All Data are Equal, but Some are More Equal Than Others

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Understanding Activities -- Definitions

Science – the attempt to understand the natural, that which has mass

- Physics – positional change on earth
- Chemistry – structure and substantial change on earth
- Astronomy – positional and substantial change in space

Metaphysics – the attempt to understand the supernatural, that which does not have mass

- Theology
- Aesthetics
- Psychology (Love, Hate)

History – the attempt to know and understand what happened

Manipulating Activities -- Definitions

Technology – the attempt to know and manipulate the natural

- Engineering
- Medicine
- Crafts (as in Craft Guilds)

Religion – the attempt to know and manipulate the supernatural / metaphysical

- All metaphysical assumptions

Politics – the attempt to manipulate what happens

- Any use of knowledge or assumptions to manipulate what happens

A Model for Inquiry

Technology – the attempt to manipulate the Natural	Religion – the attempt to manipulate the non-natural / Supernatural	Politics – the attempt to manipulate what happens
Manipulation Activities are related to Understanding Activities		
Science – the attempt to know and understand the Natural	Metaphysics – the attempt to know and understand the non-natural / Supernatural	History – the attempt to know and understand what happened

Objectives of this Paper

Compare, among the data-seeking domains (science, metaphysics, history, technology, religion, and politics)

1. **How data is generated**
2. **Confidence in various data**
3. **Prognostication from the data**

Inquiry Processes

- **Personal Objectives**
  Domain / Subject Objectives
- **Data Collection (observation)**
- **Analysis (Abduction, Deduction, Induction, Statistical Analysis)**
- **Prognostication**

I have argued previously that the inquiry process is the same for all six areas of inquiry

Data Collection for Manipulation Activities

Data is first gathered for the manipulating activities

Once we can manipulate, some will want to understand

Technology -- Attempts to manipulate the natural (that which has mass)

Examples of Technology Data

- Blue light refracts more than red light
- Hickory has double the strength of ash (how much weight it will support)
- Plating iron with tin prevents rust
- Gold is soluble in mercury
- 32 feet is the limit for pumping water with a surface pump
- Artillery trajectories relating to weight, charge, and angle
- Milk thistle is good for the liver, Hawthorne for the heart
- John's blood level K^+ is 4.3 mEq/L (normal)
- Lead iodide makes a stable yellow pigment for painting
- Plotting trajectories of stars and planets

Science -- Attempts to know and understand the natural (that which has mass)

Examples of Science Data

- Spectrum of light from Sirius to learn what nuclear reactions are taking place on the surface of Sirius
- Analysis of ratios of cellulose to lignin in Hickory to understand superior strength of Hickory
- Analysis of photons emitted from excited sodium atoms to understand structures and energy states of excited sodium atoms
- Electron diffraction to determine the crystalline structure of halite

Note that the difference between science and technology data has to do with the objective of understanding rather than manipulating

What is unique about science/technology data?

- It is data about that which has mass
- The data can be checked by someone with the skills and equipment to reproduce the experiment
- The data is minimally (if at all) influenced by the objective(s) of the observer – **it is rarely nuanced**
- The data is almost universally accepted

Religion – Attempts to manipulate the supernatural / non-natural (that which has no mass)

Examples of Religion Data

- Thoughts of gratitude throughout the day improve attitude
- Healing improves through prayer
- When I meditate I feel closer to my Higher Power
- I am healthier when I eat following Krishna rules / Koran rules
- "The Bible says," "the Koran says," "the Upanishads say" (revealed data)
- I am satisfied with my families religious beliefs (tradition -- "If its good enough for grandma, its good enough for me")

What is unique about religion/ metaphysical data?

