Teaching Portfolio

Justin D'Ambrosio
Research Fellow
Language of Consciousness Project
Australian National University

September 4, 2018

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1 Teaching Statement

In my view, teaching philosophy to undergraduates should begin by helping them to see that in our ordinary lives, we take answers to many deep philosophical questions for granted. We often fail to recognize that we are making substantive philosophical decisions either because we fail to realize the depth of certain questions, or because we have failed to recognize that there are questions there in the first place. Philosophy teachers should help to point out these questions, help students appreciate their depth, and then call students' awareness to the answers that they may implicitly endorse. This process of pointing out and examining commitments is essential to the justification of our believing and acting as we do. Insofar as philosophy teachers do this, the philosophical education that they help to foster can be seen as one that broadens the consciousness of their students.

Logic is perhaps the most basic tool with which a teacher can equip her students that will help them uncover their implicit philosophical commitments. I have taught logic extensively, both at an introductory level and at an advanced mathematical level, and to students ranging from high school freshmen to PhDs in philosophy. In 2010 I constructed and taught a course called Logic and Reasoning that combined the rigor of a formal logic course with extensive practice reasoning and making distinctions in natural language. On the first day, I asked students to state one of their beliefs, give a reason why they held that belief, and then state one claim that they thought followed from that belief. We later went on to formalize both of those relations in a deductive calculus, and then deduce other, sometimes surprising consequences of the original belief. The informal part of the course was guided by Jamie Whyte's book *Crimes Against Logic*. One assigment was to construct and present an argument that exhibited one of the any fallacies Whyte outlines, but to still attempt to convince the class of its conclusion. The subject-matter of the argument had to be drawn from current events, or from related political and ethical issues. My students both enjoyed and excelled at this, and constructed many subtly fallacious but still persuasive arguments. Ultimately, the interaction between my students' use of a formal system and and their practice reasoning in natural language deepened their facility with both. You will find a modified syllabus from this class below.

In the Spring of 2014 I was a teaching fellow for Infinity, a class on the mathematical and philosophical underpinnings of the notion of the infinite. My teaching in this class, perhaps more than in any other, involved pointing out that things we do on an everyday basis—things as simple as *moving*—presuppose resolutions to philosophical puzzles concerning the infinite, and that far from being trivial, these puzzles are deeply revealing of the nature and mathematics of space and time. The course began by discussing the mathematics of countably infinite sets—for instance, the naturals, the rationals, and the algebraic numbers—and then the distinctive features of sets that are uncountable, such as the set of real numbers. We then discussed the paradoxes of the infinite, with a close eye to whether the mathematics we had introduced provided a solution to the paradoxes, or merely the appearance of a solution. This pushed students to carefully and critically examine many mathematical concepts and definitions that they were using in other classes. In leading discussion sections, I created supplementary handouts that explained infinitary mathematics in further detail, and clarified the relationships between mathematical representations and the underlying metaphysical reality.

In the Spring of 2016, as a result of completing the Mellon Interdisciplinary Concentration in the Humanities, I was awarded the opportunity to construct and co-teach an interdisciplinary class with my advisor, Zoltán Gendler Szabó. The title of the class was "Intentionality", and it attempted to address the nature of representation and aboutness from within philosophy of mind and philosophy of language, while incorporating work from psychology and linguistics. Classes often began as a dialogue between Zoltán and me, with one of us being the primary presenter and the other serving to raise objections and provide background information. This setup drew students into the discussion, since classes were never purely lectures. Rather, the class was essentially a discussion, and students felt free to interject to support one of the positions we had taken or to establish their own. Much of the class focused on the puzzles of intentionality, especially the question of how our representations can be *about* things that don't exist. This puzzle underlies huge portions of our everyday thought and talk—our goal was to exhibit the different possible views of aboutness, and show how they figure into theories of linguistic communication and psychological explanation. As you will see in the student evaluations, the course was extremely successful; you will find both a syllabus and handouts from the course in the following sections.

In the spring of 2018, together with Renée Jorgensen Bolinger, I designed a course titled "Social Categorization and Social Inference", which Renée and I then co-taught to a group of ANU's PhD students. The course focused on the epistemic problems that arise when we categorize the social world, and use our categorizations to draw inferences. We began with an overview of the semantics of generic statements and the role they play in our social cognition. We then moved on to discuss the rational flaws in certain kidns of social and statistical inferences. We read papers on the reference-class problem, epistemic problems with accurate statistical beliefs, the difference between statistical and individualized evidence, the right to be treated as an individual, moral encroachment on belief, and the legal issues raised by these epistemic issues. Through intense discussion, the course was able to bring into focus the ways that language and social cognition can have epistemically questionable and morally dangerous effects in the social world. Designing and teaching the course expanded my breadth as a philosopher and a teacher, and was the high point of my experience as an educator. You will find the syllabus for the course below.

PHIL2061: Philosophy of Mind

Semester 2, 2018

Justin D'Ambrosio

justin.d'ambrosio@anu.edu.au

Course Description

This is an introductory course on the Philosophy of Mind. The course will be divided into three sections: (1) metaphysics of the mental, (2) consciousness, and (3) intentionality.

Metaphysics of the Mental This section will cover issues concerning the metaphysics of mental states, such as the following: are mental states identical to physical states? or are they states of a totally different substance? if so, how does this substance interact with the body? Does this distinction rest on a mistake that we can correct by examining how we apply mental terms? Are we confused when we talk about the metaphysics of mind? Are mental states functional states?

Consciousness One major view of what makes the mind distinctive is that it is conscious. This view faces serious objections. But even if this is not the defining feature of the mental, consciousness is still a deeply puzzling feature of mentality. This section will cover several views on the nature of consciousness, along with issues concerning the subjectivity, or "qualitative character" of experience. Is there an irreducibly subjective element to experience? How hard is the problem of consciousness? Do we even know what a theory of consciousness would look like?

Intentionality The other major position on what is distinctive about the mind is that it exhibits intentionality: it represents things. How it comes to represent, though, is not so clear. This section will focus on theories of intentionality. Intentionality is characterized by certain peculiar features, including the ability to represent objects that do not exist. The question of how we manage to represent the non-existent is called the puzzle of non-existence, and it causes problems for other views of how it is that the mind comes to represent.

Course Requirements

Most of our readings will come from the following text:

David Chalmers: *Philosophy of Mind: Classical and Contemporary Readings*, Oxford: Oxford University Press (2002). All of the readings will be posted on Wattle. The readings won't be long, but many may be difficult. You are expected to do them fully and carefully before the class for which they are listed so we can discuss them during class.

10% of your grade will be class participation. The remaining 90% will be based on the following material:

Essay 1: (40%) 2,000 words. Essay questions will be posted on Wattle on 12/08/18.

Essay 2: (50%) 2,500 words. Essay questions will be posted on Wattle on 7/10/18.

Course Structure and Readings

METAPHYSICS OF THE MENTAL

Week 1: Introduction and Dualism

1.1
- Required: Chalmers, David (2002). *Philosophy of Mind: Classical and Contemporary Readings*, Oxford University Press, USA, (Introduction)
- Further reading: Clark, Andy, Mindware: An Introduction to the Philosophy of Cognitive Science (Introduction)

1.2
- Required: Dualism - Descartes: Meditations II and IV (in PoM)
- Required: Robinson, Howard (2015). "Dualism" *Stanford Encyclopedia of Philosophy.*
- Further reading: David Braddon-Mitchell and Frank Jackson, Introduction to Philosophy of Mind and Cognition, Ch. 1

Week 2: Behaviorism

2.1
- Required: Ryle, Gilbert (1949). "The Concept of Mind." University of Chicago Press. [Extract: "Descartes' Myth"]
- Further reading: "Behaviorism", *Stanford Encyclopedia of Philosophy*
- Putnam, Hilary (1963). "Brains and Behaviour." in Butler, Ronald (ed.), "Analytical Philosophy: Second Series." Blackwell.

2.2
- Required: Dan Dennett: "True Believers: The Intentional Strategy and Why it Works"
- Further reading: Chomsky, Noam (1959), "A Review of B.F. Skinner's Verbal Behavior"

Week 3: The Identity Theory

3.1
- Required: U.T. Place: "Is Consciousness a Brain Process?", in Chalmers (2002)
- Required: J.J.C. Smart: "Sensations and Brain Processes" (included with the above link)
- Further reading: Herbert Feigl: "The Mental and the Physical"
- Further reading: J.J.C. Smart: "The Mind/Brain Identity Theory", *Stanford Encyclopedia of Philosophy*

3.2
- David Lewis: Psychophysical and Theoretical Identifications (in PoM)
- Saul Kripke, Naming and Necessity, excerpts

Week 4: Functionalism

4.1
- Required: Sterelny, Kim (1991). *The Representational Theory of Mind: An Introduction* (1st ed.) Wiley-Blackwell. [Chapter 1 only]
- Further reading: Levin, Janet (2018): "Functionalism", Stanford Encyclopedia of Philosophy
- Further reading: Polger (2008) "Functionalism." Internet Encyclopedia of Philosophy

- Further reading: Lycan, W. G. (1981). "Form, function, and feel." The Journal of Philosophy, 2450.

4.2
- Required: Putnam, Hilary (1975). "The Nature of Mental States." in Putnam, H. (ed.) *Philosophical Papers Volume 2 , Mind, Language and Reality*, Cambridge University Press: 429-440 (originally published as "Psychological Predicates", 1963).
- Further reading: Lewis, David (1980). "Mad Pain and Martian Pain." in Block, N. (ed.) *Readings in the Philosophy of Psychology, Vol. I*, Harvard University Press: 216-223

Week 5: Troubles with Functionalism, Eliminativism

5.1
- Required: Block, Ned and Fodor, Jerry: "What Psychological States are Not", The Philosophical Review, Vol. 81, No. 2.
- Further reading: Block, Ned (1978). "Troubles with functionalism." in Savage, C. W. (ed.) *Perception and Cognition*, University of Minnesota Press: 261-325.

