WHAT I BELIEVE AFTER 45YRS OF PHILOSOPHICAL STUDY
(AND HOW)

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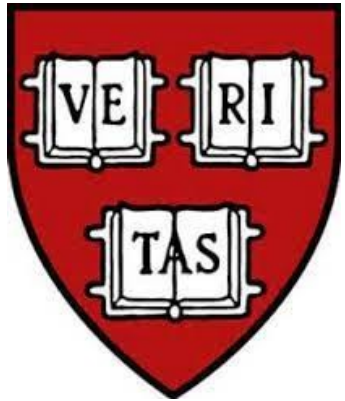
OUTLINE

- Keynesian and Kyburgian ampliative tradition in induction
- defeasible dialectical argument
- specific analogical reasoning and legal interpretation of precedent
- probability in negotiation and in risk management
- formality and norms
- procedural fairness
- epistemology and ethics
- what VERITAS means to me

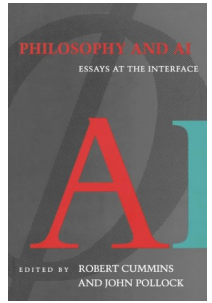


Keynesian ampliative tradition

- Logic of Russell and Whitehead: **deductive**: math, constraint prop, digital logic
- Other forms of reasoning: **analogical**, **inductive**, probabilistic, dialectical, abductive?

- Keynes (ESSAYS IN BIOGRAPHY, 1972): … ***the formal treatment*** *at the hands of [**Russell**], of Wittgenstein and of Ramsey ha[s] been ... to* ***empty [logic] of content*** *and to reduce it more and more to mere dry bones, until finally it seem[s] to* ***exclude ... most of the principles, usually deemed*** *logical, of* ***reasonable thought****."* (But see later Ludwig W ZETTEL, 1967)
  Image: Derek Jarman's 1993 movie, WITTGENSTEIN

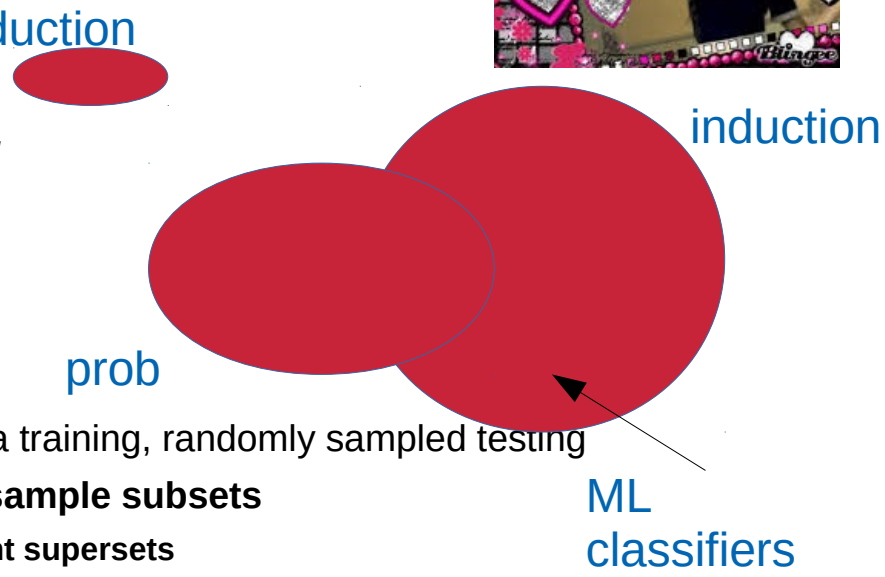
- **Ampliative** vs non-Ampliative reasoning
  - Logic merely expounds meaning (meaning postulates) of *S = Thms(S)*
  - Loui: **ampliative reasoning** is rational **non-deterministic** nonmonotonic reasoning (PHILOSOPHY AND AI, 1991)



Non-Ampliative vs Ampliative

Image: Blingee.com

- *If p then q*
  - So q is part of the **meaning** of p
  - All **p-worlds are contained in q-worlds**
  - **Ontology** makes this clear: *if is human then is mammal, duh!*
    - Not what you thought you were saying
    - Counterfactual, not material conditional? *q or !p*
- *If p then probably q, Prob(q|p) is high*
- **Scandal of machine learning**
  - Hide no-knowledge guesses in **nondeterministic** local optima training, randomly sampled testing
  - **Training/testing randomized supersets** hide biased **small-sample subsets**
    - maybe Bayes is helping you a bit if your subsets have **close relevant supersets**
  - **Scandal of induction**: How does an inductive method **confirm** your inductive method?
    - Better than Tarski: *is-true(p is true)*

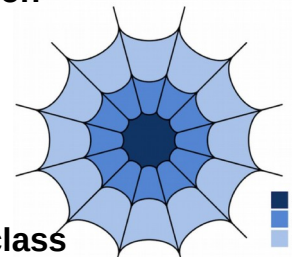


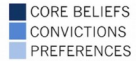
Carabelli, 2023

Hacking, I. 1975. *The Emergence of Probability*. Cambridge UP.
Hesse, M. B. 1964. *Models and Analogies in Science*. University of Notre Dame.
Kahneman, D., O. Sibony, and C. Sunstein. 2021. *Noise: A Flaw in Human Judgment*. London: William Collins.
Keynes, J. M. 1904a. *Ethics in Relation to Conduct* UA/19.
Keynes, J. M. 1904b. *The Political Doctrines of Edmund Burke*, November UA/20.
Keynes, J. M. 1905a. *Virtue and Happiness*, after the Easter Vacation (MM/24.2).
Keynes, J. M. 1905b. *Miscellanea Ethica*, July-September UA/21.
Keynes, J. M. 1905c. *Beauty*, 3 October 1905 (UA/23.2/3).
Keynes, J. M. 1905d. *Modern Civilisation*, 28 October UA/22.
Keynes, J. M. 1906. *Egoism*, 24 February UA/26.
Keynes, J. M. 1907. The Principles of Probability (PP), 1907 version TP/A.
Keynes, J. M. 1910. Notebook, 8 Lectures on Company Finance and Stock Exchange, Lent Term 1910, (UA/6/3).
Keynes, J. M. 1931. "F. P. Ramsey." In *Essays in Biography*, in CW X, 335–346. London: Macmillan.
Keynes, J. M. 1971–1989. *The Collected Writings of John Maynard Keynes (CW)*. Vol. I–XXX, edited by E. Johnson and D. E. Moggridge. London: Macmillan.
Keynes, J. M. n.d.-a. *The Papers of John Maynard Keynes*. Cambridge: King's College Archive Centre.
Keynes, J. M. n.d.-b. On beauty and Art. On Art Criticism and the Appreciation of Beauty UA/23
Loui, R. P. 1991. "Argument and Belief: Where We Stand in the Keynesian Tradition." *Minds and Machines* 1 (4): 357–365. https://doi.org/10.1007/BF00352915

Kyburgian ampliative induction

- Most elegant, beautiful, complete account of **Scientific theory formation**
  - More about **non-deductive reasoning** than **science**
- Addresses problem of Popper confirming a universal generalization
  - Carnap, Reichenbach, Quine-Ullian WEB OF BELIEF
    Image: City Church of Long Beach

