicate their contents. Dretske thus provides answers to the two parts of the problem of mental content: the content of a mental state is whatever it indicated which caused it to be recruited by reinforcement learning to control certain bodily movements in response to certain stimuli, and their contents are causally relevant to behavior by being one of its structuring causes.

Despite its ingenuity, Dretske's approach suffers from a number of well-known problems. The most glaring problem is that behaviors driven by simple conditioning are too inflexible to merit intentional explanation. The view's reliance on reinforcement conditioning also results in a number of other limitations, such as requiring an unrealistically high degree of indication in early stages of learning to settle content indeterminacy, having difficulty making sense of latent and observational learning, and an inability to generalize to the more complex forms of behavior which *do* merit intentional ascription. Finally and perhaps most significantly, his view is unable to adequately make sense of misrepresentation. Although it opens up conceptual space in

which error is possible, the position offers no resources by which we can make sense of an organism's responses to errors or of the corresponding improvement in a representation's ability to indicate which occurs in response. The central problem is that the view lacks a criterion of content ascription that preserves identity of content across revisions of representational vehicle.

My approach takes Dretske's key insights and applies them to the more advanced forms of learning which occur in the mammalian hippocampal system (and functional analogues). Like Dretske, I take meaning to have a causal influence on behavior in virtue of learning being a process causally sensitive to semantic (indicator) properties. Sustained and careful engagement with the cognitive neuroscience of hippocampal learning and connectionist models of hippocampal function reveals a picture of learning in which representations are continuously revised to improve their causal contact with their contents. The result is a naturalized theory of content which can preserve unity of content across dramatic revisions of representational vehicle, and which can handle a number of standard cases and objections better than alternatives.