5.2
- Required: Churchland, Paul (1981). "Eliminative Materialism and the Propositional Attitudes", The Journal of Philosophy 78 (2)

Consciousness

Week 6: Consciousness and the Explanatory Gap

6.1
- Required: Chalmers, David (1996), The Conscious Mind, Ch. 1
- Required: Chalmers, David (1995). "Facing up the problem of consciousness." Journal of Consciousness Studies 2(3): 200-219
- Further reading: Seager, William (1995). "Consciousness, Information, and Panpsychism." Journal of Consciousness Studies 2-3: 272-88
- Further reading: Nagel, Thomas (1979). "Panpsychism." in Nagel, T. *Mortal Questions*, Cambridge University Press

6.2
- Required: Nagel, T. (1974). "What is It Like to Be a Bat?", in *Philosophical Review* 83: 435-450
- Further reading: Levine, Joseph (1983). "Materialism and Qualia: the Explanatory Gap." Pacific Philosophy Quarterly 64: 354-361
- Levine, Joseph (1993). "On Leaving Out What It Is Like." in Davies, M., & Humphreys, G. W. (eds.) *Consciousness: Psychological and Philosophical Essays*, Blackwell: 121-136

Week 7: The Conceivability Argument

7.1
- Required: Chalmers, David (1996), The Conscious Mind, Ch. 3,4
- Further reading: Kirk, Robert (2015). "Zombies." Stanford Encyclopedia of Philosophy.
- Further reading: Byrne, Alex (2015). "Inverted Qualia." Stanford Encyclopedia of Philosophy.

7.2
- Required: Dennett, Daniel (1995). "The Unimagined Preposterousness of Zombies." Journal of Consciousness Studies 2: 322326.

- Chalmers, D.J. (2002). “Does Conceivability Entail Possibility?” in Gendler, T. and Hawthorne, J. (eds.) *Conceivability and Possibility*, Oxford University Press: 145-200.
- Katalin Balog: Conceivability, Possibility, and the Mind-Body Problem (online)

Week 8: The Knowledge Argument

8.1
- Required: Jackson, Frank (1982). “Epiphenomenal qualia.” The Philosophical Quarterly 32:127136.
- Further reading: Dennett, Daniel (2006). “What RoboMary Knows.” in (eds.) *Phenomenal Concepts and Phenomenal Knowledge: New Essays on Consciousness and Physicalism* 15.

8.2
- Required: Churchland, P. M. (1996). “The rediscovery of light.” *The Journal of Philosophy*, 211228.
- Required: Lewis, D. (1990). “What Experience Teaches.” In W. G. Lycan (Ed.), *Mind and Cognition*, Blackwell.
- Further reading: Lewis, D. (1995). “Should a materialist believe in Qualia?” *Australasian Journal of Philosophy*, 73(1), 140144.

Intentionality

Week 9: Intentionality and Mental Representation

9.1
- Required: Brentano, Franz: *Psychology from an Empirical Standpoint* (in PoM)
- Required: Crane, Tim: “Intentionality as the Mark of the Mental” (Online)

9.2
- Required: Jerry Fodor: Propositional Attitudes (PoM)
- Required: Jesse Prinz: Furnishing the Mind

Week 10: Internalism vs. Externalism

10.1
- Required: Hilary Putnam: The Meaning of ‘Meaning’ (excerpts from PoM)
- Further Reading: Tyler Burge: Individualism and the Mental

10.2
- Required: Gabriel Segal, A Slim Book about Narrow Content (excerpts)
- Required: Tim Crane: “All the Difference in the World”, *Philosophical Quarterly*, 41:1-25

Week 11: Semantics for Mental Representations

11.1
- Jerry Fodor: Psychosemantics, Preface and Ch. 1 (Online)
- Dan Dennett: Brain Writing and Mind Reading

11.2
- Ruth Millikan: Biosemantics (excerpts in PoM)

Week 12: The Extended Mind

12.1
- Andy Clark and Dave Chalmers: “The Extended Mind”

12.2
- Derek Parfit: “Reductionism and Personal Identity”

Foundations: Social Categorization and Social Inference

Renee Jorgensen Bolinger
Justin D'Ambrosio
Australian National University

May 10, 2018

Course Description

This is a course on social categorization and the inferences that we can and do draw on the basis of these categorizations. Questions concerning social categorization and inference fall at the intersection of a huge number of areas within philosophy and the social and cognitive sciences. These questions can be approached from within metaphysics, epistemology, philosophy of mind, cognitive science, philosophy of language, semantics, ethics, political philosophy, and legal theory, among others. Suffice it to say, we won't be able to cover all of these approaches in a *Foundations* course. Our plan is to introduce you to these problems first through a discussion of *generics*, and then by presenting a related collection of epistemological and ethical issues concerning inferences made on the basis of membership within certain kinds of categories. However, the entire course is oriented around an epistemic goal: when are inferences made on the basis of social categorization rational? But even proposing solutions to our epistemic question will require taking many semantic, cognitive, ethical, and metaphysical detours.

Course Requirements

The only course requirements are that you come to class having read the required readings, and ready to engage in discussion with us and your fellow post-graduate students.

A note about the syllabus: • denotes required reading, while ◦ denotes suggested reading. In one case, we've used both to indicate that we strongly suggest reading part of a paper. Whether required or suggested, the most important readings are listed first. At the end of the syllabus is a list of related readings organized by topic.

Schedule and Readings - SUBJECT TO CHANGE!

1. 17/5 - Generics: Semantics

• Sarah-Jane Leslie and Adam Lerner: Generic Generalizations, in the Stanford Encyclopedia of Philosophy

• Sarah-Jane Leslie - "Generics: Cognition and Acquisition", *The Philosophical Review*, 117(1):1-47, (2008)

•◦ Ariel Cohen - "Generics, Frequency Adverbs, and Probability", *Linguistics and Philosophy*, 22(3):221-253, (1999) - we strongly suggest reading sections 1 and 2.

◦ Ariel Cohen - "Generics and Mental Representations", *Linguistics and Philosophy*, 27(5):529-556, (2004)

◦ David Liebesman - "Simple Generics", *Nôus*, 45(3):409-442, (2011)

◦ Rachel Sterken - "Generics in Context", *Philosopher's Imprint*, 15(21), (2015)

2. 24/5 - Generics Continued: Prejudice

- Sally Haslanger - Ideology, Generics, and Common Ground, in Charlotte Witt, *ed.*, *Feminist Metaphysics*, 179-207, (2011)
- Endre Begby - "The Epistemology of Prejudice", *Thought*, 2(1):90-99, (2013)

◦ Sally Haslanger - "The Normal, the Natural, and the Good", *Political & Societá*, 365-392, (2014)

3. 31/5 - Generics Continued: Essentialism

- Sarah-Jane Leslie - "The Original Sin of Cognition: Fear, Prejudice, and Generalization", in *The Journal of Philosophy*, 114(8):393-421 (2017)
- Jenny Saul - "Are generics especially pernicious?", *Inquiry*, (2017)

◦ Paul Silva - "A Bayesian Explanation of the Irrationality of Sexist and Racist Beliefs Involving Generic Content", *Synthese*, forthcoming.

4. 14/6 - Epistemic Problems with Statistical Inference

- Jessie Munton (ms) - "The Epistemic Flaw with Accurate Statistical Generalizations"
- Colyvan, Regan, and Ferson - "Is it a Crime to belong to a Reference Class?", *Journal of Political Philosophy*, 9(2):168-181, (2001)

◦ Laurence Thomas - "Statistical Badness", *Journal of Social Philosophy*, 32(1):30-41

◦ Alan Hajek - "The Reference Class Problem is Your Problem, Too", *Synthese*, 156(2):536-585, (2007)

◦ Oscar H. Gandy, "Engaging Rational Discrimination", *Ethics and Information Technology*, 12(1):29-42, (2209)

5. 31/5 - Moral Problems with Statistical Inference

- Lara Buchak - *Belief, Credence, and Norms*, *Philosophical Studies*, 169(2):1-27
- Sarah Moss - "Moral Encroachment", *Proceedings of the Aristotelian Society*, forthcoming

◦ Georgi Gardiner, "Evidentialism and Moral Encroachment", in Kevin McCain (*ed.*), *Believing in Accordance with the Evidence: New Essays on Evidentialism*], forthcoming

6. 7/6 - The Importance of Statistical Inference

- Risse & Zeckhauser - "Racial Profiling", *Philosophy & Public Affairs*, 32(2):131-170, (2004)
- Kasper Lippert-Rasmussen - "We are all different: statistical discrimination and the right to be treated as an individual", *The Journal of Ethics*, 15(1/2):47-59, (2011)

◦ Kasper Lippert-Rasmussen - "Nothing Personal: On Statistical Discrimination", *Journal of Political Philosophy*, 15(4):385-403, (2007)

◦ Georgi Gardiner - "Legal Burdens of Proof and Statistical Evidence", in James Chase and David Coady (*ed.s*), *Routledge Handbook of Applied Epistemology*, Routledge, forthcoming

◦ Barbara D. Underwood - "Law and the Crystal Ball: Predicting Behavior with Statistical Inference and Individualized Judgment", 88 *Yale Law Journal* 1408, (1979)

Logic and Reasoning (Introductory Level)

Fall 2016

Justin D'Ambrosio

justin.dambrosio@yale.edu

Course Description

This course is an introduction to logic with both formal and informal components. Its goal is to get you to learn the basic formal concepts from logic and then to help you use them in your reasoning. I hope to get you to see, on the one hand, that logic, as a subject of mathematical investigation, is very beautiful, and that as a tool for analyzing claims and arguments that we encounter every day, it is also very powerful. When we engage with the claims made by, for instance, journalists, politicians, and academics, whether we should believe their claims depends largely on our ability to make distinctions, detect ambiguities, and ultimately test their arguments for validity. Formal systems are not necessary for this kind of critical evaluation, but they are immensely helpful. This class will try to emphasize the status of formal logic as a powerful tool, and so will move back and forth between the introduction of formal logical tools and their applications. Here is a partial list of the things you will know before the term is over:

1. the syntax and semantics of propositional logic and first-order logic;
2. how to do natural deduction in both languages;
3. how to translate a fragment of English into each of the languages, and which portions are not susceptible to such translations;
4. how to detect and capture scope and other kinds of ambiguities;
5. how to detect the traditional fallacies using truth-tables;
6. and how to detect many other common but faulty modes of reasoning.