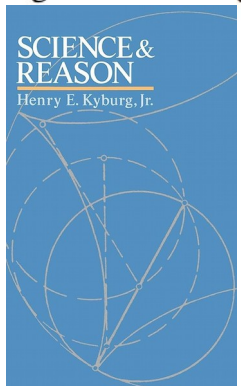




- Probability is an **interval**, based on **data** from **undefeated reference class**
  - no small samples! vs. **machine learning**
  - *Prob = .5 vs Prob = [0, 1]*
- **Theory** is part of **Ur-corpus** of meaning
  - *PV = nRT, F = ma, preference is transitive*
  - Gives up unlimited conjunction, logical closure only for maximal consistent subsets
- Evidence+Theory → Prob Observational Error
  - revise Ur-corpus, remove/weaken some meaning postulate
    - → **fewer predictions, less error**

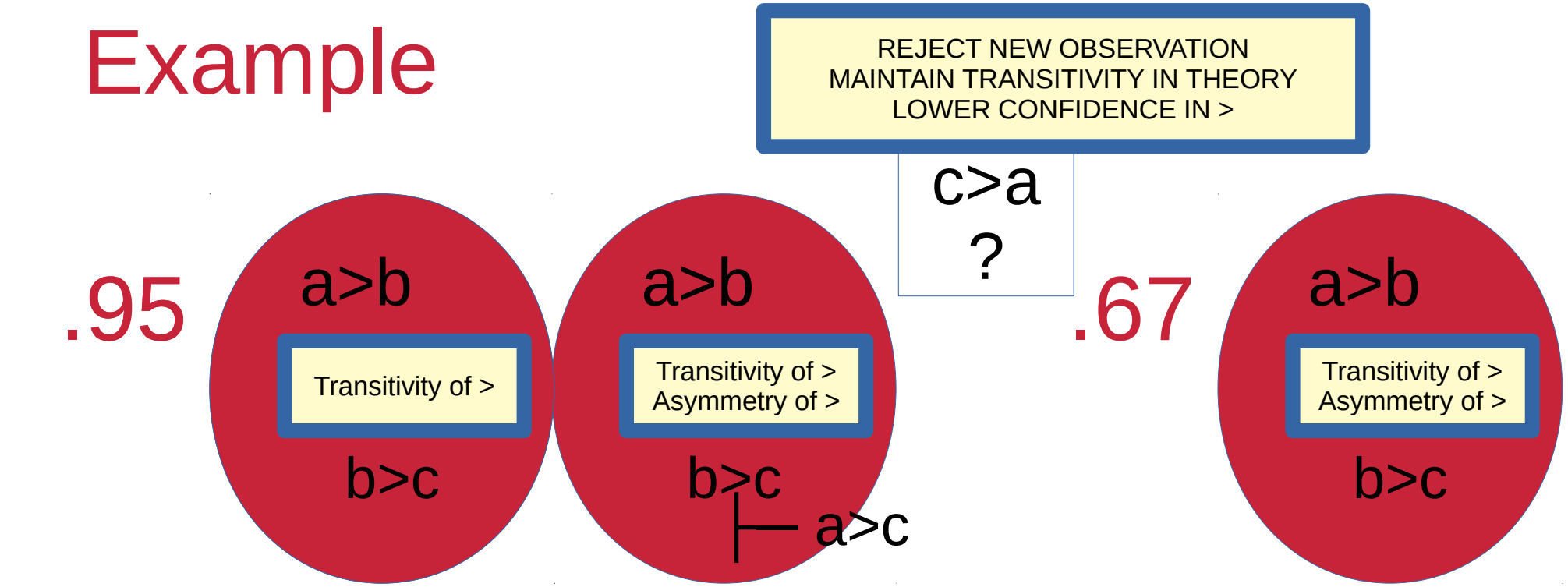
Ronald P. Loui

Scientific and Legal Theory Formation in an Era of Machine Learning: Remembering Background Rules, Coherence, and Cogency in Induction



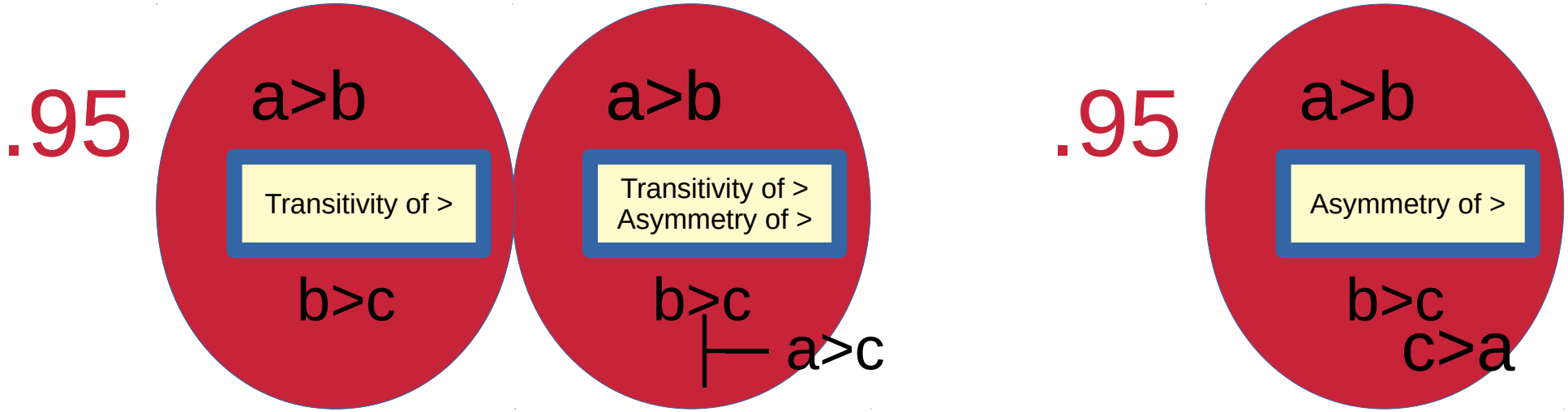
- FOUNDATIONS OF MEASUREMENT: **Suppes**, Krantz, **Tversky**, Luce; PHILOSOPHY OF LOGICS, Haack

Example

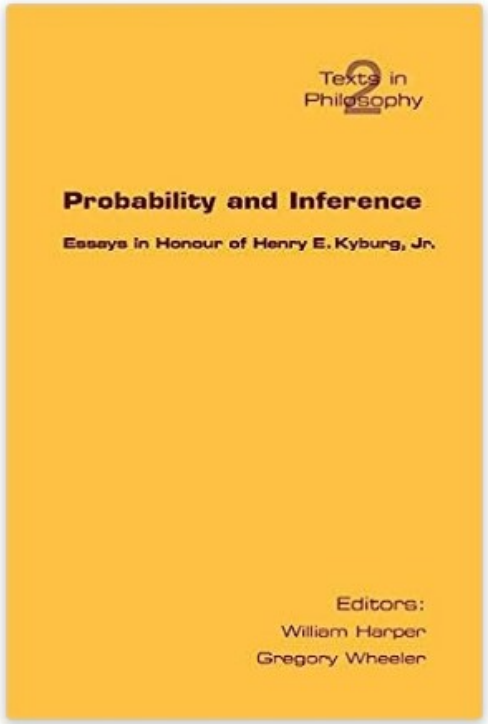

REJECT NEW OBSERVATION
MAINTAIN TRANSITIVITY IN THEORY
LOWER CONFIDENCE IN >
c>a
?
.95
a>b
Transitivity of >
b>c
a>b
Transitivity of >
Asymmetry of >
b>c
⊢ a>c
.67
a>b
Transitivity of >
Asymmetry of >
b>c

Example

REJECT TRANSITIVITY OF >



Books › Computers & Technology › Computer Science




See all 2 images

Probability and Inference. Essays in Honour of Henry E. Kyburg Jr. (Texts in Philosophy)

by G. Wheeler (Editor), W. Harper (Editor)

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$40.80

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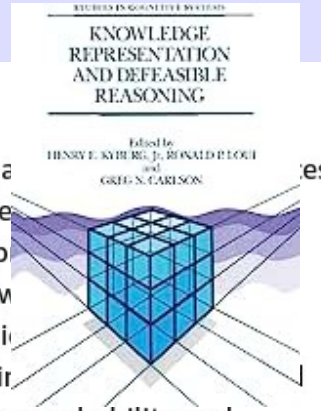
$40.80

Probability intervals measure your ignorance.

