Are Humans Rational?

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1 General Orientation

1.1 Driving Thesis

The Aristotelian dictum that we are *rational animals* is under severe attack these days. In fact, the previous sentence may be to seriously understate the situation: the dictum is perhaps outright rejected by many, if not most. From psychologists of reasoning and decision-making to behavioral economists to the “new atheists” (all groups whose message we will consider in this class), the onslaught is firmly underway, and fierce. Yet this course revolves around a defense of the proposition that Aristotle, modernized along Thomistic, Piagetian, and Bringsjordian \( \times 2 \) lines, is right. This proposition, put a bit more precisely, is:

\[ R \]

Humans, at least neurobiologically normal ones, are fundamentally rational, where rationality is constituted by certain logico-mathematically based reasoning and decision-making in response to real-world stimuli, including stimuli given in the form of focused tests; but mere animals are not fundamentally rational, since, *contra* Darwin, their minds are fundamentally qualitatively inferior to the human mind. As to whether computing machines/robots are fundamentally rational, the answer is “No.” For starters, if \( x \) can’t read, write, and create, \( x \) can’t be rational; computing machines/robots can neither read nor write nor create; ergo, they aren’t fundamentally rational.

1.2 Rapid Example

For a rapid example\(^1\) of some of the stimuli to which \( R \) refers:

<table>
<thead>
<tr>
<th>Amtrak-to-Princeton J-L Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suppose that the following two statements are true:</td>
</tr>
<tr>
<td>(1) Everyone likes anyone who likes someone.</td>
</tr>
<tr>
<td>(2) Abigail likes Bruno.</td>
</tr>
<tr>
<td>Does it follow deductively that everyone likes Bruno? Prove that your answer is right!</td>
</tr>
</tbody>
</table>

1.3 Notice: ‘Fundamentally’

Notice that the adverb ‘fundamentally’ is used repeatedly in \( R \). This means, among other things, that humans are *potentially* rational. What humans need in order to reason and make decisions in the relevant ways, we (i.e., S & A) further claim, is sustained study of the relevant logic and mathematics, and an ability to use what one has studied in order to reason and decide correctly in response to the aforementioned stimuli. In the course of our defense, we’re going to supply at least some of the relevant logic and mathematics to you. Hence, as you receive and judge our case, we believe that you will move some distance from being merely fundamentally rational to being *presently* rational. We believe it’s fair to say that the purpose of college is to markedly increase the level of reasoning and decision-making power that constitutes being presently rational.

1.4 A Disclaimer!

Please note that guest lecturers other than A Bringsjord should not be assumed to have affirmed anything like the claim \( R \) issued above. This thus applies specifically to TA Dan Arista, and Professors John Milanese and John Licato, and MS student Thomas Carter. As to what these thinkers hold in connection with \( R \), that is an open question. You are free to inquire.

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\(^1\)Provided long ago on Amtrak to Selmer by Professor Yingrui Yang, who relayed it from Professor Johnson-Laird.
1.5 Context: A Research University

You have wisely decided to attend a technical research university, with a faculty-led mission to create new knowledge and technology in collaboration with students. RPI is the oldest such place in the English-speaking world; it may know a thing or two about this mission. The mission drives those who teach you in this class. The last thing we want to do is simply convey to you how others answer the driving question that gives this class its name. As should be obvious by now, we think we have correct answers to the driving question, and are working hard to explain them, specify them formally, and disseminate them. We’ll tell you objectively what other thinkers say, but we’re going to tell you that, at least for the most part, they’re wrong. You can judge whether our arguments are sound or not. And you should start to develop your own individual answer, which may well be different than ours. You should seek to defend your answer, and will indeed by asked to do so in this class. For purposes of evaluating your performance, it matters not a whit what your positions is; what matter is your understanding of the technical material presented, and the quality of your reasoning given in defense of your positions.

1.6 Graduate Teaching Assistant; Further Help

The TA for this course is senior PhD student Dan Arista. His email address is Daniel.Arista@gmail.com. Assisting as well will be Thomas Carter; his email is thomas.milton.carter@gmail.com. A leading expert on Piaget in connection with both AI and cognitive science, Professor John Licato, will make an appearance. Professor John Milanese, who teaches other courses related to the present one, may contribute as well. Please note again §1.4.