These tools will help you evaluate the evidence and arguments presented to you by your friends, parents, teachers, and everyone else you know. They provide a scaffold, or a guide, for what you should come to believe, given your other beliefs or other claims that you accept.

Texts

Virginia Klenk: *Understanding Symbolic Logic*
Jamie White: *Crimes Against Logic*

Course Requirements

Problem Sets: (50%) You will be assigned six problem sets during the term, consisting of various exercises both from our texts and elsewhere. They are due on the dates listed on the schedule below. Grades for late problem sets decrease one portion of a grade for each day late. (e.g. A to A- for 1 day late, A to B+ for two days late, *etc.*).

Exams: (50%) There will be one midterm exam, worth 20% of your grade, and one final exam during finals period, worth 30% of your grade.

Schedule

Week	**Topics**	**Readings**
Week 1	Reasons, Premises, and Arguments Argument markers and notation Argument Construction Inductive vs. Deductive Arguments Solving LSAT Problems	*Crimes Against Logic*, Ch. 1 Klenk, pp. 1-18
Week 2	Formal vs. Natural Languages Form vs. Content Logical Words and Logical Symbols Syntax of Sentential Logic vs. English Diagrams of Sentences in SL and English Construct your own formal language	Klenk, pp. 22-31 *Crimes Against Logic*, Ch. 2 “Motives” PS1 due
Week 3	Truth-functions Truth-tables Computing truth-values of complex sentences Object Language and Metalanguage	Klenk, Ch. 3
Week 4	Symbolizing English sentences Introduction to Scope Non-truth-functional words	Klenk, Ch. 4 *Crimes Against Logic*, Ch. 3 “Authority” PS2 due
Week 5	Semantics for Sentential Logic Truth-tables Validity of Arguments Sentential Logic Fallacy Detection Can computers detect fallacies?	Klenk, Ch. 5
Week 6	Consistency and Inconsistency Tautologies, Contradictions, Contingencies Implication, Equivalence Intro to Rules of Inference Fallacies with Conditionals	Klenk, Ch. 6 *Crimes Against Logic*, Ch. 4 PS3 due
Week 7	Introduction to Proofs in SL Rules of Inference and their justifications Basic proof methods The notion of soundness	Klenk, Ch. 7 *Crimes Against Logic*, Inconsistency Midterm!!
Week 8	Replacement rules and their justification Ways proofs can go wrong: equivocation Proof Strategies	Klenk, Ch. 8 *Crimes Against Logic*: Equivocation PS4 due

Week 9	Conditional proof Proof by contradiction Deduction Theorem Suppositions in philosophical argument	Klenk, Ch. 9 *Crimes Against Logic*: Begging the Question
Week 10	A richer language: syntax for Predicate Logic Subject vs. Predicate The square of opposition	Klenk, Ch. 10 PS5 due
Week 11	Modern views of quantifiers Variables and Binding Scope revisited	Klenk Ch. 11 *Crimes Against Logic*: Weasel Words
Week 12	Interpretations for Predicate Logic Logical vs. non-logical symbols Sets and models as tools of abstraction	Klenk Ch. 12 PS6 due
Week 13	Relationship between formal and informal Practice reasoning in natural language Predicate Logic Proofs Statistical Fallacies	*Crimes Against Logic*: Shocking Statistics

Intentionality (Upper Level Undergraduate)

Spring 2016

Prof. Zoltán Gendler Szabó and Justin D'Ambrosio

zoltan.szabo@yale.edu, justin.dambrosio@yale.edu

Course Description

One of the central questions in philosophy is how our representations come to be about anything. Put slightly differently, in virtue of what are we able to represent the extra-mental, non-linguistic world? Consider a few examples: my thoughts may be directed towards my upcoming hockey game, I may write an encyclopedia entry about the Pangolin, or I may utter words of concern over the recent stagnation of wages among middle-class workers. In each case there is a link between my thoughts or words and some, typically worldly, subject-matter. In the first case, I am thinking about a particular future event, in the second, a very cute scaled anteater, and in the third, a particular feature of Americas current economic situation. How these representations are linked with their subject matter has come to be called the problem of intentionality. It is at the intersection of many major areas of philosophy: the philosophy of mind, the philosophy of language, metaphysics, and epistemology.

This course will address this problem in four sections. The first deals with how it is possible for our representations to be about things that dont exist. (This is a traditional way of introducing and motivating the puzzle of intentionality.) The second presents several accounts of the nature of intentionality that attempt to solve the puzzle laid out in the first section. The third deals with the socalled propositional attitudesattitudes like belief, desire, and doubt. Finally, the last delves into the question whether people in radically different environments could believe or mean the same thing.

Course Requirements

Readings for each meeting will be posted to classes v2. The readings won't be long, but many may be difficult. You are expected to do them fully and carefully before the class for which they are listed so we can discuss them during class.

10% of your grade will be class participation. The remaining 90% will be based on the following material:

<u>Short Papers:</u> (60%) Three short papers (3-5 pages), 20% each, on selected topics from the course. We will provide suggestions. The papers are expected to propose and defend a particular view of an issue discussed in class or the readings.

<u>Final Paper:</u> (30%) The final essay (8-10 pages) can be an extension of one of your short papers. Pick a topic in the course that you found interesting and argue for the position that seems true to you, using the course readings as a guide and a resource. We will read a rough draft of the paper and provide comments before you submit the final version.

Course Structure and Readings:

Representing the Non-Existent

1. Introduction Jan. 19
2. Quine, W. V.: "On What There Is" Jan. 21
3. Meinong, Alexius: "The Theory of Objects" Jan. 26
4. Russell, Bertrand: "Descriptions" Jan. 28
5. van Inwagen, Peter: "Creatures of Fiction" Feb. 2
6. Walton, Kendall: "Existence as Metaphor" Feb. 4

The Nature of Intentionality

7. Husserl, Edmund: *Logical Investigations* (excerpts)
8. Brentano, Franz: *Psychology from an Empirical Standpoint* (excerpts) Feb. 9
9. Crane, Tim: "Intentionality as the Mark of the Mental" Feb. 11
10. Chisholm, Roderick: *Perceiving: A Philosophical Study* (excerpts) Feb. 16
11. Anscombe, G. E. M.: "The Intentionality of Sensation..." Feb. 18
12. Goodman, Nelson: *Languages of Art* (excerpts) Feb. 23
13. Byrne, Alex: "Intentionalism Defended" Feb. 25
14. Horgan, T. and J. Tienson: "The Intentionality of Phenomenology and the Phenomenology of Intentionality" Mar. 1
15. Prinz, Jesse: *Furnishing the Mind: Concepts and their Perceptual Basis* (excerpt) Mar. 3

Propositional Attitudes

16. Frege, Gottlob: "The Thought" Mar. 8
17. Dennett, Daniel: "True Believers" Mar. 10
18. Fodor, Jerry: "Propositional Attitudes" Mar. 29
19. Churchland, Paul: "Eliminative Materialism and the Propositional Attitudes" Mar. 31
20. Davidson, Donald: "On saying *that*" Apr. 5
21. Russell, Bertrand: *Problems of Philosophy* (excerpts) Apr. 7
22. Kripke, Saul: "A Puzzle About Belief" Apr. 12

Internalism vs. Externalism

23. Kripke, Saul: *Naming and Necessity* (excerpts) Apr. 14
24. Putnam, Hilary: "The Meaning of 'Meaning' " (excerpt) Apr. 19
25. Chalmers, David and Andy Clark: "The Extended Mind" Apr. 21
26. Keil, Frank: "Concepts, Kinds, and Cognitive Development" Apr. 26
27. McKinsey, Michael: "Anti-Individualism and Privileged Access" Apr. 28

Optional Background Readings:

- Ebbesen, Sten: "The Chimera's Diary",
- Buridan, John: *Tractatus de Consequentiis* (excerpts),

- Ockham, William (of): *Expositio super Libros Elenchorum* (excerpts)
- Searle, John: *Intentionality: A Study in the Philosophy of Mind* (excerpts)
- Sellars, Wilfrid: "The Adverbial Theory of the Objects of Perception"
- Millikan, Ruth: "Biosemantics"
- Sellars, Wilfrid: *Empiricism and the Philosophy of Mind*, excerpts
- Burge, Tyler: "Individualism and the Mental" (excerpt)
- Sartre, J.P.: *The Psychology of Imagination* (excerpts)

Intensionality (Graduate Seminar)

Fall 2016

Justin D'Ambrosio

justin.dambrosio@yale.edu

Course Description

Course Description: This course is a graduate seminar on intensionality in natural language. Intensionality is one of the phenomena that has most exercised and puzzled analytic philosophers since Frege. Intensionality is a property exhibited by certain positions or contexts within sentences; roughly, a position or context is intensional just in case the truth of the sentence does not depend solely on the extension of the expression in that position, where the extension of an expression is typically taken to be the object or objects to which that expression refers or applies. If a context within a sentence is intensional, the truth of that sentence depends on something over and above the extensions its constituent expressions. But on what, exactly, over and above extension, can the truth of a sentence depend? The dominant view can be traced back to Frege, who held that there were two kinds of meaning: sense and reference. In such cases, the truth of the sentence depends on the sense of the expression in the intensional context, as opposed to its reference. An example will be most helpful here. Suppose that John thinks elephants are cute. John need not think that the number-one killer in the animal kingdom is cute. But "elephant" and "number one killer in the animal kingdom" are coextensive: they are true of the same things. Accordingly, the truth of the above sentence must depend on something over and above the extension of "elephant". According to Frege, the clause after the complementizer "that" contributes its sense, rather than its reference, to the meaning of the sentence. But of course, this answer may be unsatisfying for various reasons, and is one among many competing accounts of intensionality.

