PHILOSOPHY OF SCIENCE AND ITS RELEVANCE TO RESEARCH DESIGN

PTJ • American University

WAGERS

- provisional position on likely unresolvable issues
- *philosophical ontology*: pertaining to mind-world hook-up
  - more fundamental than "epistemology"
- artificially—instrumentally—dichotomized for clarity
- goal is a more adequate lexicon

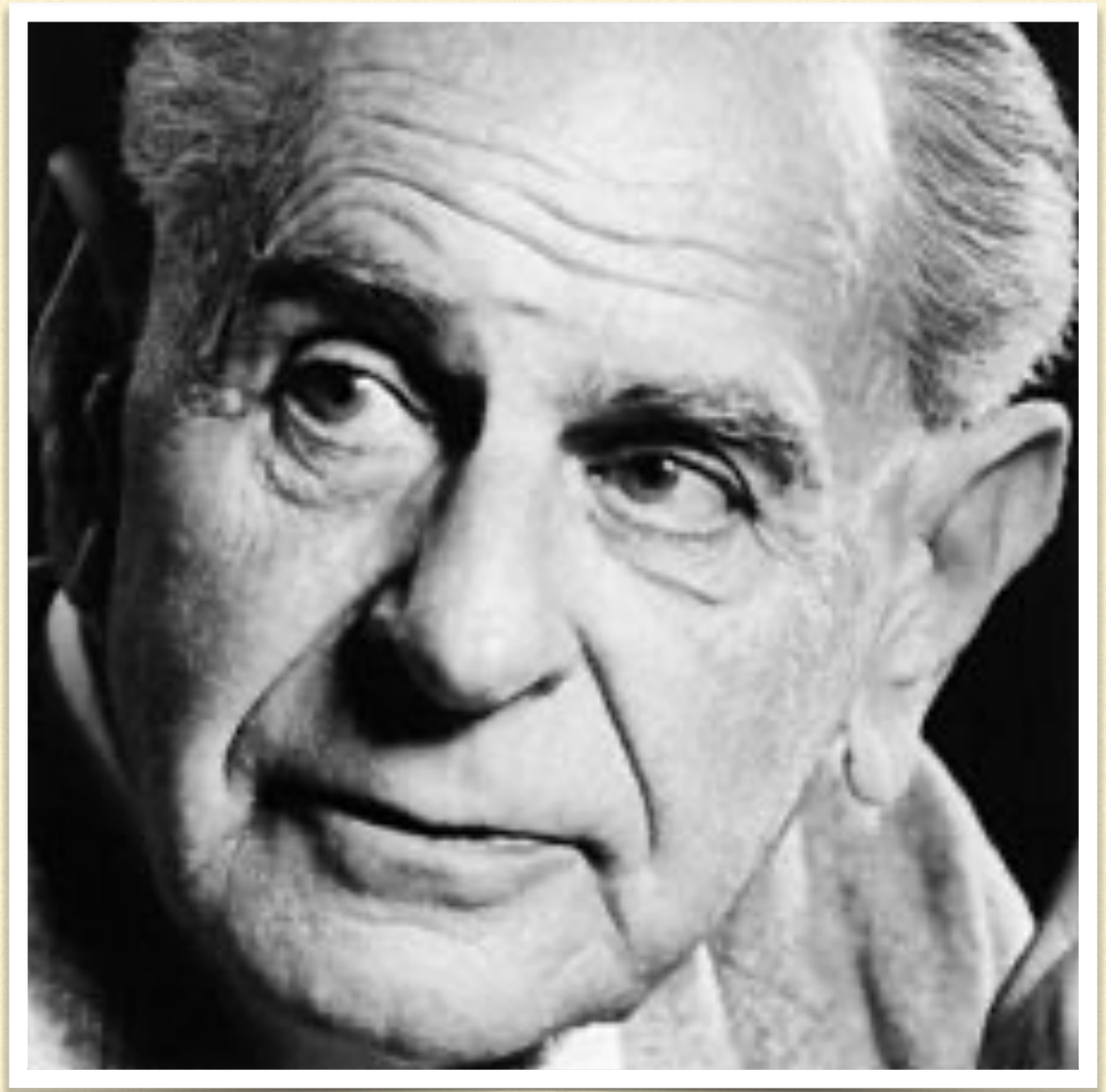
DUALISM AND MONISM

- dualism: mind separate from world, valid knowledge mirrors the world
- monism: mind continuous with world, knowledge a perspectival disclosing of the world
- dualists like testing; monists like explication