Point probabilities demonstrate it.



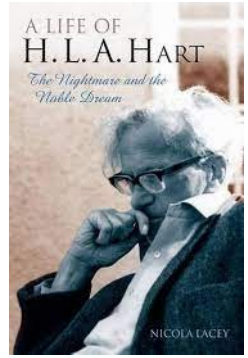
Recent advances in philosophy, artificial intelligence, mathematical psychology, a…es have brought a renewed focus to the role and interpretation of probability in the… reasoning. Henry E. Kyburg, Jr. has long resisted the now dominate Bayesian app… probability in scientific inference and practical decision. The sharp contrasts betw… approach and Kyburg's program offer a uniquely powerful framework within whi… issues at the heart of scientific inference, decision, and reasoning under uncertai… essays for this volume take measure of the scope and impact of Kyburg's views on probability and scientific inference, and include several new and important contributions to the field. Contributors: Gert de Cooman, Clark Glymour, William Harper, Isaac Levi, Ron Loui, Enrique Miranda, John Pollock, Teddy Seidenfeld, Choh Man Teng, Mariam Thalos, Gregory Wheeler, Jon Williamson, and Henry E. Kyburg, Jr.

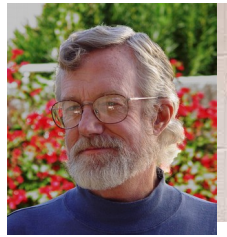
Read less

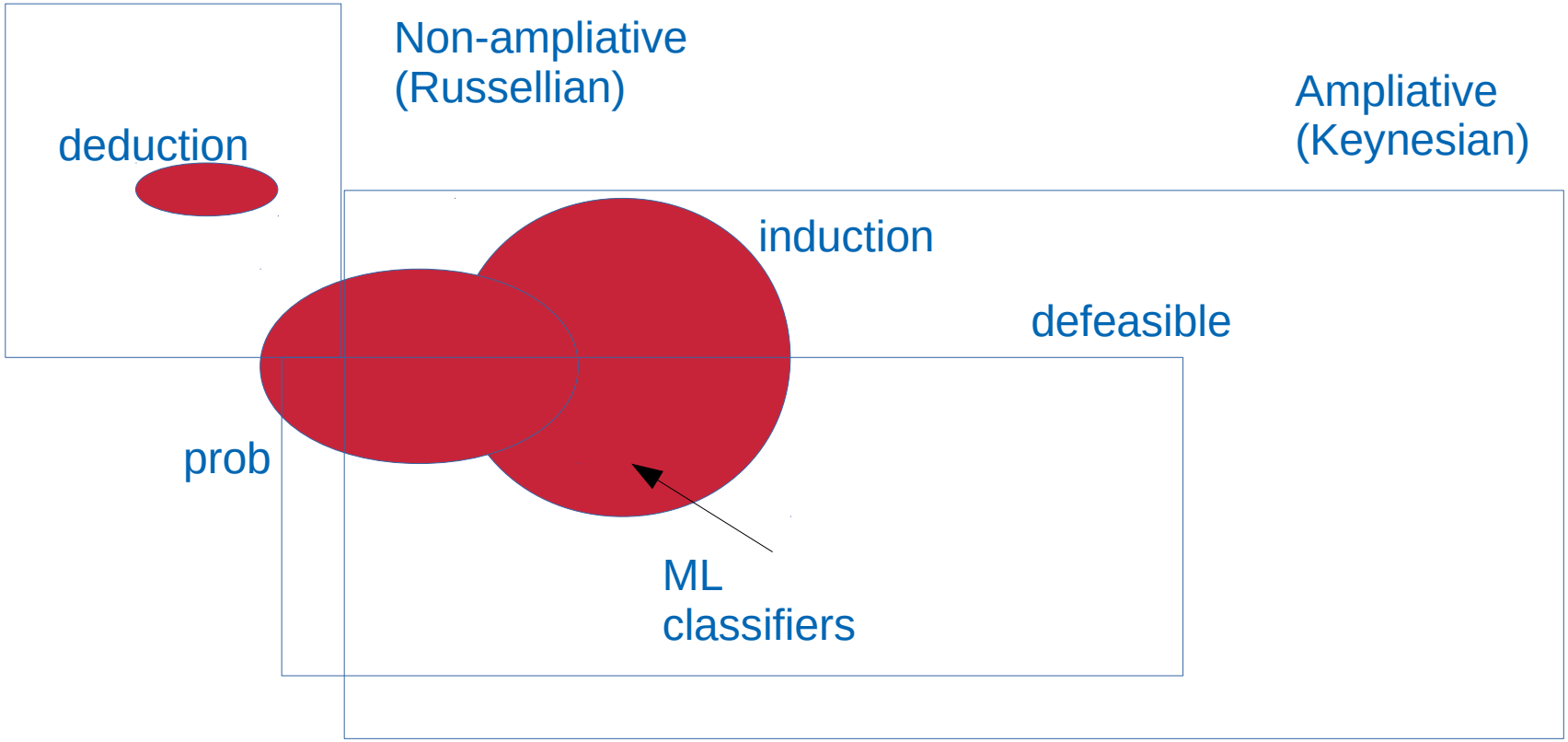
Defeasible dialectical argument

- John Pollock interpreting later Wittgenstein (led to this via Keynes)
  - See also Rescher DIALECTICS, Donald Nute
  - It appears red, therefore **defeasibly** it is red (not just **probability**, but **acceptance**)
- `If p then q`
  - **`if p then defeasibly q`**
  - **`if p & s then defeasibly not-q`**
  - `if r then not( if p then defeasibly q )`
- Broached by HLA Hart THE CONCEPT OF LAW, 1961, cf. *prima facie, ceteris paribus, mutatis mutandis*
  - *Valid Contract: Offer, acceptance, consideration AND memorandum*
  - *But NOT illegal, NOT minority age, NOT coerced, ...*
- AI nonmonotonic reasoning: inheritance, persistence, defaults, exceptions, undercutters, annulments, repeals, abrogations, invalidation, nullification, ...
- **Defeasible reasons** chained → **arguments** → **pro-con: dialectic**/debate

Isn't all implicature defeasible inference?
Isn't all analogy defeasible inference?
Aren't all decision and risk analyses defeasible?
Aren't all statistical arguments defeasible?