This course will be broken into two parts. The first part of this course will discuss the origins and nature of intensionality, and cover how various theories try to address it. This section will be partly historical and partly conceptual. Some questions that will guide us include questions such as the following: Where does intensionality come from? What is its source? What is the correct semantics for intensional constructions? What, over and above reference, could be relevant to truth? What are the existing theories of intensionality, and where do they fail, if they do? Is intensionality a purely propositional phenomenon?

The next section of the course will present the idea that a large number of semantic, perceptual, and representational verbs—verbs like "means", "refers", "is true of", "represents", "depicts", "indicates", "perceives", "experiences", and "senses"—are actually *intensional transitive verbs*. If this is true, then providing a semantics for intensional transitive verbs stands to tell us something important about the nature of meaning, perception, and representation. On this thesis, intensionality in natural language is a mark of intentionality. This section of the course will address various possible proposals concerning semantics of intensional transitive verbs, and questions concerning how such verbs might pose problems for traditional theories of intensionality.

Course Requirements

Readings for each meeting will be posted online. You are expected to do them fully and carefully before the class for which they are listed so we can discuss them during class.

10% of your grade will be class participation. The remaining 90% will be based on the following material:

Undergrads: One midterm paper (30%, 7-10 pages) and one final paper 60% (15 pages). The final paper can be a revision or extension of the midterm paper. Consult with me about a topic.

Grad Students: One final paper (20 pages), but this paper can (and probably should) be a development of a midterm paper, if you feel inclined to submit one early. Don't feel constrained to write a *term* paper. Feel free to write a paper on a related topic that you think is interesting, perhaps with an eye to submitting it to a conference. This can be a good exercise in professionalization. I will read the midterm version and a draft of the final version and provide comments on both.

Course Structure and Readings:

Section 1: Intensionality and its History

Week 1: Medieval Origins

Readings:

- Gyula Klima: Existence and Reference in Medieval Logic (2001)
- Graham Priest and Stephen Read: Meinongianism and the Medievals (2004)
- Optional: Ebbesen, Sten: "The Chimera's Diary",
- Optional: Buridan, John: *Tractatus de Consequentiis* (selections)
- Optional: Stanford Encyclopedia of Philosophy: Theories of Meaning

Week 2: The Doctrine of Sense and Reference

Readings:

- Gottlob Frege: Sense and Reference (1892)
- Gottlob Frege: The Thought (1897)
- Genoveva Marti: The Source of Intensionality (1993)

Week 3: Meaning and Truth-Conditions Readings:

- Donald Davidson (1967): Truth and Meaning
- John Foster (1976): Meaning and Truth Theory
- Donald Davidson (1976): Reply to Foster
- Scott Soames (1989): Semantics and Semantic Competence

Week 4: Modal Operators

Readings:

- Kit Fine: Modal Logic and its Applications
- Saul Kripke: Semantical Considerations on Modal Logic
- Optional: Jack Copeland: The Origins of Possible Worlds Semantics
- Optional: Stanford Encyclopedia of Philosophy: Intensional Logic

Week 5: Modal Intensions

Readings:

- Rudolf Carnap: Meaning and Necessity (1947, selections), Appendix D: Meaning and Synonymy in Natural Languages
- David Lewis: General Semantics (1970)
- Irene Heim and Kai Von Fintel: Intensional Semantics, Ch. 1

Week 6: Semantics for Attitude Verbs

Readings:

- Irene Heim and Kai Von Fintel: Intensional Semantics, Ch. 2
- Robert Stalnaker: Semantics for Belief
- Jakko Hintikka: Semantics for Propositional Attitudes

Week 7: Rigidity and Two-Dimensional Semantics

Readings:

- Saul Kripke: Naming and Necessity (1970)(selections)
- Stalnaker (1974): Assertion
- Chalmers (2006): Foundations of Two-Dimensional Semantics

Week 8: The Elimination of Reference

Readings:

- Bertrand Russell (1905): On Denoting
- W.V. Quine: On What there Is (1953)
- Delia Graff-Fara: Names are Predicates (2015)
- Zoltán Gendler Szabó: Major Parts of Speech (2015)

Week 9: Non-Propositional Intensionality

Readings:

- Richard Montague: The Proper Treatment of Quantification in Ordinary English (1974)

- Jennifer Saul: Intensionality: What are Intensional Transitives? (2002)
- Optional: Friederike Moltmann: Intensional Verbs and Quantifiers (1997)
- Optional: Dowty, Wall, Peters: Introduction to Montague Grammar, Ch. 9 (1981)

Week 10: Semantics for Intensional Transitives

Readings:

- Ede Zimmermann: On the Property Treatment of Opacity in Certain Verbs (1993)
- Graeme Forbes: Attitude Problems (2006), Ch. 4
- Nelson Goodman: Languages of Art (1973), Ch. 1-2
- Mark Richard: Intensional Transitives and Empty Names (2013)

Week 11: Semantic and Perceptual Verbs

Readings:

- Roderick Chisholm (1956): *Perceiving: A Philosophical Study* (excerpts on Adverbialism)
- Elizabeth Anscombe (1965): The Intensionality of Sensation: A Grammatical Feature
- Optional: Andrew Bacon (2014): Quantificational Logic and Empty Names
- Optional: Justin D'Ambrosio (2015): Semantic Verbs are Intensional Transitives

W.V. Quine: *On What There Is*

1. *A Dialogue*

McX: Quine, I've come to believe that there are unicorns.
Quine: Oh shut up. You know there are no unicorns. Unicorns are creatures of mythology, just like centaurs, sprites, elves, *etc*. You're starting to sound like my crazy friend who thinks that the Lord of the Rings is real.
McX: No, no, hear me out! It turns out you have to believe in unicorns! And guess what, you can't even coherently disagree with me!
Quine: [*eye roll*] Why not?
McX: Because in order to *deny* that there are are unicorns, you have to talk *about* them. And you can't talk about something if there isn't anything to talk about!

The little dialogue raises the question of Unreality, the last puzzle we talked about in our first class. The question of Unreality, broadly, is this: can we give a theory of how we talk about things that doesn't entail that those things exist? But more specifically to the above dialogue: How can we consistently say that certain things don't exist?

Many accounts of how we manage to talk about objects involve the notion of *reference*. Traditionally, *reference* is seen as a binary relation between a noun or a noun phrase and an object. It is one way in which many linguists and philosophers think that words come to be about things: they refer to them.

But this is exactly the notion that seems to get us into trouble in the above dialogue: if aboutness is explained in terms of reference, and reference is a relation, then there is no non-relational aboutness. But relations require relata, and so if aboutness is a relation, then anything about which we can talk must – in some sense – exist.

2. Ontological Slums

Quine: But surely, McX, you don't think that unicorns exist in the same sense in which you and I exist! They aren't creatures that can be found, fed, ridden, or rubbed.
McX: Well no, unicorns do exist, but they're just ideas or concepts!
Wyman: Wait, wait, you're both idiots. McX, we're clearly not talking about *ideas*. When I say that the Parthenon is in Greece, I'm not talking about my Parthenon-idea, which is in America. Unicorns are merely possible entities. They don't exist, but we can talk about them because they are possible entities, and possible entities are not actual. Existent entities have to be actual.
Quine: First of all, Wyman, who invited you? And second, you're just obfuscating. What I meant by *existence* was simply everything that there is. You've just changed the meaning of the word 'exists' on us.

If we are committed to a relational account of aboutness, then we've got to find some entities to serve as relata. Wyman proposes possible entities. We could also have used entities that don't exist. In either of these cases, we need two senses of 'exists' – one for merely possible entities, and one for actual entities.

We also might claim that when we talk about unicorns, or Pegasus, instead of talking about merely possible entities, we're talking about fictional characters that actually exist: they are abstract objects. But of course, while unicorns fly in the myths, abstract objects do not fly – they are not spatio-temporal. So the things we are talking about lack many of the properties that we take them to have. How does this compare to the case of searching – can I be mistaken, and turn out to be searching for an abstract object?

3. *Taking Steps*

Quine's solution to how we can deny the existence of various entities is to *give up on reference*. Rather than letting expressions like 'Pegasus' or 'unicorn' refer, they will be translated into our logical language as *descriptions*. Descriptions, Quine thinks, do not refer. Rather, they are satisfied or not, depending on whether something exists that meets the condition they specify. Here Quine invokes Russell's theory of descriptions.

Consider 'Pegasus flies'. Quine proposes that we treat 'Pegasus' as a predicate, 'is-Pegasus', or 'pegasizes', which takes an existentially quantified variable as an argument. So in order to deny that Pegasus exists, we would make a statement like 'it is not the case that there exists an x such that x pegasizes'. What used to be a referring term is now a predicate that specifies a condition, and to deny existence, we deny that there is any value for the variable that meets the condition.

