PHIL 474/673 -Natural Rationality – week 2 – January 11

Benoit Hardy-Vallée, Department of Philosophy
University of Waterloo
http://phi673uw.wordpress.com

HISTORICAL AND PHILOSOPHICAL ROOTS OF NATURAL RATIONALITY (I)

1. KEY CONCEPTS

Rationality: practical vs. theoretical

- *Theoretical* rationality: inferences, thoughts, reasoning, beliefs (formation, revision, justification), mental representations, theories and explanations. "What to think"
- *Practical* rationality: actions, behaviors, decisions, intentions, motivations, preferences and strategies. "What to do"

2 distinctions: (Harman, 1999)

1. *Arbitrary choices*: it is T-irrational to believe A and not B when A and B are equiprobable, although it can be P-rational to prefer A to B when A and B are equally satisfying (not choosing can be P-irrational)
2. *Wishful thinking*: it is T-irrational to let beliefs be influenced by desires, but it can be P-rational to let actions be influenced by desires

Formalized theories:

- Theoretical rationality: logic, epistemology, semantics, probability theory
- Practical rationality: decision theory, game theory, general equilibrium (a.k.a. market) theory

Normative vs. descriptive projects:

Normative: what agents *should* do, what rule *should* be used, what results *should* be sought. (Economics, mathematics, philosophy)

- *Deontological* conception of norms: agent should follow rational-choice theory prescriptions and deviations are irrational (the "Standard Picture" see (Stein, 1996)).
- *Consequentialist* conception: "what it is to reason correctly, is to reason in such a way that you are likely to attain certain goals or outcomes" (Samuels *et al.*, 2004)

Descriptive: what agents do, what rules they use, what results they obtain. (Psychology, experimental economics, behavioral economics, neuroeconomics)

Economics and rationality

Economics is *not* (only) about money:

> *"Economics is a science which studies human behavior as a relationship between ends and scarce means which have alternative uses" (Robbins, 1932)*

> *"a study of mankind in the ordinary business of life; it examines that part of individual and social action which is most closely connected with the attainment and with the use of the material requisites of wellbeing. Thus it is on one side a study of wealth; and on the other, and more important side, a part of the study of man." (Marshall, 1890)*

3 orders of economic rationality

1. Individual rationality (decision theory)
2. Strategic rationality (game theory)
3. Social/distributed rationality (market theory)

The core of formal economic rationality: *preferences*

- $A \geq B$ = "A is preferred to B" =
- $U_A P_A \geq U_B P_B$ =
- "the *subjective expected utility* of A is higher than (or equal to) B" (U=utility, P=probability)
- Classical assumptions:
    - Reflexivity: $A \geq A$
    - Transitivity: $A \geq B$ and $B \geq C$ then $A \geq C$.
    - Completeness: $A \geq B$ or $B \geq A$ or both
- Can be used to construct models of decision or social interaction.

Related concepts:

- *Probability* (frequentist vs. subjectivist interpretations
- *Utility*: cardinal (magnitude) or ordinal (preference ranking). Anything that has a value: happiness, pleasure, wealth, desire satisfaction, etc.
- *Risk* vs *Uncertainty* (Knight, 1921): measurable uncertainty vs un-measurable uncertainty (*radical* uncertainty)

Classical model: "Homo Economicus"

- Perfectly rational, selfish and utility-maximizer agent
- Abstraction (that is supposed to be) useful for economic modeling and prediction
- Analogy with physics: ideal gas, ideal particles
- Economic version of "intentional stance" (Dennett, 1987) or "Principle of charity" (Davidson, 1980, 1984, 2004)

Rationality and folk-psychology

- Folk-psychology: intuitive, naïve, ordinary and non-scientific explanation and prediction of behavior. Beliefs, desires, and intentions attribution.
- Davidson: rational actions are *caused* by beliefs and desires that *justify* the action. Rationality is a norm of interpretation.
- Simulation vs Theory-Theory (Stich & Nichols, 2003)
- Rationality principle or postulate: interpreting others as if they are rational, making sense of their action by considering them rational
- Decision theory can be seen as a formalization of folk-psychology, where probability=belief and utility=desire.
- Can folk-psychology teach us anything about rationality? (Alternatively: can folk-biology teach us anything about animals?)

Different concepts of rationality:

- *Substantive*: about the ends
- *Instrumental*: about the means
- *Classical* (standard economics): utility maximization, optimization.
- *Bounded*: procedures and biases that real agents implement (Kahneman *et al.*, 1982; Simon, 1982).
- *Ecological*: "fast and frugal heuristics": study of adaptive heuristics that agents use in specific environments (Gigerenzer, 2000; Gigerenzer & Selten, 2001; Gigerenzer *et al.*, 1999).

Problems:

- Usual concepts of rationality seem to be either descriptive or normative, and neglect the interplay between both.
- (Too much) theory-ladenness: rationality is thought to be perfect, or "limited" or adaptive. How can we know that in advance?
- "Ought implies can": rational norms cannot require omnipotence (Cherniak, 1986).
- Normative theories do not account for important feature of cognitive agents: risk-aversion, ambiguity-aversion, domain-specificity, prosocial behavior etc.
- Descriptive theories need conceptual resources from normative theories to describe and assess actual performance.
- It is not clear that our "fast and frugal heuristics" are always adaptive and efficient.
- "Deviating from standard norms" may not be always irrational if agents are better off
- Gaps between i) reasons and action, ii) decision and action iii) initiation and completion of the action (Searle, 2001)
- Normative theories need facts to account for their optimality.