Non-ampliative
(Russellian)
Ampliative
(Keynesian)
deduction
induction
defeasible
prob
ML
classifiers

Automatic Zoom

2022 undergraduate thesis, Munich
2017 HaLawRev Baude and Sachs
2000 UChiLaw Adjunct, future USSen/POTUS: “Fascinating work”
~~1998-2023+ Canadian AI Textbooks~~
1995 half the papers in AI and Law Conf?
~~1988 treatise of 2012 Turing Award Winner~~
1988 paper of current Cornell President
1987 Chinese academic fan mail

...ive Sci ...er, 11(2), 1987.

P. Loui. Defeat among arguments: A ...easible inference. *Computational Intelli-*...987.

] .1. McCarthy. Applications of circum-...rmalizing common sense knowledge. In *...f the American Association for Artificial ...Workshop on Nonmonotonic Reasoning,* ...Y., 1984.

82] D. McDennott. A temporal logic for ...ut processes and plans. *Cognitive Sci-*...82.

M. E. Pollack. A model of plan infer-...inguishes between the beliefs of actors ... In *Proceedings of the Association for ... Linguistics,* New York, 1986.

...mentation is based on distinguishing relevant arguments from insignificant argu-...s and examining conclusions for a given problem. It can also entail identifying con-... causing to seperate pros and cons for certain conclusions. In the 1990s, innovations ...hifts in the field of artificial intelligence led to a more formal and computational argu-...ation theory, which yielded the field known as Argumentation Logic.

...mentation Logic is likely to be a very influential field of research for the future of ar-...l intelligence more specifically logic, law, optimization, security administration and ...philosophy.

...hesis is an overview of the achievements in Argumentation Logic and of the history ...gumentation Logic research. It also mentions the most significant scientists in the field ...g others Dung, Pollock, Loui, Prakken. Furthermore the general semantics of the ab-... argumentation framework, applications are displayed and finally an extension of the ...ework to structured arguments is intro...

Harsanyi [1985] and Loui [1986b] include computational considerations as part of the pragmatics of belief acceptance. The crystallization of partial beliefs into a corpus of crisp logical statements has computational advantages which overshadow the incurred loss of detail. An obvious advantage is the economy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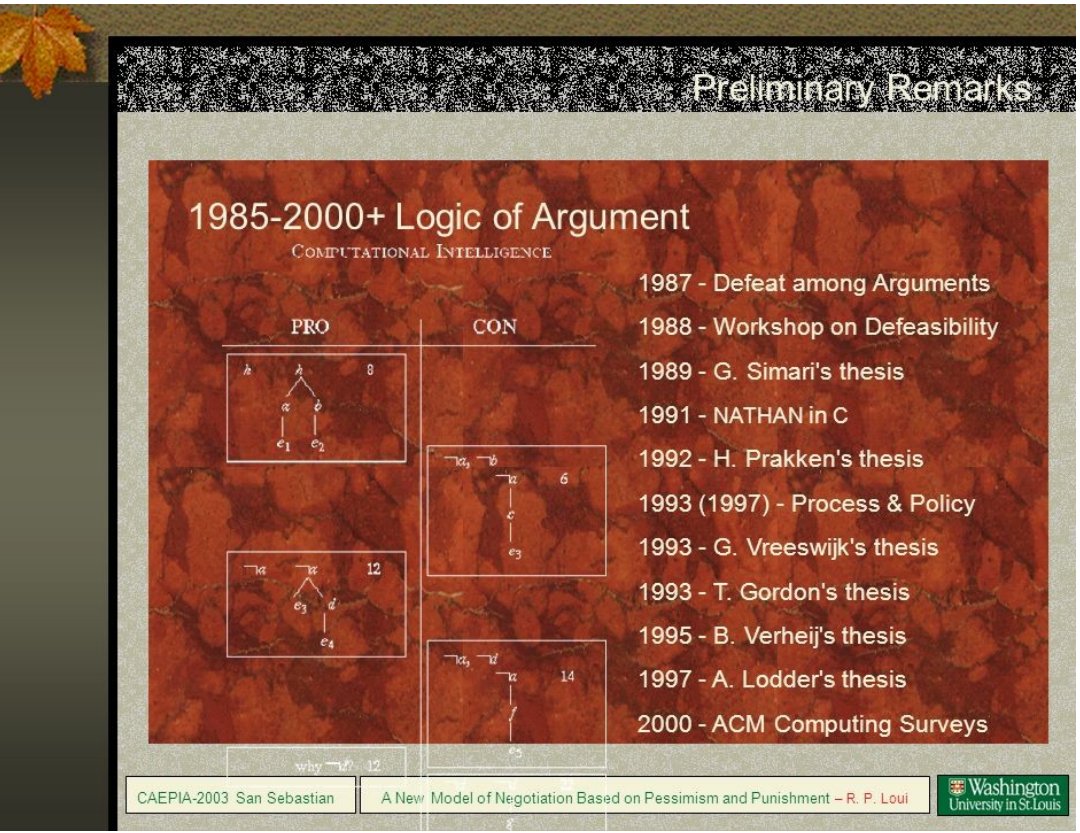
Defeasible dialectical argument



Argumentation (2005) 19:259–266
DOI 10.1007/s10503-005-4415-x

A Citation-Based Reflection on Toulmin and Argument

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Intellectual history has always appealed to certain kinds of scholars. The prospect of being vindicated by future thinkers can compensate for the difficult struggle that many original thinkers experience when they take risks, attempt fundamental change, or simply have difficulty communicating their ideas to contemporaries. Especially in today's intellectual din, where the fast pace of technology and science and the rise of new disciplines can make it hard to hear traditional voices, where scholars are under pressure to produce short-term and conventionally valuable thoughts, there is merit in what the intellectual historian does.

The new tool in intellectual history is the citation count. Today, there are numerous ways to gauge the impact of a publication because there are numerous citation databases that are maintained, both by professional organizations and by companies in the business of providing high quality indexes. Online databases make comparative study possible across an entire discipline.

For Stephen Toulmin, intellectual history is a relevant question. Toulmin is known widely as a seminal author, is appreciated in many disparate intellectual communities, and continues to grow in stature. By all accounts, Stephen Edelston Toulmin has done things in an academic career that only few will do. He stands as an important twentieth century thinker, whether one thinks he is a logician, a philosopher of science, a rhetorician, a popular writer, or even an intellectual historian himself. His work reaches the most improbable corners of the academic landscape. I have been approached by many people wanting to discuss the Toulmin diagram, by scholars from every continent, for dozens of purposes, whether they use the diagram formally or informally, whether they are technologists or Luddites, whether they know a lot about Stephen Toulmin or nothing at all. Meanwhile, the depth of Toulmin's work has always been under suspicion, its technical importance questionable; and one can even quarrel whether there are precedents for his