Perhaps most importantly, Quine thinks that when we talk about entities like unicorns, we are not talking about anything at all. But there is an ambiguity here. On one hand, since Quine explains 'talking about' in terms of quantification, we can rightfully say we are talking about unicorns: we are talking about the thing that satisfies a description. But on the other hand, there is nothing that satisfies the description. So we are not talking about anything (in the relational sense).

4. *Ontological Disagreement*

The question with which Quine began was: how can we disagree about ontology? We now see that the person who favors the sparser ontology can translate her interlocutor's language into descriptive form, and deny it.

Ontological disagreement, according to Quine, amounts to a difference in what objects can serve as values for existentially quantified variables. In a slogan: "to be is to be the value of a variable". This is what we can call a *standard for ontological commitment*. If we want to see what entities a theory is *committed to*, or what the theory *says exists,* we look to see what entities must exist for its existentially quantified statements to come out true. According to Quine, that is the ontology that accompanies a theory.

PUTNAM: 'THE MEANING OF "MEANING"'

1. Causal Theory of Intentionality

According to Kripke, what determines the reference of a name is its *causal connection* back through its uses to an original use. This is a causal account of intentionality. It stands in contrast to qualitative accounts of intentionality, of which descriptivism is one sort.

Putnam argues for a similar kind of non-qualitative intentionality, and against the idea that meanings are conditions that speakers have in mind which determine the extension of a term.

2. Twin Earth

Putnam claims the following two principles are implicit in much philosophy of language:

> I. Knowing the meaning of a term is a matter of being in a certain psychological state.
> II. The meaning of a term determines its extension.

Together with the following two assumptions, these principles are not satisfiable:

> **(MS)** Our psychological states are "self-contained".
> **(SUP)** If A and B differ in meaning, so do the the states of grasping their meaning.

Consider Twin Earth. It is an exact replica of Earth, except the stuff that fills the rivers and lakes and reservoirs of Twin Earth has some long chemical formula, which we can abbreviate as *XYZ*. Inhabitants of twin earth call *XYZ* "water", and *XYZ* behaves *exactly like water*. If we went to Twin Earth in a spaceship, it seems we would say:

1. On Twin Earth the word "water" means *XYZ*.
2. On Earth the word "water" means H_20.
3. #On Twin Earth the meaning of the word "water" is XYZ.

But now wind the clock back to 1750, before anyone on either planet knew any chemistry. Suppose $Oscar_2$ is the Twin Earth duplicate of $Oscar_1$. Since H_20 behaves exactly like *XYZ*, $Oscar_1$ and $Oscar_2$ are in the exact same psychological state: they are *phenomenal duplicates*. But this psychological state is associated with words that mean different things. So: meanings ain't in the head!

Less outlandish cases can be constructed—consider Elms and Beeches. I can't tell them apart, and my concepts of them are identical, but they still have different extensions.

Putnam's idea is that in many cases, we don't have much of a concept in our head at all, and certainly not one that is sufficient to fix the extension of a term. Rather, this is done by the community at large.

3. Indexicality

Putnam claims that there is an indexical component to natural kind terms. He roughly thinks that the extension of a term is fixed by ostension, together with the relation *x is the same (general kind) as y*. So if an expert points at an instance of a kind, then the term introduced will refer to the stuff that bears (or things that bear) the relevant sameness relation to that instance.

This is similar to Kripke's view, but it is perhaps more honest. Rigidity seems to follow from, or be a species of, indexicality. Perhaps what Kripke is really putting his finger on is that names, like kind terms, have an indexical element, and thus, thoughts involving them cannot be purely qualitative.

Indexicals are context-dependent: they pick out different things in different contexts. But they don't seem to do this qualitatively, like descriptions. The thoughts expressed by sentences with indexicals seem to be *object-dependent* or *de re*.

This comes out in counterfactual circumstances. If I say "I could have been at home asleep right now", this is different from saying "the person currently speaking to you could have been at home asleep right now".

The meaning of an indexical does not determine its reference. If we were to model names and kind terms on indexicals, we could deny (II). But Putnam denies (I).

4. Generalizing the Account

But there are problems. Every object is a member of many kinds. Which one are we picking out? Picking out the relevant kind will depend on our account of the $same_L$ relation. It seems that the $same_L$ relation is going to be context-sensitive, or perhaps we need speaker's intentions to make it determinate.

Putnam's account seems to be correct for the terms which require expertise. But for many terms in common circulation, we know their extension as well as anyone. And many seem to lack the relevant "microstructure" or "nature" that would allow us to apply the *sameness* relation in picking out their extension. Artifacts such as pencils were *designed*. So "pencil" seems like a much more plausible candidate for having some kinds of conditions attached to it.

Another question: is the Twin Earth scenario metaphysically possible? It may well be the case that, if we were to look at the details of *XYZ*, there would be no way it could turn out to behave identically to water. Does the thought experiment rely crucially on underspecification?

5. Stereotypes

Putnam claims that linguistic competence relies on stereotypes. Competence with a word may well require certain kinds of stereotypic knowledge, but it is not *definitional*, or *analytic*, that the thing in question have the stereotypical properties.

Mathematical Logic
Discussion Section 1

Justin D'Ambrosio

October 12, 2016

1 Basic facts about sets

- The identity of a set is determined by its members. In other words, if two sets have the same members, they are identical, and if they have different members, they are different.
- Since any two sets that are empty have exactly the same members (*viz.* none), all empty sets are identical. Thus there is only one empty set.
- Sets are often defined using a property. For example, we can use the property "x is a student at Yale University" to define the set of students that go to Yale. Below are some examples:

(1) a. $\{x|x$ is a student at Yale University$\}$
b. $\{x|x$ is a Vizsla $\}$
c. $\{x|x$ has won the lottery $\}$

- A set A is a subset of a set B, $A \subseteq B$ iff for all x, if $x \in A$ then $x \in B$. This is very different from being an element of B!.
- The empty set is a subset of every set. But it is *not* an element of every set! Why? Because there are no members of the empty set that are not in the set A, for arbitrary A.

(2) a. $\{0\} \subseteq \{0, 1\}$
b. $\{0\} \notin \{0, 1\}$
c. $\emptyset \subseteq \{0, 1\}$
d. $\emptyset \notin \{0, 1\}$

(3) Definitions.
a. Intersection: $x \in A \cap B$ iff $x \in A$ and $x \in B$
b. Union: $x \in A \cup B$ iff $x \in A$ or $x \in B$
c. Subtraction: $x \in A - B$ iff $x \in A$ and $x \notin B$.

2 Relations and Functions

- A relation between two sets A and B is a set of ordered pairs $\langle x, y \rangle$ such that $x \in A$ and $y \in B$.

- Given two sets, any relation between those sets is a subset of the *Cartesian Product*, which is what you might call the *total relation* between those two sets. It is the set of all ordered pairs $\langle x, y\rangle$ such that $x \in A$ and $y \in B$.
- You can think of this like the Cartesian plane. The two-dimensional Cartesian plane, in set-theoretic terms, is just the Cartesian Product of the real numbers with themselves.
- Most of the important properties of relations are outlined on your class handout, but one is particularly important: an *equivalence relation*
- A relation is an equivalence relation if it is *reflexive*, *symmetric*, and *transitive*. If a relation R on a set A has these three properties, then it divides up A into *equivalence classes*: subsets of A, where each of the members are related to all and only each other.

  (4) The relation of having the same name as someone else is an equivalence relation. Why? How can we prove it? So is the relation of having the same height as.

- A relation R is a function just in case for any two pairs $\langle a, b\rangle$, $\langle c, d\rangle \in R$, if $a = c$ then $b = d$. A function encapsulates the notion of a rule.
- When we have a function f that is defined for every member of a set A, and maps each member of A to a member of B, we write $f : A \to B$. If every member of B is the value of the function for some $x \in A$, then we say the function is a function from A *onto* B. If every $x \in A$ is mapped to a distinct value in B, we say that the function is *one-to-one*.

3 Example Proofs

- Show that $A - B = A - (A \cap B)$ (do this together in class)
- Show that $A \cap B = A - (A - B)$

  Left to right: Let $x \in A \cap B$. Then $x \in A$ and $x \in B$. But then assume $x \in A - B$. We get a contradiction. So $x \in A$ and $x \notin A - B$. So $x \in A - (A - B)$.

  Right to left: Assume $x \in A - (A - B)$. So $x \in A$ and $x \notin A - B$. So assume that $x \notin B$. Then $x \in A - B$, which is a contradiction. So $x \in B$. So $x \in A$ and $x \in B$. So $x \in A \cap B$. By extensionality, $A \cap B = A - (A - B)$. $\dashv$

- Show that $A - (B - C) = (A - B) \cup (A \cap C)$

  Left to right: Suppose $x \in A - (B - C)$. So $x \in A$ and $x \notin B - C$. So either $x \notin B$ or $x \in C$. So there are two cases: Case 1: assume $x \notin B$. So $x \in A - B$. So $x \in A - B$ or $x \in A \cap C$. So $x \in (A - B) \cup (A \cap C)$. Case 2: assume $x \in C$. So $x \in A \cap C$. So $x \in A \cap C$ or $x \in A - B$. So $x \in (A - B) \cup (A \cap C)$.