2 Prerequisites

There are no formal prerequisites. However, this course covers parts of such things as formal deductive logic, formal probabilistic logic, game theory, etc. This implies that — for want of a better phrase — students are expected to have a degree of mathematical maturity. At RPI, this expectation is quite reasonable.2

3 Texts/Readings

In-class lectures deliver crucial content. (Assuming that things go according to plan, all lectures will be recorded, and will be available for review to all students.) Attendance is required and note-taking is key. Sometimes slides will be distributed by email. Most readings will be electronic, and either distributed by email, or can be obtained by url. As a first example, students should read (Baker 2013) asap, since it (we claim) represents a stark example of an implicit denial of $\mathcal{R}$. As to books, it’s required that students purchase and read Kahneman’s (2013) Thinking, Fast and Slow. In addition, every incoming student at Rensselaer should already be in possession of Seligman’s (2002) Authentic Happiness, which (esp. the final chapter) will be analyzed in connection with the topic of the meaning of life (see §4).

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2To be a bit more specific, the logico-mathematics alluded to in claim $\mathcal{R}$ can be partitioned into three general areas: analysis and continuous mathematics (A1); deductive formalisms, systems, and techniques (A2); and inductive/statistical/probabilistic formalisms, systems, and techniques (A3). Because of the nature of RPI’s requirements for a BS, A1 is generally already covered in other classes. The emphasis in the present class is on (introductory elements of) areas A2 and A3.
4 Schedule

4.1 Setting the Stage

- **Aug 31**: General Orientation, Logistics, Mechanics. The syllabus is reviewed in detail. It’s made clear to the students that there is a very definite position (viz., \( R \)) advocated in the class, and that content from the formal sciences will be presented at a fast pace. Students who, upon learning about the nature of *Are Humans Rational?*, find that it’s not their cup of tea, are encouraged to make a change in their schedule before next class.

- **Sep 3**: Main Claim \( R \) Presented and Initial Discussion Stage I, via Overarching Picture. Humans, despite recent claims to the contrary, are rational; more specifically, \( R \), which is the main claim. Rationality consists in cognition that conforms to relevant logic & mathematics, in the face of tests. Piaget was fundamentally correct that humans are fundamentally logical. The methods and anti-\( R \) claims of “disparaging” psychology of reasoning and decision-making are irrational and should be rejected. Corollary: Claims, such as N Baker’s, that algebra should be optional, with all of mathematics, if heeded, would doom people to a pre-rational phase — which obviously would be a very bad thing.

- **Sep 7**: No Class (Labor Day)

4.2 The Attack from Failures of Deductive Reasoning

- **Sep 10**: Now we move to Stage II in the presentation of the overarching picture, and defense and discussion thereof. Review and Expansion of “Main Claims Presented.” Then: The Original, Classic Shots at Piaget (from Wason, Johnson-Laird, etc.). This includes the Wason Selection Task and the THOG Problem.

- **Sep 14**: Recent Shots @ Piaget (& @ Aristotle too).

- **Sep 17**: Additional Recent — & More Elaborate — Shots

4.3 The Attack from Failures of Probabilistic Reasoning

- **Sep 21**: Probabilistic Logic/Entailment. Kolmogorovian axioms sets “declarativized.” Normative correctness characterized.

And in the next four classes, we deflate, in his sequence, Nobelist (economics) Kahneman’s four main attacks on rationality:

- **Sep 24**\( ^\ast \): Linda, Heuristics, & Logic. Reading from Kahneman must be studied beforehand.

- **Sep 28**: Overconfidence in “Professional” Investors; the Efficient Market Hypothesis. Reading from Kahneman must be studied beforehand. Bad Choices, Framing Effects, Prospect Theory. Reading from Kahneman must be studied beforehand.

- **Oct 1**\( ^\ast \): Test #1: Basic Machinery of Rationality (from areas A2 & A3; See footnote 2.)

- **Oct 5**: Pain, Pleasure, Utility & the Meaning of Life. Pascal, Sartre, Seligman (last chapter, and this must be read beforehand), Thagard, Kahneman, Nozick. Defense of Nozick’s argument. Objections to Thagard and Seligman.