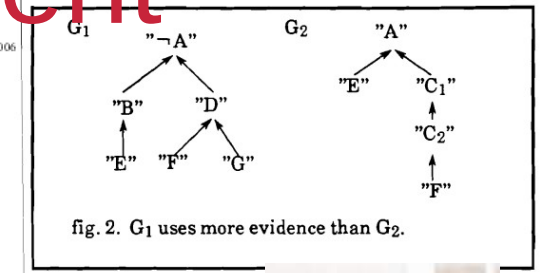
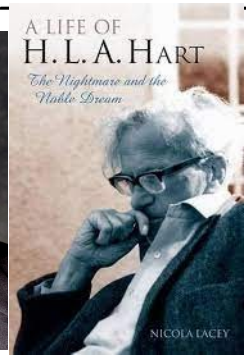
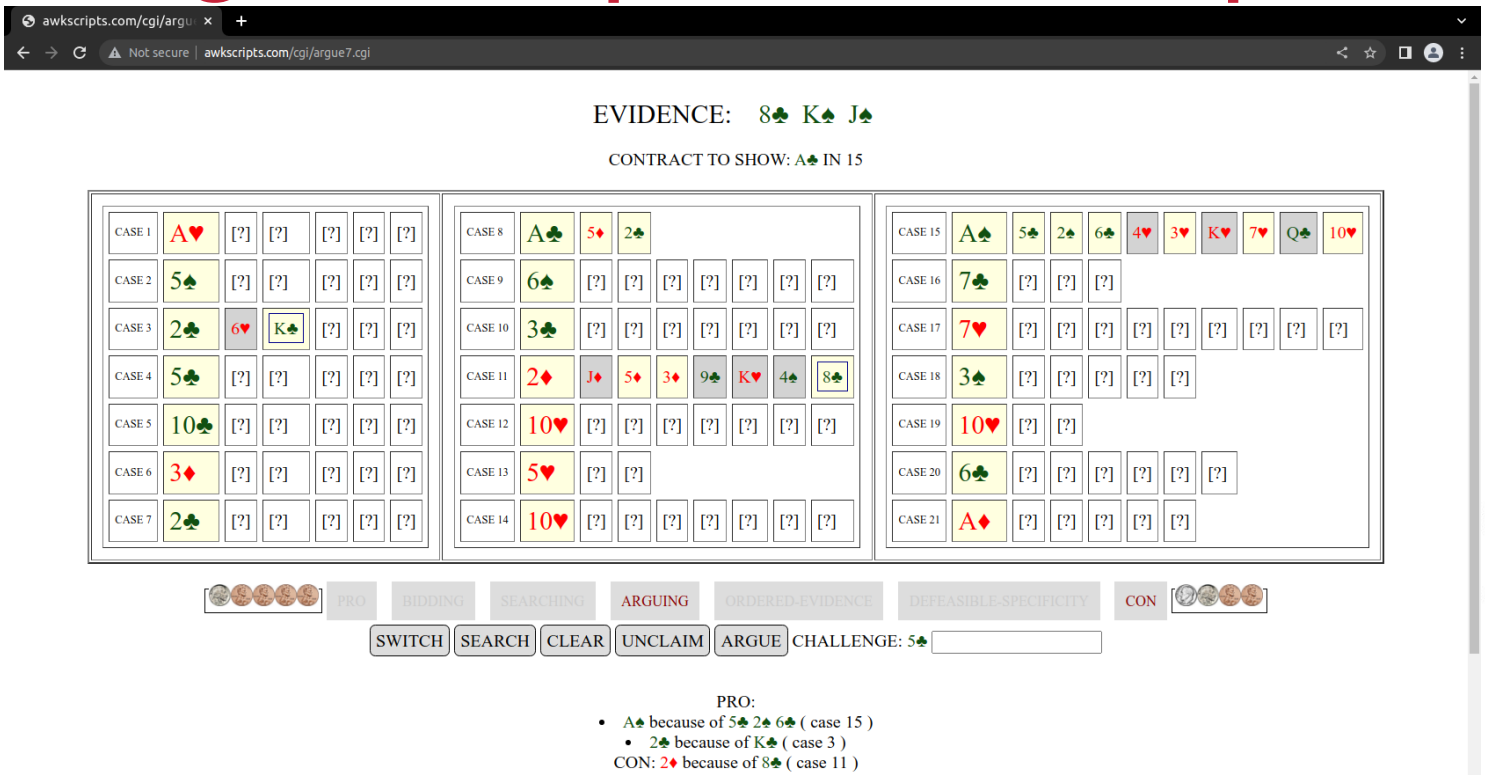


fig. 2. G_1 uses more evidence than G_2.



Specific analogical reasoning and legal interpretation of precedent



Eliding
The Arguments of Cases

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I

Joseph Raz ventured in *The Authority of Law* to describe the case with a set of letters.[1]

> A reported decision, P, records that in that case where the facts were a, b, c, d, e, g, the decision was based on the rule that whenever A, B, C then X should be decided. The ruling in P, can be summarized as:
>
> [P] a, b, c, d, e, g / A, B, C —> X.
>
> The novel case, N, is a case of a_1, b_1, c_1, not-e_1, f_1, and is thus governed by P ...[2]

Raz identifies two important patterns of legal reasoning which he can describe symbolically. The first is *distinguishing*:

> The rule laid down in P was when A, B, C then X. Since N is a case of a_1, b_1, c_1 the rule applies to it. But the court has a power to distinguish. It can change the rule into A, B, C, E, then X.[3]

The second is *analogizing*:

> If the facts in the new case N_1 include a_1, b_1, and c_1, there is no room for

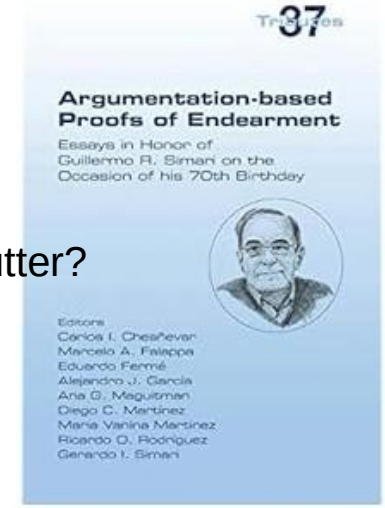
[1]: Joseph Raz, *The*
[2]: p. 183. Raz does
A. But this reading
[3]: *Ibid.*, p. 185.

If you throw away specificity defeaters
You throw away your argument logic

Argument moves:

Dialectically refining the predicate

- *(x): if P(x) then defeasibly Q(x)*: Asians don't generally do well at Harvard in sports
- Rebuttal: *P(a) & !Q(a)*: Jeremy Lin did fine; therefore, not all Asians don't do well in sports
- 1: Retract the original claim? Or accept *a* as an exception?
- 2: Revise the predicate that conditions the antecedent:
  - How much: Just Jeremy Lin? Asians ≥ 6'3"? More specific rule or undercutter?
  - *Asians < 6'3" is P'(x)*
  - *If P'(x) then Q(x)*
  - *P – { x: like(JL)(x) }*



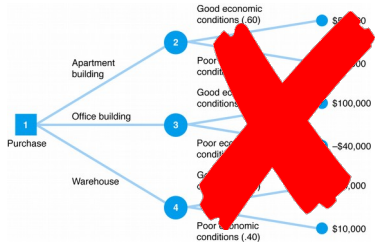
Dialectically severing the correlated or conversationally implicated consequent

- *(x): If P(x) then defeasibly Q(x):* Geeks don't typically do well at Harvard in sports
- *(x): If P(x) and Q(x) then defeasibly R(x)*: Geeks who don't do well at Harvard in sports, don't typically contribute to college reputation
- Rebuttal: *P(a) & Q(a) & !R(a)*: Geeky Bill Gates did not do well at Harvard in sports; but does contribute to college reputation
- 1: Retract the second claim? Accept *a* as an exception w.r.t. *P(x) & Q(x)* >— *R(x)*?
- 2: Revise: Sever the correlate: *(x): P(x) then defeasibly Q(x) but !(defeasibly R(x))*
- 3: Relent and add *(x): If P(x) & Q(x) then defeasibly !R(x) ?*
- Usually the *R* is part of the *Q* (implicature) and needs to be separated out
  - does well = does well socially + does well academically
  - Polysemic correlates

Utility and Negotiation

Payoff Matrix = Wrong Idea:

It matters not what you can get,
But what you can do with it.