LOGICAL POSITIVISM

- unverifiable statements are *nonsense*
  - verifiable = observable implications
- empirical evidence determines whether a statement is true
- logical form of the statement gives *truth conditions*
  - purest logical form can be probabilistic

KARL POPPER



- doctorate in psychology (University of Vienna, 1928)
- *Logic der Forschung* (1934)
- *The Open Society and its Enemies* (1945)
- philosophy not just about dis-solving linguistic puzzles

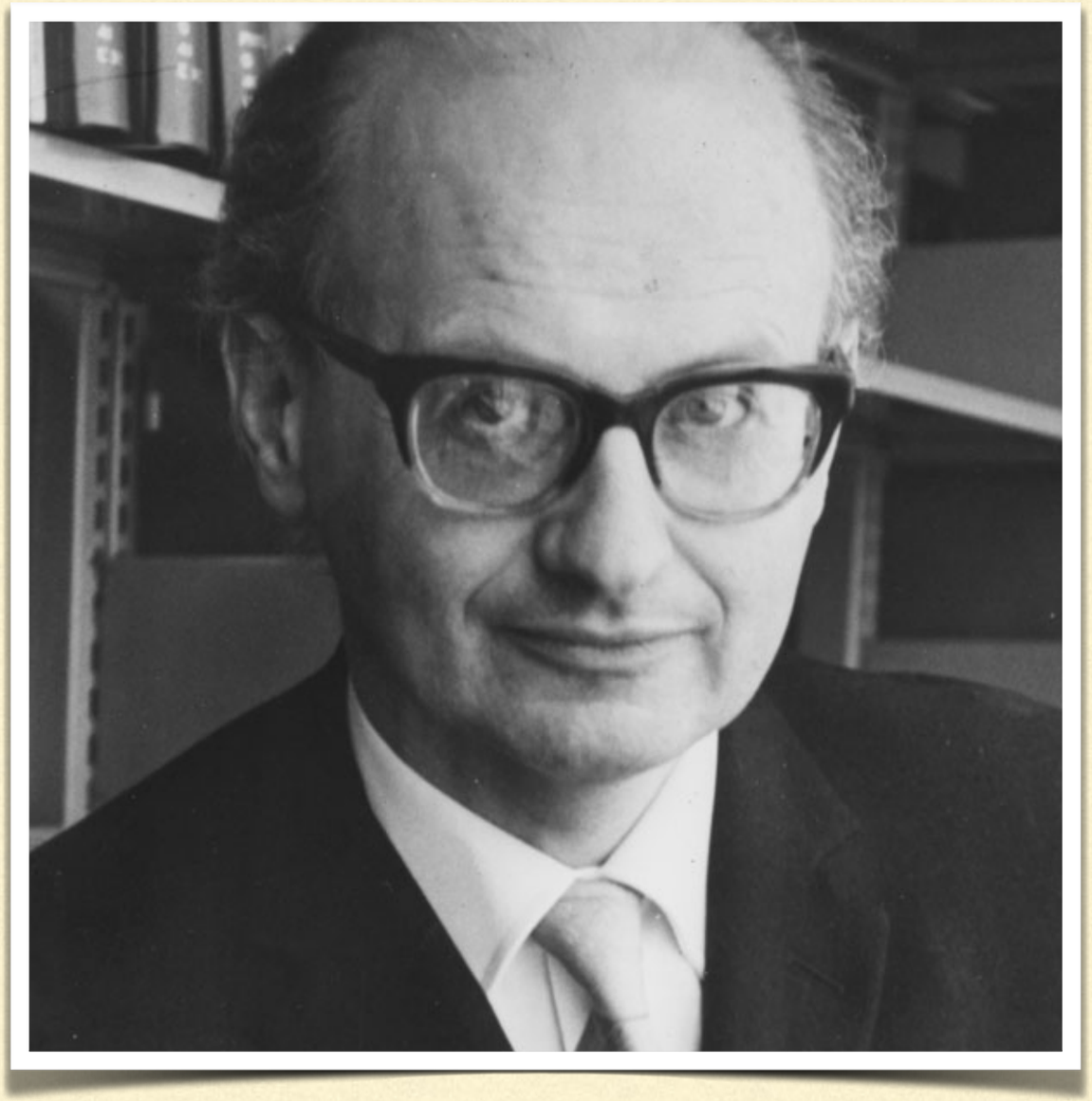
FALSIFIABILITY

- inverts the logical positivist position
  - *all* knowledge is conjectural; *none* is certain
  - empirical testing should be *continual*
- metaphysics as a source of hypotheses
- observable implications remain central

THE PRACTICE OF SCIENCE

- history of science is not a linear story
  - falsification doesn't always drive changes
  - now-accepted theories often start out "falsified"
  - shifts in background assumptions and techniques
- falsification thus falsified by the history of scientific practice…
- *…even though scientific practice is successful*

KUHN AND LAKATOS



- Kuhn: discontinuous jumps…
- Lakatos: …but retrospective rational reconstruction shows progress
- *both* skeptical about the scientific status of the social sciences!