4.4 Doing Rational Economics

- **Oct 8**: The Singularity, the MiniMaxularity, & Human Disemployment

- **Oct 12**: No class: Columbus Day — but the next day, Tues, is Mon schedule; hence:

- **Oct 13**: The Bi-Pay Auction. (Simon on steroidal logic.)

- **Oct 15**: On Catching Madoff’s and Their Accomplices.

- **Oct 19**: Deterrence (Chain Stores, Iran, etc.)

- **Oct 22**: Test #2: short essay questions, some of which call for issuing and defending a non-trivial claim.

4.5 The Paradoxes

- **Oct 26**: Russell’s Bogus Barber. ZFC, Cantor’s Paradise via Power, CH.

- **Oct 29**: The Lottery Paradox

- **Nov 2**: Time Travel (grandfather paradox and looping painter). It may be that we decide to substitute coverage of Newcomb’s Paradox for coverage of time-travel paradoxes.

4.6 Darwin’s Dumb Ideas

- **Nov 5**: *Descent* into Error & Veneration of the Dog. Wallace’s argument. Why Darwin would’ve flunked Logic 101 in light of his reasoning about reasoning in *DoM*.

- **Nov 9**: Dim Chimsky. This is based on the paper available at [here](#).
• **Nov 12**: Piaget, ADR, & Licato’s PAGI/PAGI World. Professor John Licato, international authority on Piaget, esp. late Piagetian theory, most of which few on the planet are even aware of.

• **Nov 16**: Chimp Chicanery. Chimps can’t talk, and so Chomsky was right — and listening to him could’ve saved a lot of money. Here we discuss the Symbol Grounding Problem, Searle’s Chinese Room Argument, and whether a computing machine can do better than the likes of Washoe.

• **Nov 19**: Learning a First Language is Hard!

4.7 The Attack on Rationality From “New” Atheism

• **Nov 23**: Rash Russell; Hapless Harris

• **Nov 26**: No Class (Thanksgiving Recess)

• **Nov 30**: Breaking Dennett’s *Breaking the Spell*. Focus includes Dennett’s argument from inconsistency of the union of religious claims.

4.8 Steeples of Rationalistic Genius

• **Dec 3**: Excerpts from Gödel’s Great Theorems.

• **Dec 7**: Excerpts from Gödel’s Great Theorems.

• **Dec 10**: Test #3: short essay questions, each of which calls for issuing and defending a non-trivial claim.
5 Grading

Test #1: 20%. Test #2: 25%. Test #3 (= Final): 35%. Class Participation: 20%. Test #1 will have few to no essays, as it will be focused on technical material. Tests #2 will have some combination of multiple-choice, short-answer, and short- and medium-sized essay questions. Test #3, the Final, which is not cumulative, will have only essay questions. In the case of essays in which you must articulate and defend a determinate, non-trivial claim, you will need to give an argument for your claim, and at least one serious objection must be rebutted. Hard-working students with the aptitude of those admitted to RPI have it within their power to receive an A in this course.

6 Some Learning Outcomes

There are three desired outcomes.

O1 Students will understand the covered arguments against the thesis $\mathcal{R}$.

O2 Students will understanding the main covered Bringsjordian arguments and counterarguments in favor of the thesis that humans are fundamentally rational (= in favor of $\mathcal{R}$).

O3 Students will understand, to a significant degree, the relevant logico-mathematical terrain on which which debates over the driving question take place (e.g., propositional calculus, first-order logic, basic modal logic, probability logic, game theory, decision theory, etc.). See again footnote 2.

7 Academic Honesty

Student-teacher relationships are built on mutual respect and trust. Students must be able to trust that their teachers have made responsible decisions about the structure and content of the course, and that they’re conscientiously making their best effort to help students learn. Teachers must be able to trust that students do their work conscientiously and honestly, making their best effort to learn. Acts that violate this mutual respect and trust undermine the educational process; they counteract and contradict our very reason for being at Rensselaer and will not be tolerated. Any student who engages in any form of academic dishonesty will receive an F in this course and will be reported to the Dean of Students for further disciplinary action. (The Rensselaer Handbook defines various forms of Academic Dishonesty and procedures for responding to them. All of these forms are violations of trust between students and teachers. Please familiarize yourself with this portion of the handbook.)

References

