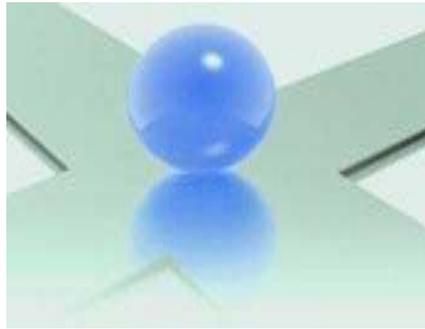


Picking a Theory: How Hard Can That Be?

Yakov Ben-Haim

Technion

Israel Institute of Technology



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1 *Highlights and Preliminary Examples*

§ Sources:

Yakov Ben-Haim, 2011,

Picking a Theory is Like Building a Boat at Sea,

- \papers\essays\Central-Tension\cen-ten06.tex
- <http://decisions-and-info-gaps.blogspot.com/2011/12/picking-theory-is-like-building-boat-at.html>

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§ We will consider last question.

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 - Which theory should you use?

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Little contribution to dynamics.

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- **Why** choose Galileo's theory?
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§ Questions:

- **Why** is axiom *G* fruitful?
- **Why** choose Galileo's theory?
- **Why** is it a **difficult choice**?

1.2 *2nd Preliminary Example: Economic Policy Formulation*

§ Economic policy formulation:

- Design market-based policy to induce firms to reduce pollution.

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- **Which** theory to use?
- **Why** is it a **difficult choice**?
- Is this a **more difficult choice** than robotic expl? **Why?**

Highlight Summary

§ Theories underlie decisions.

§ We will not discuss
how, who, or when to choose a theory.

§ We will discuss why theory-choice is **difficult**.

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Highlight Summary

- § Theories underlie decisions.
- § We will not discuss how, who, or when to choose a theory.
- § We will discuss why theory-choice is **difficult**.
- § We will consider 4 trade offs:
 - Tension between **right and right**.
 - **Fox-hedgehog** tension.
 - **Truth-meaning** tension.
 - **Knowledge-ignorance** tension.

2 *Tension Between Right and Right*

“Thanks to the negation sign,
there are as many truths as falsehoods;
we just can’t always be sure
which are which.”

Willard V. Quine



Figure 1: Willard Van Orman Quine, 1908–2000.

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- Infinity of possible theories.
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§ We have considered 1 trade off:

- Tension between **right and right**.

§ We now consider the 2nd trade off:

- **Fox-hedgehog** tension.

3 *Fox-Hedgehog Tension*

“The fox knows many things,
but the hedgehog knows one big thing.”

Archilochus



Figure 2: Archilochus, 680-645 BCE.

“The fox knows many things,
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Archilochus

§ 2 types of theories (and people).

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 - Comprehensive. All relevant details.
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 - **Comprehensiveness** vs **essentialism**.
- **What are criteria for choosing?**

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Weigh context, goals, meaning of decision.

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§ Motivates next trade off.



§ We have considered 2 trade offs:

- Tension between **right and right**.
- **Fox-hedgehog** tension.

§ We now consider the 3rd trade off:

truth-meaning tension.

4 *Truth-Meaning Tension*

“Beyond this island of meanings which in their own nature are true or false lies the ocean of meanings to which truth and falsity are irrelevant.”

John Dewey

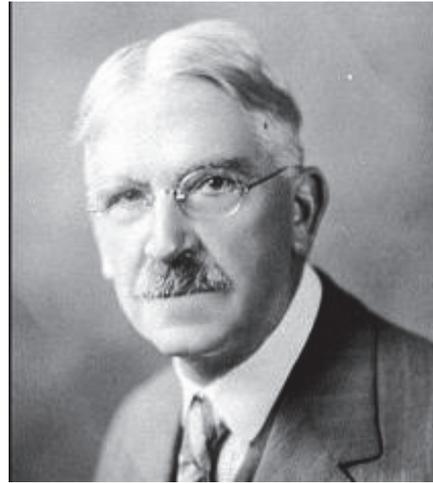


Figure 3: **John Dewey, 1859-1952.**

“Beyond this island of meanings which in their own nature are true or false lies the ocean of meanings to which truth and falsity are irrelevant.”

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§ Meaning and truth.

- Theories are made of statements.

E.g. axioms A and G .

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Meaningful but false.

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- Statements have meaning.
- Statements can be true or false. E.g.
“Archilochus was a Japanese belly dancer.”
Meaningful but false.
- What is “meaning”?
- “Meaning” is broader than “truth”.
 - All true statements mean something.
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- **“Meaning” is broader than “truth”.**
 - All true statements mean something.
 - Not all meaningful statements are true.
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“Beyond this island of meanings which in their own nature are true or false lies the ocean of meanings to which truth and falsity are irrelevant.”

John Dewey

§ Meaning and truth.

- **Theories are made of statements.**
E.g. axioms A and G .
- Statements have **meaning**.
- Statements can be **true or false**. E.g.
“Archilochus was a Japanese belly dancer.”
Meaningful but false.
- **What is “meaning”?**
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- We learn by:
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 - **Experiencing** the meaning of love,
or of being good or bad (or cookie).

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- Related to **fox-hedgehog tension:**
 - Fox’s many truths hide the meaning.
 - H-hog’s idealized theory may be false or untestable.



§ We have considered 3 trade offs:

- Tension between **right and right**.
- **Fox-hedgehog** tension.
- **Truth-meaning** tension.

§ We now consider the 4th trade off:

knowledge-ignorance tension.

5 *Knowledge-Ignorance Tension*

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- **Hard judgment** in selecting decision theory:
Centrality of **ignorance** and **new info.**

6 Conclusion

§ Theories underlie decisions.

§ We didn't discuss

how, who or when to choose a theory.

§ We discussed **why** theory-choice is hard.

§ We considered 4 trade offs:

- Tension between **right and right**.
- **Fox-hedgehog** tension.
- **Truth-meaning** tension.
- **Knowledge-ignorance** tension.



7 *Questions for Discussion*

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- What underlying assumptions?
- Are there **competing theories**?
- Who decides what theory to use? How?
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§ Are you a **fox** or a **hedgehog**?

§ **For what job would you hire** a fox? A hedgehog?