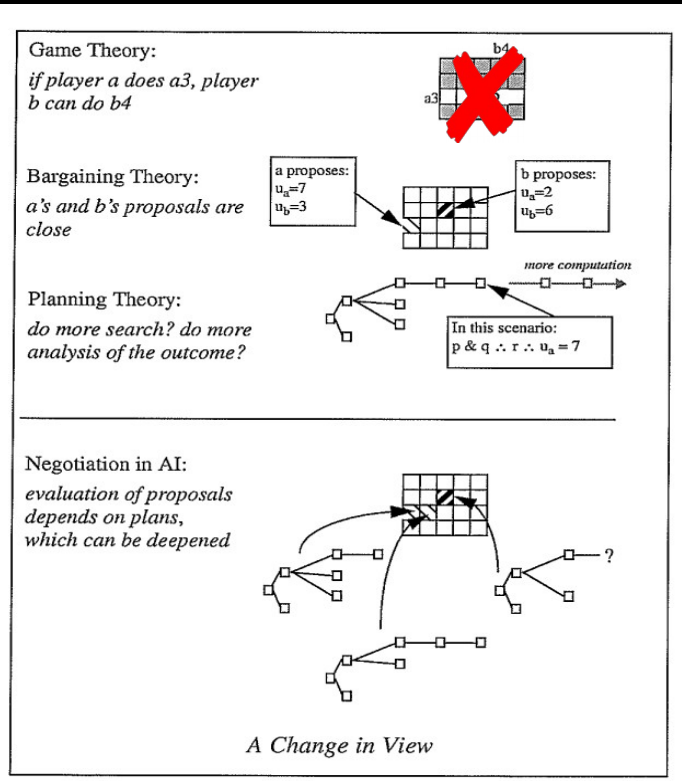


So I claim there is more to be said than "$u(recovery) = 15$",

Defeasible Specification of Utilities

Transactional value:
Not just What, but How, Why, and Whom

You can't buy the smile that you can get just by being nice.
And you have to know how to value that smile.

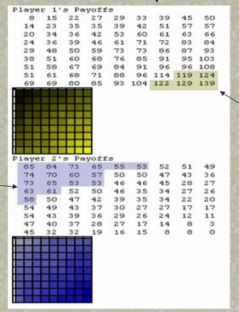


Utility calculus

Should shift at each Maslow level, duh.

Probability in negotiation (reject Nash Eq)

Observation: parties to a negotiation (can) construct a probability distribution over potential settlements



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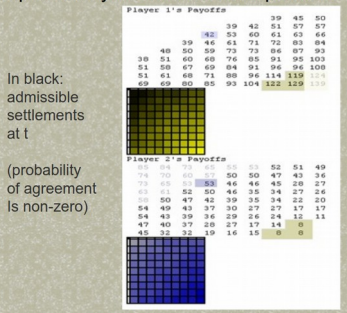

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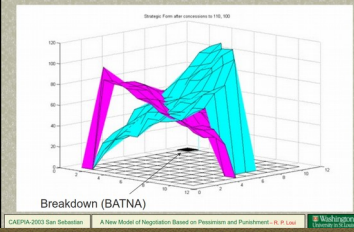

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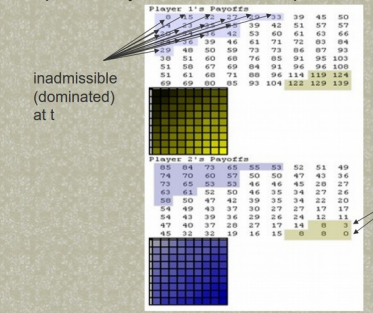

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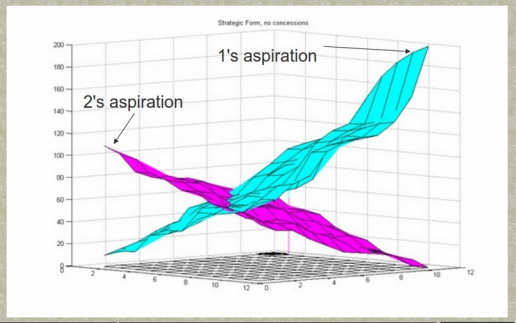

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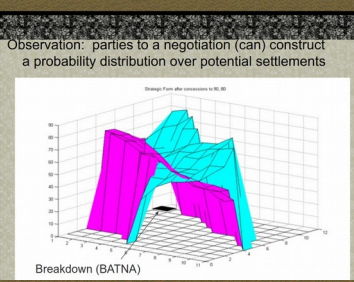
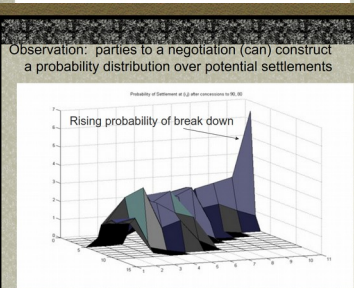


Observation: parties to a negotiation (can) construct a probability distribution over potential settlements



Probability in negotiation: Process

Nobel awaits whoever develops this (see Ward Edwards re: Kahneman)

Observation: From probability, one may calculate

1. An expected utility given settlement ($Eu|s$) and
2. An expected utility given continued negotiation, $Eu = Eu|s\ (1 - prob(bd)) + u(bd)\ prob(bd)$

Observation: It may be rational to

1. **Extend an offer**, *o*, if $Eu < u(o)$
2. **Accept an offer**, *acc*, if $Eu < u(acc)$, $acc \in offers(t)$
3. **Break down** unilaterally if $Eu <$ *security*

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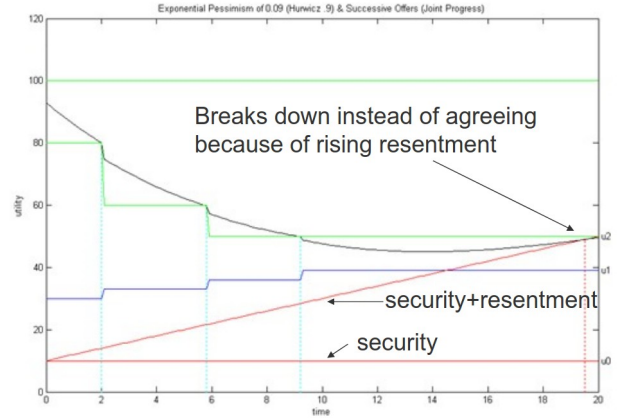