  Right to left: Suppose $x \in (A - B) \cup (A \cap C)$. So $x \in A - B$ or $x \in A \cap C$. So there are two cases. Case 1: Assume $x \in A - B$. Then $x \in A$ and $x \notin B$. If $x \notin B$ then $x \notin B - C$. So $x \in A$ and $x \notin B - C$. So $x \in A - (B - C)$. Case 2: Assume $x \in A \cap C$. So $x \in A$ and $x \in C$. If $x \in C$ then $x \notin B - C$. So $x \in A$ and $x \notin B - C$. So, $x \in A - (B - C)$. So $x \in A - (B - C)$ iff $x \in (A - B) \cup A \cap C$. So by extensionality, $A - (B - C) = (A - B) \cup (A \cap C)$. $\dashv$

Mathematical Logic
Discussion Section 3

Justin D'Ambrosio

October 12, 2016

1 Syntax

- A syntax for a language are the rules that specify which strings of symbols count as grammatical, or "well-formed". Recall that we specified the syntax of our formal language by collecting everything that we could get from the basic elements by applying the five formation functions: $\mathcal{E}_\neg$, $\mathcal{E}_\rightarrow$, $\mathcal{E}_\leftrightarrow$, $\mathcal{E}_\wedge$, $\mathcal{E}_\vee$.
- This gave us a particular formation or construction history for each WFF: each WFF was built up out of smaller WFFs through the application of one of the functions.
- This history can be mapped out with a tree: when we apply a unary function, the branches go straight down, and when we apply a binary function, we have a binary-branching tree. (Enderton, p. 17)
- Importantly, this tree is unique: there is a unique tree—aka a unique construction history—corresponding to each WFF. In order to find this unique tree, we simply decompose the WFF in the opposite order that it was constructed: the last function we applied to get it is the first level of the tree that we consider.
- This is called "unique readability", and it is a consequence of the fact that the set of WFFs is "freely generated".

2 Semantics

- Semantics is interested in the *meaning* or *interpretation* of sentences. Given a state of the world, the meaning of a sentence determines its truth, so in our little language, our stand-ins for meanings will be truth-values (slogan: meaning is as meaning does).
- Basically, we want an algorithm for computing the truth-value of a whole sentence in terms of the truth-values of the parts, when we know the truth-values of the basic elements.
- A function $v : SS \rightarrow \{T, F\}$ is called a *truth-assignment*. It assigns either T or F to each $A_n \in SS$.
- So we have a syntactic tree, and our truth-assignment assigns a truth-value to each of the leaves of the tree (the terminal nodes).

- To compute the truth-value of the whole, we have to move up the tree and compute the truth-values of larger and larger parts of the sentence. So: we have functions corresponding to each of the symbols that the formation functions introduce. These symbols take the truth-values of the parts of the sentence, and eventually output a truth-value for the whole.
- We compute this using the tree (Enderton p. 22).

3 Inductive Syntax, Recursive Semantics

- We are going to define a function that does exactly what I just said: it computes the truth-values of the whole sentence from the truth-values of the parts, in accordance with the syntax.
- The method that I've just told you about—start from the top of the tree, move down until you get to the basic values, and then go up the tree to compute the value for the whole—is just recursion. It's way less complicated than you think.
- Corresponding to each of our syntactic formation functions is a function from truth-values to truth-values.
- What the recursion theorem says is that, given some functions (for instance, $\mathcal{E}_\neg$, $\mathcal{E}_\rightarrow$, $\mathcal{E}_\leftrightarrow$, $\mathcal{E}_\wedge$, $\mathcal{E}_\vee$), and corresponding functions from truth-values to truth-values (for $\mathcal{F}_\neg$, $\mathcal{F}_\rightarrow$, $\mathcal{F}_\leftrightarrow$, $\mathcal{F}_\wedge$, $\mathcal{F}_\vee$), and some assignment of values to the base cases, there is a function that goes down the tree, gets the values of each of the parts, and returns a value for the whole.
- Here is a toy case: imagine you have a set C that is freely generated from a basic set B by two functions f and g (we'll get back to what it means to be freely generated). The set corresponds to the set of WFFs, and the functions correspond to our formation functions, defined on strings of symbols. Suppose that:

$$f : U \times U \rightarrow U$$

$$g : U \rightarrow U$$

- Now suppose that we have corresponding functions that map the values of our functions f and g onto some other values (like, maybe, truth-values!), and a function that tells us the values of our basic elements.

$$h : B \rightarrow V$$

$$F : V \times V \rightarrow V$$

$$G : V \rightarrow V$$

- Then the recursion theorem tells us that we can define a new function, which is an extension of h, called $\bar{h}$, which is defined as follows:
  (i) For x in B, $\bar{h} = h(x)$
  (ii) For x, y, in C,

$$\bar{h}(f(x, y)) = F(\bar{h}(x), \bar{h}(y))$$
$$\bar{h}(g(x)) = G(\bar{h}(x))$$

- This new function is a function from the inductively defined set (the WFFs), to the set of values (the truth-values), and supplies a value to the whole sentence in terms of the values of each of the parts.
- But there is one thing we have to check: that the set C is freely generated. In the case of the WFFs, this means that we need to check that each WFF is uniquely readable. This is the case iff the formation functions have ranges that are disjoint, and if the functions are one-to-one. And they are!

Infinite Ordinals and Infinite Cardinals

Whittle and D'Ambrosio

Phil. 281: Infinity

October 12, 2016

1 Basic Facts about Ordinals and Cardinals

- Cardinal numbers are numbers that measure the size of sets, and $\aleph_0$ is the first infinite cardinal. In particular, it is the size of the set of natural numbers, ω. This size is also known as "countable infinity".[1]
- Ordinals do not measure size: ordinal numbers are generalizations of our process of counting, so two ordinals will be the same or different not based on their size, but based on their order properties. It turns out that, when considering ordinals, $2 + \omega \neq \omega + 2$. Why? Because the latter has a greatest element, but the former doesn't. And for ordinals, facts about order matter.
- And as it will turn out, all of the following *ordinals* are countably infinite, and have the same cardinal number: $\omega, \omega + 1, \omega + 1 \ldots \omega + \omega, \omega + \omega + \omega, \ldots \omega \cdot \omega, \omega^{\omega}$.[2]
- The rules for cardinal and ordinal arithmetic are different, but these differences are only apparent once we get into the realm of infinite sets.

[1] This size is called "countable" because if you kept going step by step, you'd eventually get to everything. A set is countable if and only if it can be put into one to one correspondence with ω, the set of natural numbers.

[2] All cardinals are ordinals, but not every ordinal is a cardinal. In particular, cardinals are *initial ordinals*. They are the smallest ordinals of a given size. Since ω is the smallest countably infinite ordinal, it is identified with the first infinite cardinal, $\aleph_0$. And more on ω^{ω} later.

2 Some Important Definitions and Notation

The following definitions should help you get a hold of this. In order to understand them, you need to know what the Cartesian product of two sets is, and how we denote the set of all functions from a set A to a set B.

- The Cartesian product of two sets A and B, denoted $A \times B$, is the set of all ordered pairs $\langle a, b \rangle$ such that $a \in A$ and $b \in B$.[3]
- A^B is the set of all functions with domain B and codomain A (the functions from B into A).[4]
- Given a set A, $|A|$ is the *cardinality*, or cardinal number, of A. Intuitively, $|A|$ is the size of A.[5]

[3] You can think of this like the Cartesian coordinate plane: A and B are the axes, and the pairs are the coordinates.

[4] This is different than ordinary exponentiation: don't get confused.

[5] So $|\omega| = \aleph_0$

3 Cardinal Arithmetic

So now suppose we have two disjoint sets J and K whose cardinal numbers (sizes) are ι and κ respectively. Then we have the following definitions.

- $\iota + \kappa = |J \cup K|$. In other words, if we adding the cardinal numbers is like measuring the union of two sets.
- $\iota \cdot \kappa = |J \times K|$: in other words: if we multiply the cardinal numbers of two sets, it's like measuring the cartesian product of the two sets.
- $\iota^{\kappa} = |J^K|$, where J^K is the set of all functions from K into J.

These definitions imply the following facts:

1. $|\omega| = \aleph_0$ (this is just a definition)
2. $|\omega + n| = |\omega \cup n| = \aleph_0$ for $n \in \omega$.
3. $|\omega + \omega| = |\omega \cup \omega| = |\omega| = \aleph_0$.
4. $|\omega_1 \cdot \ldots \cdot \omega_n| = |\omega_1 \times \ldots \times \omega_n| = |\omega^n| = \aleph_0^n = \aleph_0$[6]
5. $|\omega^\omega| = |2^\omega| = 2^{\aleph_0} = |\mathbb{R}|$, when we take ω^ω as the set of all functions from ω into itself.[7]
6. $|\omega^\omega| = |\omega| = \aleph_0$, when we take ω^ω to be the limit of the sequence $\omega_1 \cdot \ldots \cdot \omega_n$ as n approaches ω.

[6] This should seem very weird: it points to a more general fact that the Cartesian product of any infinite set with itself is the same size as the original set. So the real plane is the same size as the real line!

[7] The set of all functions from ω into itself is basically the set of all infinite sequences of natural numbers.

The last two facts are kind of weird, so they need a bit of explaining. When we're talking about ordinals, the ω^ω is the limit of the sequence $\omega_1 \cdot \omega_2 \cdot \omega_3$.... It is *not* the set of all functions from ω into ω. So the symbol ω^ω is ambiguous. On the one hand it can mean the limit of the sequence $\omega^1, \omega^2, \omega^3$..., each of which has cardinality ω. Or, on the other hand, it can mean the set of all functions from ω into ω, which has size $2^{\aleph_0}$

Another interesting fact: the definitions of addition, multiplication, and exponentiation in transfinite ordinal arithmetic are exactly the same as the recursive definitions in the finite case. So we can do lots of different arithmetic operations on transfinite ordinals, even though they're all the same size.

I hope this is useful!

Benacerraf and Thomson on Supertasks

Whittle and D'Ambrosio

Phil. 281: Infinity

October 12, 2016

1 *Recap*

This handout will try to give you a brief recap of the stuff going on in the Thomson-Benacerraf exchange, in a simplified form.

HERE IS THE ARGUMENT in question:[1]

1. Motion is a supertask.
2. Supertasks are impossible.
3. Therefore, Motion is impossible.

Thomson argues at length that supertasks are impossible, but that motion is not a supertask. I think there's a considerable amount of confusion about these concepts. So let's try to clarify.