Parallel with naturalized epistemology:

> *Naturalization of epistemology does not jettison the normative and settle for the indiscriminate description of ongoing procedures. For me, normative epistemology is a branch of engineering. It is the technology of truth-seeking, or, in more cautiously epistemological term, prediction. Like any technology, it makes free use of whatever scientific findings may suit its purpose. It draws upon mathematics in computing standard deviation and probable error and in scouting*

> *the gambler's fallacy. It draws upon experimental psychology in exposing perceptual illusions, and upon cognitive psychology in scouting wishful thinking. It draws upon neurology and physics, in a general way, in discounting testimony from occult or parapsychological sources. There is no question here of ultimate value, as in morals; it is a matter of efficacy for an ulterior end, truth or prediction. The normative here, as elsewhere in engineering, becomes descriptive when the terminal parameter is expressed.*(Quine, 1986, pp. 664-665)

Natural rationality

Set of questions, not of assumptions:

- What is a decision? Is it a unitary kind?
- What is a good decision?
- How decisions are made?
- How good decisions are made?
- How good decisions are good?
- Do animals make decisions?
- What is the role of learning, evolution and culture?
- Are decisions "in the head"?

Interdisciplinary field, not a definite research program:

- Cognitive science
- Philosophy of science, philosophy of mind
- Anthropology
- Economics (formal, experimental, behavioral, evolutionary, neuroeconomics)
- Biology (evolutionary biology, behavioral ecology, ethology)
- Neuroscience
- Artificial Intelligence and Artificial Life

2. ADAM SMITH, THE "FATHER OF MODERN ECONOMICS"

The Wealth of Nations (Smith, [1776]1986)

The "invisible hand", division of labor, market organization: selfish individuals collectively create wealth by trading. (note: descriptive thesis, not normative)

> *By preferring the support of domestic to that of foreign industry, he [the individual] intends only his own security; and by directing that industry in such a manner as its produce may be of the greatest value, he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention. (IV, ii)*

> *It is not from the benevolence of the butcher, the brewer, or the baker, that we can expect our dinner, but from their regard to their own interest. (I,ii)*

The Theory of Moral Sentiments (Smith, [1759] 2002)

> *How selfish soever man may be supposed, there are evidently some principles in his nature, which interest him in the fortune of others, and render their happiness necessary to him, though he derives nothing from it except the pleasure of seeing it.* (I, I, *i*)

- Moral sentiments = social emotions and prosocial behavior ("generosity, humanity, kindness, compassion, mutual friendship and esteem")
- 2 functions of sympathy: ("fellow-feeling")
    - Epistemological: feeling what others feel
    - Social-Normative: approve or disapprove others' reactions
- Emotions + imagination solve the problem of other minds.
- We also *assess* each other's intellectual and affective judgment according to our feelings
- Sympathy as the basis for moral virtues: humanity and self-control (social emotions as "guardians of justice": "we detest Iago as much as we esteem Othello" I,II,iii)
- Emotions can be social, unsocial or selfish.

Relevance for natural rationality

- "Simulationist" account of mindreading: embodied, automatic skill instead of theoretical inference ("*the effect of sympathy is instantaneous*" I,I,iv)
- Decision-making as a struggle between the "passions" and the "spectator" (dual process theories, see (Evans, 2003; Stanovich & West, 2000))
- Akin to modern behavioral economics (Ashraf *et al.*, 2005): fairness, trust, reciprocity, altruism etc.
- The importance of sympathy (now called "empathy") in social cognition (epistemological and social functions)

> *Empathy might enable us to make faster and more accurate predictions of other people's needs and actions and discover salient aspects of our environment. Furthermore, empathy might serve as the origin of the motivation for altruistic behavior and cooperation (de Vignemont & Singer, 2006, p. 440)*

- The importance of emotions in cognition
    - (Damasio, 1994, 1999): individuals emotionally impaired can hardly be rational
    - Compare with Pascal: "*The heart has its reasons which reason knows nothing of*"
- The "bounded rationality" of sympathy:

> *I judge of your sight by my sight, of your ear by my ear, of your reason by my reason, of your resentment by my resentment, of your love by my love. I neither have, nor can have, any other way of judging about them.* (I, I iii)

> *As we have no immediate experience of what other men feel, we can form no idea of the manner in which they are affected, but by conceiving what we ourselves should feel in the like situation.* (I, I, i)

Two sides of the same coin? (the 'Adam Smith-Problem')

- Selfishness *and* sympathy?
- Solution: universal propensity for social exchange of economic and "sympathetic" good (fairness, generosity) (Smith, 1998)

> *"Smith had but one behavioral axiom, "the propensity to truck, barter, and exchange one thing for another," where the objects of trade I will interpret to include not only goods, but also gifts, assistance, and favors out of sympathy, that is, "generosity, humanity, kindness, compassion, mutual friendship and esteem" (Adam Smith 1759; 1976, p. 38)." (Vernon Smith, 1998)*

3. LINKS

- http://en.wikipedia.org/wiki/Adam_Smith
- R. H. Coase. "Adam Smith's View of Man" (PDF). University of Chicago Graduate School of Business. http://www.chicagogsb.edu/research/selectedpapers/sp50a.pdf
- Adam Smith online: http://www.adamsmith.org/policy/publications/
- Hartmut Kliemt and Axel Ockenfels: Dialogue Concerning the Nature of Rationality http://ockenfels.uni-koeln.de/download/papers/nature_of_rationality_05022004.pdf
- Searle, J. 2001. The Classical Model of Rationality and Its Weaknesses http://mitpress.mit.edu/books/chapters/0262194635chap1.pdf

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