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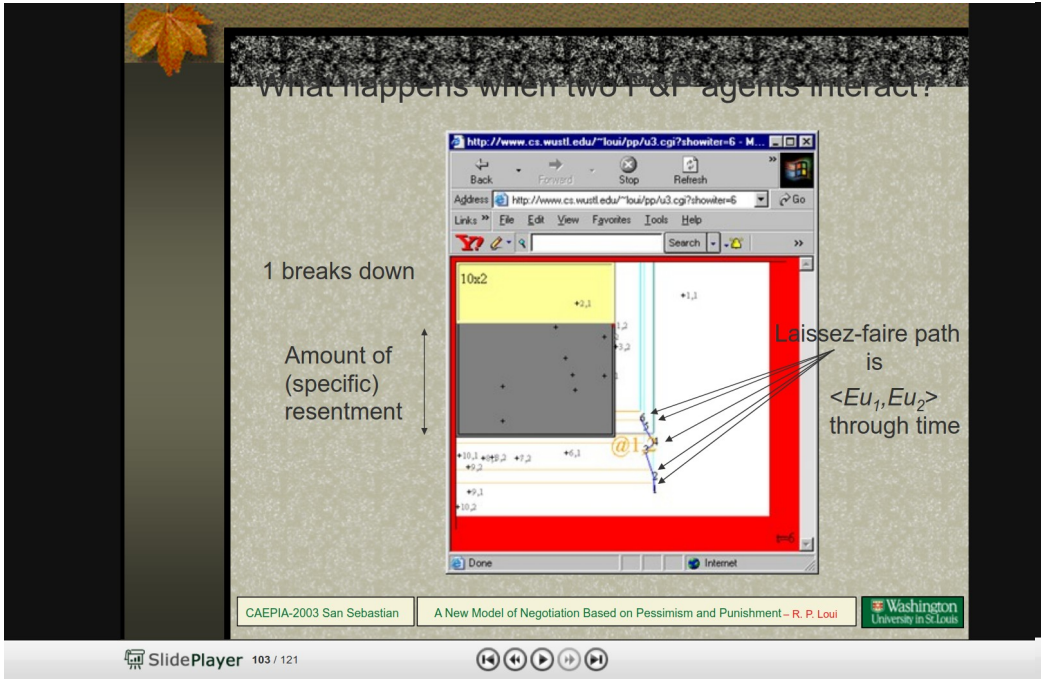
Probability in negotiation: Process



Probability in risk management

The principal contribution i
for formal argument in the evalu
a standard for path coherence (
tions and mitigations are used t
determine standards of justifiab
meeting attainment levels, subj
achievement, but is justified by envisionment, which includes meeting and raising standards, lengthening paths, and providing more specificity about milestones. The framework proposes navigating an increasingly specified and plausible, defensible path into the future, possibly deflected, but set aright.

The resulting picture of decision is a mixture of search, pr
tion, and risk management; it should superficially bear a resemb
ing mixed-integer discrete time control and many recent approa
reasoning through argumentation. It is intended as an alternative to narrow optimization, which permits easy sacrifice of externalities on the grounds that they are hard to measure as real values. It is also intended as an alternative to fixed horizon decision-making, which produces unsustainable extremizations.

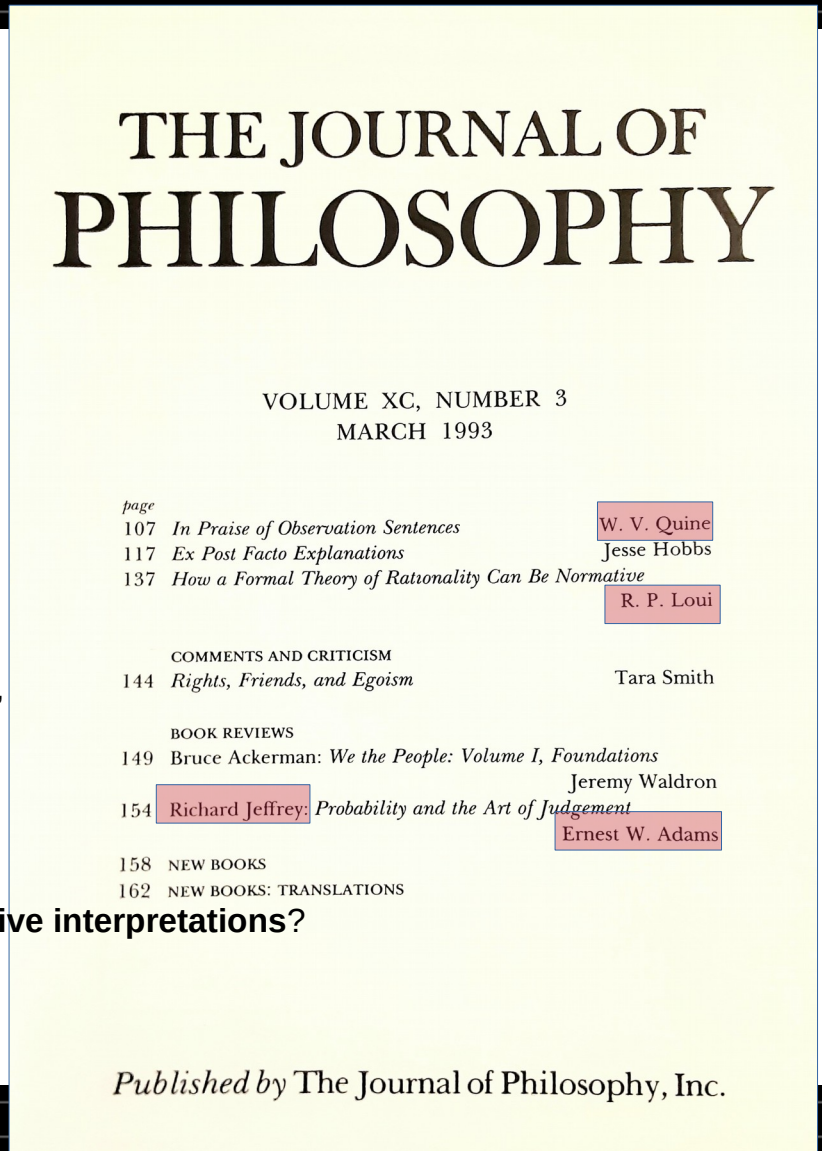
Instead of maximizing lottery-based, expected-utility bundles for selecting optimal choice under precisely measurable outcomes, consider arguing milestone-based, standard-attaining trajectories for refining commitments when faced with poorly predictable hazards.

AGAINST NARROW OPTIMIZATION AND SHORT HORIZONS: AN ARGUMENT-BASED, PATH PLANNING, AND VARIABLE MULTIATTRIBUTE MODEL FOR DECISION AND RISK

Probability could connect points on the path
Not just discount utilities at some horizon

Formality and norms

- **Apparent violations** of preference axioms (Allais, Ellsberg, Diamond)
- But Mendelssohn > Bartok isn't necessarily ALL or NOW
  - Bartok@T1 > Bach@T1
  - Bach@T2 > Mendelssohn@T2
  - Mendelssohn@T2 > Bartok@T2
- **Principle of Charity** / Charitable Interpretation
  - ChatGPT:
  - The Principle of Charity is a concept in philosophy and linguistics …
    a speaker's statements [interpreted] in the most **favorable** or reasonable way possible, even when faced with ambiguous or unclear language.
  - *... one should give the speaker the benefit of the doubt and interpret …*
    *in a manner that makes the most sense or is **logically coherent**.*
- So how can axioms or logics constrain behavior subject to wild/badFaith/**creative interpretations**?
  - cf. Kellyanne the AlternateFact machine
  - Solution like David Lewis on reference in dialogue / conversational language games