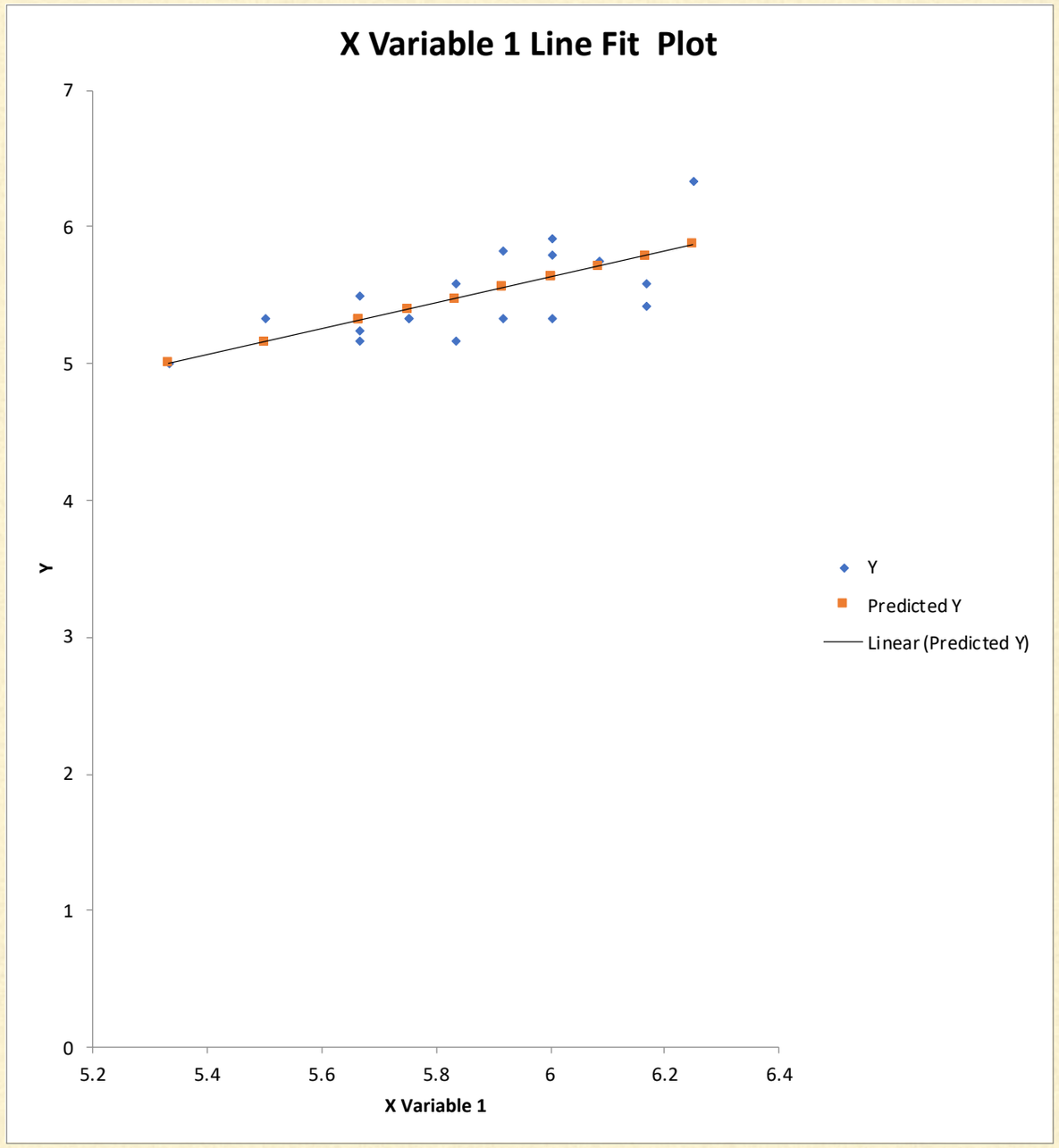
NEOPOSITIVISM

- combination of falsification with the emphasis on precise logical form
- a preference for numbers as making precision easier to attain
- testing of hypothetical general laws as the basic procedure

NEOPOSITIVIST COMPARISON

	X_1	X_2	X_3	Y
C_1	yes	2.7	a	yes
C_2	yes	1.8	b	yes
C_3	yes	3.9	b	no
C_4	yes	2.7	a	

REGRESSION


X Variable 1 Line Fit Plot
7
6
5
4
3
2
1
0
Y
5.2
5.4
5.6
5.8
6
6.2
6.4
X Variable 1
Y
Predicted Y
Linear (Predicted Y)

CORRELATION AND CAUSATION

- neopositivists say that these aren't the same…
- …but they have no *alternative* to correlation as the mark of causation
- definition of neopositivist "cause":
  - X ➜ Y (sufficient); ~X ➜ ~Y (necessary)
  - "with probability p" does *not* make a difference

CAUSAL POWERS

- Rom Harré, student of J. L. Austin
- not statistical tendencies, but deeper proclivities
- can manifest as statistical tendencies in particular environments (laboratories)

BEYOND THE EMPIRICAL

- perception not exhaustive
- “unobservable” too imprecise
  - things <u>an observer</u> hasn’t experienced or perceived
  - things <u>no one</u> has ever experienced or perceived, at least not yet
  - things no one <u>could</u> experience or perceive, <u>even in principle</u>

TYPES OF "UNOBSERVABLE"

I haven't observed	unobserved	Angor Wat	go see it
we can't observe (yet)	undectected	Neptune; Higgs boson	build detector
we can't observe (in principle)	undetectable	single quarks; social structure	?

THEORETICAL OBJECTS

- known by what they do
- *abductive inference* from observed outcomes
- have to be isolated and vetted:
  - in a laboratory
  - via transcendental argument

CAUSAL MECHANISMS

- linked series of occurrences that unfold in a similar way on different occasions
- need not always yield the same observable outcomes
- "actually present"
- brokerage, or balancing

REALIST EXPLANATIONS

- causal powers/mechanisms in an open system
  - can’t correlate using real-world data
  - can’t isolate, except in a lab or conceptually…but have to be vetted somehow
- show how they interact in a specific case
  - INUS conditions
  - “complete” explanations