- First, Thomson makes three arguments to show that it is impossible to complete an infinite sequence of tasks (a supertask).
  - The Lamp argument (p. 5).
  - The argument from the parity of π (p. 5).
  - The argument from summation of the series (p. 6).
- He then argues that one doesn't have to complete a supertask to move a particular distance: he claims that you are just making one journey, which can be infinitely analyzed, but does not genuinely contain infinitely many smaller journeys.
- So in the original argument, there is a fallacy of equivocation: "infinite" is used in two different ways: analyzable into a potential infinity of smaller journeys vs. containing a genuine infinity (a supertask).

2 *Are Thomson's Arguments Invalid?*

Thomson argues that there are two different notions of infinity in play here. And he argues that, in one of the senses, completing an infinite number of tasks is impossible. So he argues that the second premise is true. But that implies that the first premise must be false *on that reading*.

[1] Is this an acceptable way of characterizing the argument? What are some alternate ways of capturing the argument simply?

I will end up arguing that the term "supertask" is in fact ambiguous, and part of the issue is about how we're using the term.

In some sense, this means that the whole is prior to its parts. The whole journey is a unit, and the parts just result from analyzing the whole. What does this tell us about measurement?

Benacerraf doesn't seem to care too much about the argument itself. He is only arguing that Thomson is wrong about the second premise. But there is something weird going on here: if Thomson is wrong about what a supertask is, does that mean that the argument doesn't equivocate after all? or does it mean that it equivocates between supertasks and super-duper tasks?

Why is this the case? What features of arguments make it the case that we would have to give up the first premise?

THOMSON'S ARGUMENTS rely on claims about what state the lamp would be in given the fact that at each of infinitely many states, we switch the lamp on and then off.

1. The claim in Thomson's argument is that if, after every state in which the lamp is on, it has been turned off, and vice versa, then it follows that at the limit, the lamp is both on and off.

2. But this does not follow: for limit points are not in the sequences of which they are the limits.

3. So nothing about the infinite number of switchings-on and switchings-off implies anything about the state of the lamp after that sequence of actions.

4. This seems to show that Thomson's arguments are invalid. But things can't be this simple. Nothing about the prior states *logically* guarantees that the lamp must be a consequence of them. But certainly our beliefs about the physical world do yield this conclusion.

For instance: ω is not itself a natural number. Similarly, 1 is not itself one of the elements of the sequence in $\frac{1}{2^n}$ for $n > 0$.

This is because limits are not *after* the members of the sequence that approach them. For instance: ω is not the successor of any natural number. Rather, it is the *collection* of all natural numbers. Thus limits are qualitatively different than the things in the sequence that approach them.

I do think that the state of the world at time t is a consequence, perhaps not logical, but still a consequence of the state of the world at time t', where t' is only infinitesimally before t. Don't you believe this too?

3 *Infinity Plus One*

The issue here is the difference between infinity and infinity plus one. Whenever Thomson asks about whether we can complete a supertask, he actually seems to be asking about whether or not we can complete a *super-duper* task: a task that includes each of an infinite number of tasks, and their limit too. To distinguish between these two things, we need the concept of an ordinal.

Remind me to show you an SMBC comic about Cantor and Infinity.

- An ordinal is a particular set associated with a type of sequences: basically, ordinal numbers are numbers that characterize different types of orders.
- For instance, ω has is a different order type than $\omega + 1$ because $\omega + 1$ has a last member and ω doesn't.
- Thomson seems to be aware of this fact: he says "If something is infinitely divisible, and you are to say into how many parts it shall be divided, you have $\aleph_0$ alternatives from which to choose. This is not to say that $\aleph_0$ is one of them."

THOMSON CONFUSES ω with $\omega + 1$. Thus he confuses supertasks with super-duper tasks. But not without reason: Thomson gives the example of the racetrack: to complete a task of order type ω just is to put yourself at the limit.

But of course, the racetrack reasoning is bad reasoning, which Benacerraf's "reluctant genie" case shows. Or is it?

Probability, Utility, and Decisions

Whittle and D'Ambrosio

Phil. 281: Infinity

April 18, 2014

1 Probability Theory

Consider what happens when one throws one die. There are 6 possible outcomes. Call the set of these outcomes the *sample space*, denoted with Ω. In this case, $\Omega = \{1, 2, 3, 4, 5, 6\}$.

If I throw the die twice, there are 36 possible outcomes, and the sample space looks like this: $\{11, 12, 13, 14, 15, 16, 21, 22, 23, ...65, 66\}$, where the first digit represents the result of the first throw, and the second number represents the second throw.

An event is a subset of the sample space. Events are what probabilities get assigned to. So for instance, there is an event A of rolling doubles, that is a subset of the space. $A = \{11, 22, 33, 44, 55, 66\}$. Of course, A has probability 1/6, but we'll get to this below.

For some technical reasons, while every event is a subset of the sample space, not every subset of the sample space qualifies as an event.

The Event Space is a subset of the powerset of the sample space. It is a class of events that contains the sample space, is closed under complementations, and closed under finite unions (it forms a Boolean algebra).

For example, the following sets are elements of the event space: the set of all outcomes where the difference between the die is 2, the set of all outcomes where the sum of the rolls is odd, the set of all outcomes where the sum is greater than 4, *etc.*

(Boolean) Algebra of Events. We can build up complex events from simpler ones. For any two event A, we have a new event $\neg A$: the complement of A. It consists of all outcomes in the sample space that are not in A. For any events A and B, we have new events $A \cup B$, $A \cap B$,

A Boolean Algebra, roughly, is a set that is closed under three operations: complement, union, and intersection (or, equivalently, negation, disjunction, and conjunction), in addition to a number of other conditions which I am skipping. A set is closed under an operation just in case the result of applying the operation to any object or objects in the set is also in the set.

An example: Consider the events $A_1 \ldots A_n$. From them, we can form the new event $A_1 \cup \ldots \cup A_n$, or:

$$\bigcup_{i=1}^{n} A_i.$$

This is the event consisting of all of the outcomes in any of $A_1 \ldots A_n$. Similarly,

$$\bigcap_{i=1}^{n} A_i.$$

is the event containing just the outcomes that are in all of $A_1 \ldots A_n$.

Of course, this is just like set theory. We have the axiom of separation and the axiom of Union, and from them we can define the intersection of two sets A and B.

2 *Assigning Probabilities*

So far I have said nothing about probabilities. What is probability? Very roughly, probability is supposed to reflect the relative frequency of an event given an infinite number of trials. So, if I were to toss a fair coin an infinite number of times, the relative frequency with which it lands heads would approach 1/2. Probability is supposed to capture this thought.

THE CLASSICAL DEFINITION of probability is as follows: the probability of an event A the number of outcomes favorable to an event divided by the total number of outcomes, where all outcomes are equally likely.

But this definition is circular, or almost. What does "likely" mean? Likelihood is usually defined in terms of probability!

A PROBABILITY FUNCTION P assigns to each event A in the event space $\mathcal{E}$ a real number $r \in \mathbb{R}$ where $0 \leq r \leq 1$ such that:

1. $P(A) \geq 0$ for each $A \in \mathcal{E}$
2. $P(\Omega) = 1$
3. If $A_1 \ldots A_n$ are disjoint sets in $\mathcal{E}$, then $P(A_1 \cup \ldots A_n) = P(A_1) + P(A_2) + \ldots P(A_n)$.

Importantly, our probability function *assigns* probabilities to basic events. It does not *calculate* the probabilities of basic events. So, the probability that a card picked at random from a deck is 1/4, but this is simply a matter of choosing the function to accord with our intuitions.

3 *Decision Theory*

Decision theory is the theory of what agents should choose to do if they are fully rational, given two factors: their expectations about how the world will turn out, and how valuable the outcomes are. The most interesting such cases are cases where agents aren't certain how the world will turn out.

There is a difference between how valuable the outcomes are, and how valuable the agent finds them. This will become important later.

ALMOST ALL DECISION PROBLEMS can be captured using what is called a *decision matrix*. It is a matrix where the decisions are laid out along the vertical axis, and the possible states of the world are laid out along the horizontal axis.

The possible states of the world are very similar to events in probability theory, except they are assigned expectations rather than objective probabilities.

THE VALUE OF AN EVENT is called its *utility*. The idea is as follows: were the world to obtain, how much would it be worth to you? The idea is to assign both probabilities and utilities to events, and then choose what to do in light of this.

EXPECTED UTILITY is what fully rational agents attempt to maximize. What is expected utility? Well, in general, suppose that we have events $A_1 \dots A_n$, each of which has probability $p_1 \dots p_n$ respectively, and with respect to a particular course of action C, they have utility $u_1 \dots u_n$ respectively. Then the expected utility of choosing C is

$$p_1 \times u_1 + p_2 \times u_2 + \dots p_n \times u_n.$$

In other words, we weight the utilities of each of the events given choice C, and then sum them to get C's expected utility, given all the ways the world could go.

This means that Pascal's wager, where there are only two ways the world could be, comes out as a special case of our definition. The events are G and $\neg G$, and they exhaust the sample space. So $G \cup \neg G = \Omega$, so $P(G \cup \neg G) = 1$. So the expected utility of choosing to believe is $p(G) \times \infty + 1 - p(G) \times a$, where a is finite but negative.

4 *The St. Petersburg Paradox*

Suppose we flip a coin until one of the flips lands on heads. If the coin lands heads on the first toss, you get a dollar. If it comes up heads on the second toss, you get two dollars. If the third, four dollars. If the fourth, 8 dollars. In general, if the first heads is on the nth flip, then you will receive 2^n dollars.