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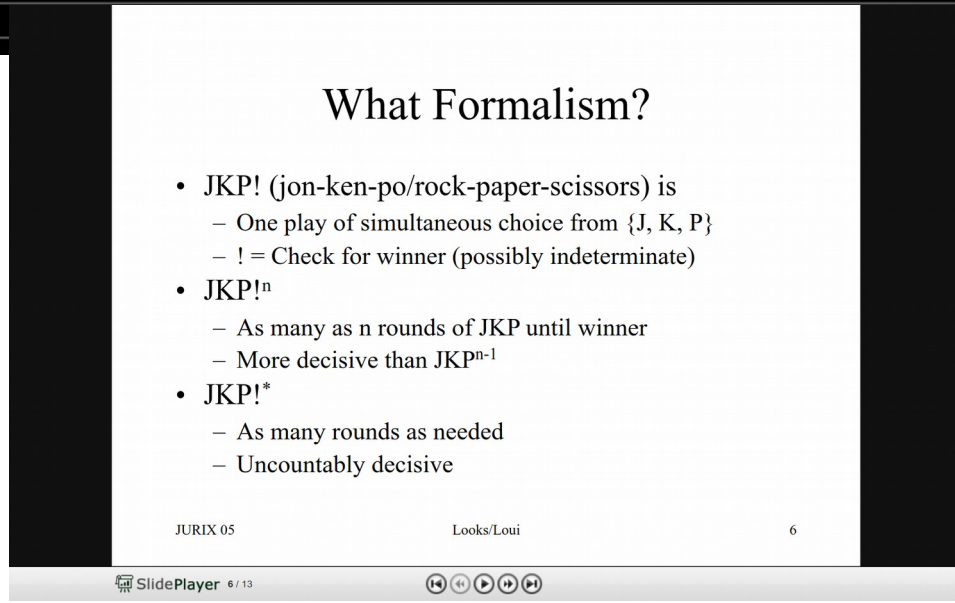
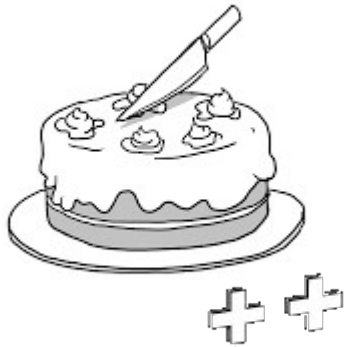
Procedural fairness as opposed to distributive

- Looks-Loui JURIX 2005
- Like Rawls ATJ pure procedural cake-cut ++
- *Why don't we flip a coin to decide who wins?*
  - *Play chess to decide who eats cake?*
  - *Play chess to decide who is guilty?*
  - *Zero the score at halftime?*
  - *Let the refs make a pass interference call with 0:01 remaining in a 10-7 game?*



- **Inputs** to an **appropriate process** determine socially **acceptable outputs**
  - From ex-ante symmetry to ex-post asymmetry
  - **Ex-ante exchangeable asymmetries**? Agreeable analogical power asymmetry position?



  - Merit/**Skill**, **Stochastics**/Chance, Decisiveness/Efficiency/**Speed**, **Spread**/DiffOutcome
  - **Repetition**, **Response**, Monotonicity of Intermediate **Report** (score), **Resources**

Ethics? Or Epistemology?

Don't tell me you have an argument;
tell me why your argument is any good.

- The best way to get a good person to do a bad thing is to feed that person **disinformation**
- Maybe teaching too much of one and not enough of the other

It's not really ethics training most decent people need;
It's better epistemics.

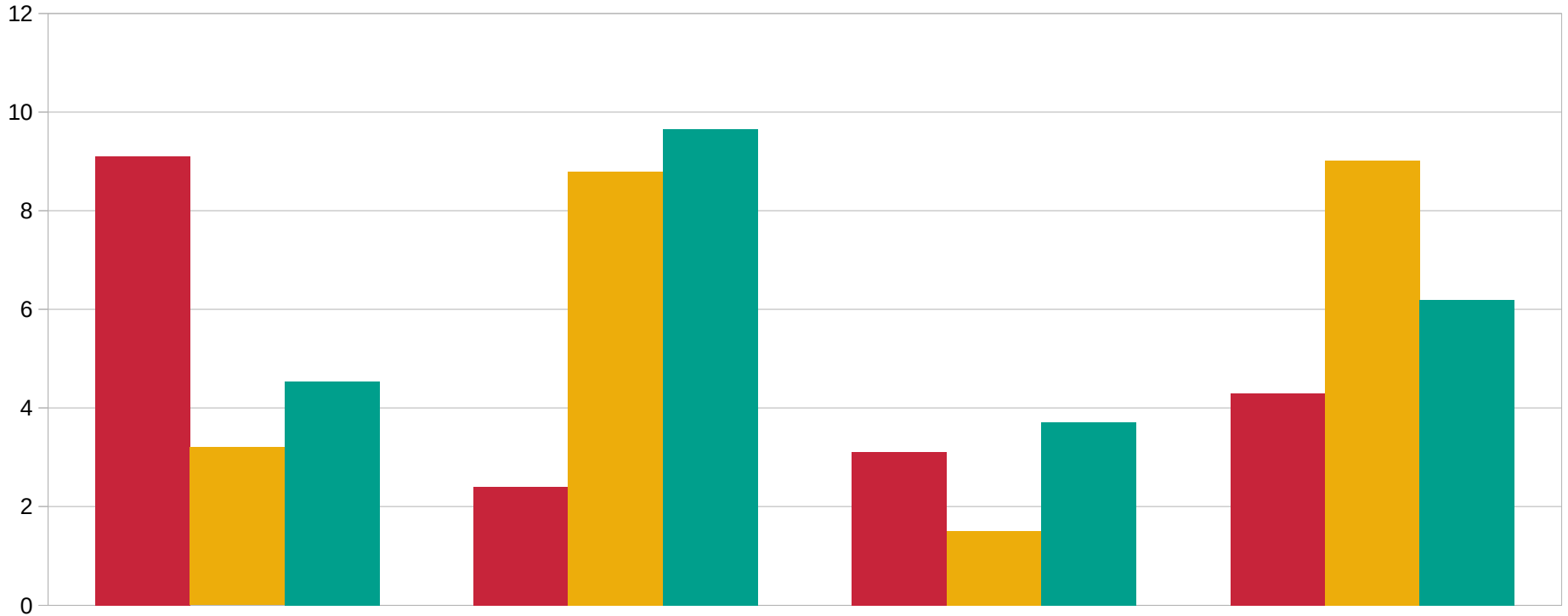
Veritas?

- It means truth, but also **wisdom/judgement**
- Not logical truth (that's just meaning)
  - **Ad Hominem** and **Appeal to Authority** are not fallacies in **induction**!
  - **Assertability**, **Defensibility** under **Counterargument**
- Please study epistemology and real forms of reasoning
- Humility?

I studied Probability, Fallibility, Corrigibility, Belief Revision, Defeasance:
Have some humility with your assertions.
When you are always adamant, I wonder about your belief formation process.

Rational Epistemology = FreqProb + Theory + MetaProcess

- Can save you from:
  - Error, stupidity, old fashioned untenable thinking
  - Demagogues, disinformation, delusion, new untenable fads like mom jeans
  - Machine learning hype, bias, bad stats, bad faith arguments, bad breath, unwise pronouncements, pure political advocacy
  - Extremist attacks on democracy, terrorist thinking, mathematical logicians, insensitivity to data and evidence
  - Bad action, bad bargaining, bad investments, nuclear holocaust
  - War, classical decision theory, Nash equilibrium and other game theory chimera
  - Youthful exuberance, bad engineering, greenwashed company claims, silly college rankings, chatGPT hallucinations, ...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