- It is data about that which has no mass
- The data is often personal – it is not universally replicable
- The objectives of the observer affect both the selection and the interpretation of the data – the data is nuanced by the observer
- The data is not universally accepted or interpreted

Politics – Attempts to manipulate what happens

Examples of Politics Data

- When I am pleasant, I am more likely to get my way
- My writing is more influential than my speaking
- Referencing God in a political speech increases approval ratings
- Waterboarding got me no information that could not be obtained by other means
- Talking with my 6-year old is more likely to change his behavior than sending him to his room
- He who pays the piper calls the tune
- The roar of the crowd encourages the home team, increasing its likelihood to win

History – Attempts to know and understand what happened

Examples of Historical Data

Primary Sources: Relics and documents from the time

- Vellum scroll of Galatians dated ca 55 AD
- County/church records of births, deaths, immigrations; Diaries
- I saw it, I was there

Secondary Sources: Identified reporting or analysis

- Gibbon's Decline and Fall of the Roman Empire
- Web records of births and deaths

Tertiary Sources: Reporting or analysis, sources unknown

- Newspaper article on sinking of the Titanic
- Manuscript of report citing oral history

What is unique about political/ historical data?

- It is data intended to aid in affecting or understanding what happens
- The data is personal – it is not universally replicable
- The objectives of the observer and the observed affect both the selection and the interpretation of the data – the data is **nuanced by both observer and observed**
- The data is often not widely accepted

Historical data has the objective of **knowing and understanding** what happened

Data Summary

- Technology and Science data are collected by the repeatable controlled experiment
- Religion and Metaphysical data are collected by personal experience, revelation, or tradition – not universally replicable; **it is nuanced by the observer**
- Politics and History data are collected by personal experience, not usually replicable; **it is nuanced by the observer and the observed**

We respect Technology and Science data more because they can be reproduced by an independent person and are less influenced by the observer's objectives or the objectives of the observed

Prognostication

- Confidence in data
- Extrapolation
- Complexity

Prognostication

Chemistry and Physics – science / technology

- Good success in predicting what will happen in reactions and motion, structural integrity

Meteorology – science / technology

- Success in predicting tides
- Some success in predicting weather, but not long term

Astronomy – science / history

- Can predict most motions of heavenly bodies, but not when new objects will appear, nor what we will see in new sectors

Prognostication

Geology – science / history

- Can't predict volcanoes, earthquakes, shift in magnetic field
- Some success in explaining what happened

Biology, Cell Biology – science / technology

- Can usually confidently predict how a cell will respond to a chemical
- Can often predict the conditions under which a cell will divide

Prognostication

Biology, animal behavior – science / metaphysics / politics

- Can predict, to some extent, what a rat will do
- What the rat does is related to its history, and its "ratness"

Biology, Ecology – science / metaphysics / politics

- Can sometimes predict the environment's response to an event – e.g. absorption of O^{18}
- More difficult to predict the affect upon species within the ecosystem

Prognostication

Biology, Evolution – history / metaphysics / science

- No repeatable experiments here; we don't know what happened
- There is some forensic evidence of time periods and skeletal remains

Meteorology, Climate change – history / politics / technology

- Data suggests that earth climate has oscillated between warming and cooling
- Do we think we can successfully predict these trends?

Prognostication

Anthropology – science / metaphysics / history / politics / religion

- Difficult to get a picture of previous cultures
- Few successful predictions on where current cultures are going

History – history / politics

- Predicting what will happen does not have a good record, whether we are predicting what mankind will do, or what God will do

Prognostication

Predicting human behavior – science / metaphysics / history

- Can we predict who will convert, who will change?
- Can we predict what any person will do in a given situation?

Ethics – metaphysics / history

- Not consistent results in predicting either a decline in ethical standards, or a great awakening; or when an addict will hit bottom or whether they will change

It is Near Impossible to Predict Human Behavior on an Individual or Mass Level

1. The chemical reactions and energy requirements of the human body can be studied scientifically

2. There are metaphysical elements to human behavior

3. We have a history

This is also true for rats!

Summation

Truth Seeking	Manipulation	Data	Analysis	Prediction
Science	Technology	Repeatable experiments	Abduction, Deduction, Induction, Statistics	Reliable from Laws; Testing purposes for theories
Meta-physics	Religion	Personal experience, depends on perspective – nuanced by observer	Abduction, Deduction, Induction, Statistics	Difficult: Complexity, Data reliability
History	Politics	Unclear on reliability of sources – nuanced by observer and observed	Abduction, Deduction, Induction, Statistics	Difficult: Complexity, Data reliability

Inquiry Processes

- **Personal Objectives**
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- **Analysis**
- **Prognostication**