THE PROBABILITY THAT THE COIN first lands heads on the nth toss is $\frac{1}{2^n}$. So what is the expected utility of the game? Supposedly, it is the probability of each event occurring multiplied by its utility, measured in dollars:

$$\frac{1}{2} \times 1 + \frac{1}{4} \times 2 + \frac{1}{8} \times 4 \dots$$

This sum is infinite! So given the infinite number of places that a head could first turn up, it seems that the expected utility of playing the game is infinite. If utility is connected to how much you should be willing to pay, then you should be able to pay any finite amount of money to play the game. What's the solution?!

There are infinite number of possible events, and we are summing their weighted utilities. Probability theory allows countably infinite sums. Note that these outcomes are disjoint.

5 *Evidence vs. Prudence*

Pascal's wager is supposed to provide a *prudential* argument for belief: you *should* believe that God exists because it will have the best consequences for you.

BUT THERE IS SOMETHING STRANGE HERE: aren't one's beliefs supposed to be based on only one's evidence? Isn't there something weird about believing something *because it will be good for you*, or *because it will be fun*?

THE THOUGHT IS AS FOLLOWS: beliefs "aim at" the truth. Belief, as an attitude, is one that is integrally tied to getting things right. The prudential effect of believing that P is not relevant to whether P is

My best friend and I apostatized at the same time when we were 18. When I asked him what he thought about Pascal's wager, he responded "I just don't like the idea of believing in God for reasons other than the likelihood that he exists." I didn't realize it at the time, but he was articulating an evidential norm for belief.

true. So, one might conclude, it is not relevant to whether one should believe that P either.

I don't agree with this position, but it does have considerable appeal. Part of the reason I don't agree is that I think lots of our beliefs are prudentially influenced, and if belief aims at the truth, then we are violating this norm all the time. That seems like a bad result.

Teaching Hegel Through Critique

Justin D'Ambrosio

Proposal for how to teach Hegel's *Phenomenology of Spirit* to undergraduate students in the humanities

Successfully teaching Hegel's *Phenomenology of Spirit* to undergraduate humanities students may seem like a difficult, if not impossible, task. Ordinarily, the *Phenomenology* is only taught in seminars for graduate students with a background in philosophy generally, and German Idealism more specifically. But I think there is one idea that can serve as a window into what is often considered one of the most opaque texts in the history of philosophy, and can render certain deep aspects of the text transparent to undergraduates. This idea also serves to clarify and systematize the *Phenomenology*'s relation to earlier texts in German Idealism, and later texts in philosophy and social theory. The idea is that of *Critique*.

The notion of Critique that I am interested in originally comes from Kant's Critique of the rationalist metaphysicians who preceded him. Kant holds that within rationalist metaphysics, reason makes metaphysical claims for which it has no justification, and as a result, it is led into confusion and ultimately, contradiction. Kant labels such claims *dogmatic*. In order to transcend its dogmatism, reason must undertake the project of critiqueing itself, and this project issues in boundaries on the domain in which human reason can hope to achieve knowledge, particularly metaphysical knowledge. On Kant's critical view, humans cannot aspire to have metaphysical knowledge beyond the bounds of possible experience.

I propose to read and teach the *Phenomenology of Spirit* as a book that aims at fulfilling Kant's critical project, as it is laid out in the introduction and preface to the *Critique of Pure Reason*. This reading is largely inspired by a book by William F. Bristow, titled *Hegel and the Transformation of Philosophical Critique*, and I plan to use this book as a guide to reading the *Phenomenology*. My hope is to use Bristow's interpretation to present Kant and Hegel's projects as successive steps in a unified project of calling into question, and then taking steps to justify, reason's claims to have metaphysical knowledge of the external world.

There are several reasons why I think a unit on the *Phenomenology* can serve as a successful part of an undergraduate humanities course, in spite of the difficulty of the texts involved. First, the concept of Critique can be explained relatively easily, but it plays an outsized role within Kant and Hegel's systems. Thus, my hope is to use the idea of Critique as a scaffold by means of which students can come to understand some of the more detailed, difficult ideas in the *Critique of Pure Reason* and the *Phenomenology*, both in this course and subsequent coursework. Second, Bristow's book is short, it provides an outline of the core ideas of the *Phenomenology*, and is written simply and clearly enough to be accessible to undergraduates. Finally, the notion of Critique can play an important epistemological role outside the realm of the history of philosophy, in considering what justification we have for our pretheoretical beliefs about moral, political, and social issues. The project of Critique is so important because it is fundamentally the project of self-examination, and so in coming to understand how Critique functions within these texts, students learn to deploy Critique as a tool for re-evaluating their own dogmatically held beliefs.

The unit will begin by reading brief selections from pre-Kantian German rationalist philosophy, including excerpts from Leibniz and Wolfe. This will give the students the sense of why Kant thinks that reason needs to critique itself, and set limits on its epistemic aspirations. We will then read the introduction and preface to Kant's *Critique of Pure Reason*, along with three critical sections from the body of the text: the Transcendental Aesthetic, the Metaphysical Deduction, and the section on Phenomena and Noumena. This overview will serve to provide the students with an understanding of teh Kantian critical project, and how, on Kant's critical view, the only way for humans to have genuine metaphysical knowledge is to have the objects of experience conform to us. In other words, it will give them a clear sense of how Kant's project of Critique led to his so-called Copernican revolution.

The rest of the unit will focus key sections of the *Phenomenology of Spirit*, with Bristow's text serving as a guide. The goal of the unit is to portray Hegel's notion of critique as a process, rather than a mere perspective or stance, and to read the *Phenomenology* as an account of this process. Each successive section of the phenomenology catalogs one step in the process of Critique, at the end of which, Hegel claims, our metaphysical knowledge will be fully justified. In the *Phenomenology*, this process serves as a microcosm of both the stages of human epistemic development, and of the stages through which an individual moves in an attempt to justify her own knowledge of the external world. I hope to help my students see that this process of development can be microcosmic for their own development. I want them to engage in the transformative process that Hegel lays out: the process of critiqueing their own standards for belief, moving to new forms of justification, and ultimately transforming themselves into better reasoners and knowers.

Student Evaluations

Phil 281: Intentionality (Spring 2016, as co-Instructor)

"Justin was a wonderful instructor to have, who obviously put much time into preparing his lectures to ensure his students would understand. Very approachable, and always open for questions and assistance."

"Justin is a cool guy, and although I disagreed with a lot of his intuitions, it's clear he has a talent in philosophy, knew what was going on, and was able to answer questions thoroughly and thoughtfully."

"If, as a thinking thing, you have any interested in thinking about just what sort of thinking thing you are, then take this course. Philosophy of mind is confusing and hard, but I am sure you will come out of this course with at least a different idea of what you are. Also, you would be silly not to take a course with Professor Szabo and/or Justin."

Phil 267: Mathematical Logic (Fall 2015)

"Justin was excellent. He really has the ability to convey abstract, complex things in a concrete, accessible way. And he clearly worked painstakingly to make sure his students were on track with the material– making excellent notes, and making himself available via email and in person. Very dedicated, and very capable! Section explained and expanded on ideas discussed in lecture."

"Justin was great! Very lucid explanations, always willing to help out and chat in office hours. I often came into office hours/section feeling confused and always left with a much better understanding of the material."

"Justin was always very helpful! He did a great job of explaining complex concepts in section. I unfortunately wasn't able to make it to as many sections as I would've liked. (I was often finishing up the problem sets during my section time.) That said, section was worthwhile every time that I was able to make it. I particularly enjoyed Justin's supplements to class's core content (many of which took the form of brief tangents)."

"Justin was an excellent TA; his section classes were amazing and helped greatly with understanding the material. His office hours were also excellent; whenever he was able he was willing to stay after hours to make sure that all of his students' questions were answered. Excellent!"

"Justin was very good. For most of the sections, he had his own handouts [...] and these were very helpful. He was very concerned both about helping students understand the material and get the right answer– but he was also very careful not to give it away straight off. He did an enormous amount of work (often on his own time) outside of his appointed section and office hours helping students on problem sets, for which I'm very appreciative."

Phil 281: Infinity (Spring 2014)

"I consider myself lucky to have had Justin as a teaching assistant in the past semester. He went the extra two miles in instructing me and was always extremely approachable. I'll give an example. Justin suggested that my writing needed some work if I did want to write some good philosophy papers in the future. We had discussed my academic interests in the past and I took up his offer. So he followed through with this by taking the time to go through every sentence of my next two assignments with him offering suggestions through almost all of them. Justin has made this class a highly educational one–I have gained so much in terms of general writing, logic, how to construct arguments and generally how to be a better philosopher. I am very grateful for his assistance."

"Justin was awesome as well. Really helpful at answering questions (in and out of class), and leads really fun discussion sections. I struggled through some of the material, but with his help I was able to do well"

"Section usually served to revisit concepts discussed in lecture with the goal of resolving difficulties students had encountered in the reading/lecture. Our TA, Justin, has a keenly analytic and critical mind and is a very good teacher. He was extraordinarily helpful and always willing to meet with us outside of class."

"Justin really offered helpful comments on all written assignments (he balanced the critical and the supportive well), and he really enhanced the material covered in lectures. I was impressed!"

"I thought that section worked out quite well in this class. It gave us opportunities to more thoroughly discuss the topics of each week. Justin was also very knowledgeable and helped direct us towards supplementary materials relevant to what we discussed."

Phil 204: Kant's *Critique of Pure Reason* (Fall 2013)

"Justin was great! He went to tremendous lengths to make sure we actually understood everything; sections were a huge part of why I was able to keep up with this class, and he was really helpful in office hours as well. I also appreciated that he was approachable and understanding of the difficulty of this class."

"Justin was a great TA. He was extremely knowledgeable, articulate, and responsive to questions."

"Justin is an amazing TA! Really accessible and helpful, and really well-versed with the Critique."