

Module 2

Material jointly developed by the faculty, adjuncts, and students at the Michigan and Maryland Programs in Survey Methodology (MPSM/JPMS)

Thanks to D.Cantor, C. Casas-Cordero, F.Conrad, M.Couper, F. Keusch, D. Oberski ... and many more

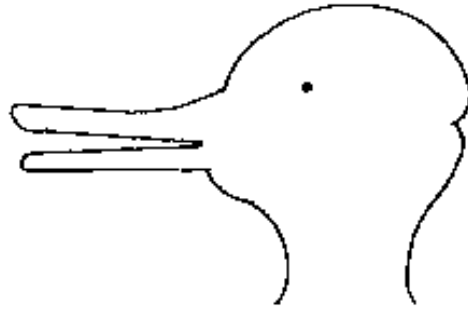
Broad but Useful Distinction

Organic / found data

vs.

Designed data

Why Design?



Stylized from original source:
Wittgenstein (1892) - Fliegende Blätter

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I observe that q_1, q_2, q_3, \dots
<insert creatively>. Now I think, 'aha!':

$p \rightarrow q_1$
 $p \rightarrow q_2$
 $p \rightarrow q_3$

...

Done. My theory " p " must be true.

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Making up explanations for known facts:
you go from the **facts** to a **theory**.

If you can decide that the **theory** is true, then
this is called “induction”.

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Issues with this Approach

Making up a theory that way is an example of
affirming the consequent.

So we know that inventing the theory *by
itself* proves nothing.

But maybe we can still verify the theory
somehow and achieve induction?

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Two Problems with Induction

.. coming up with explanations for known facts

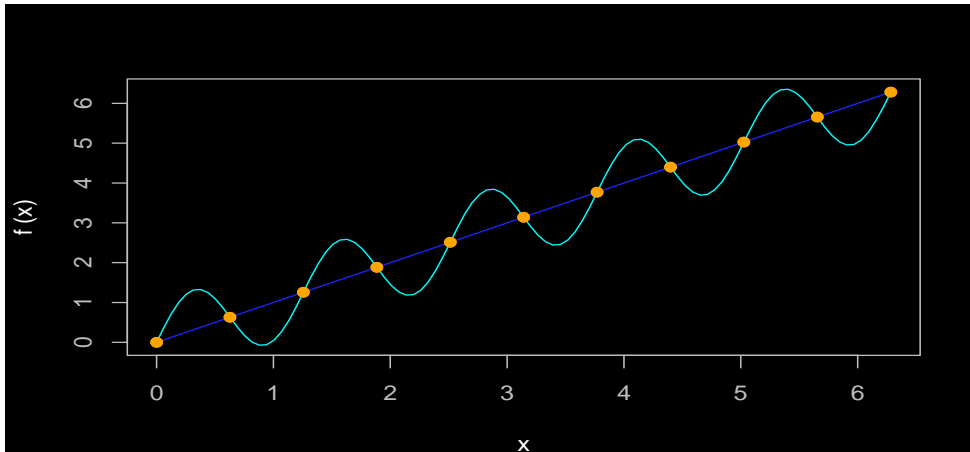
1. Equivalent models
2. Infinite number

Problem #1

1. Maybe theory p explains q_1, q_2, \dots , but what if some other theory " p_2 " does, too? How will you decide which is better?

This is the problem of equivalent models: different theories that yield the exact same predictions for some set of observations.

Problem 1: Equivalent Models



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Problem 2:

*When will they
stop staring at us?*

"All ravens are black."

Raven 1 is black.

Raven 2 is black.

Raven 3 is black.

Raven 4 is black.

Raven 5 is black.

Raven 6 is black.

Raven 7 is black.

Raven 8 is black.



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