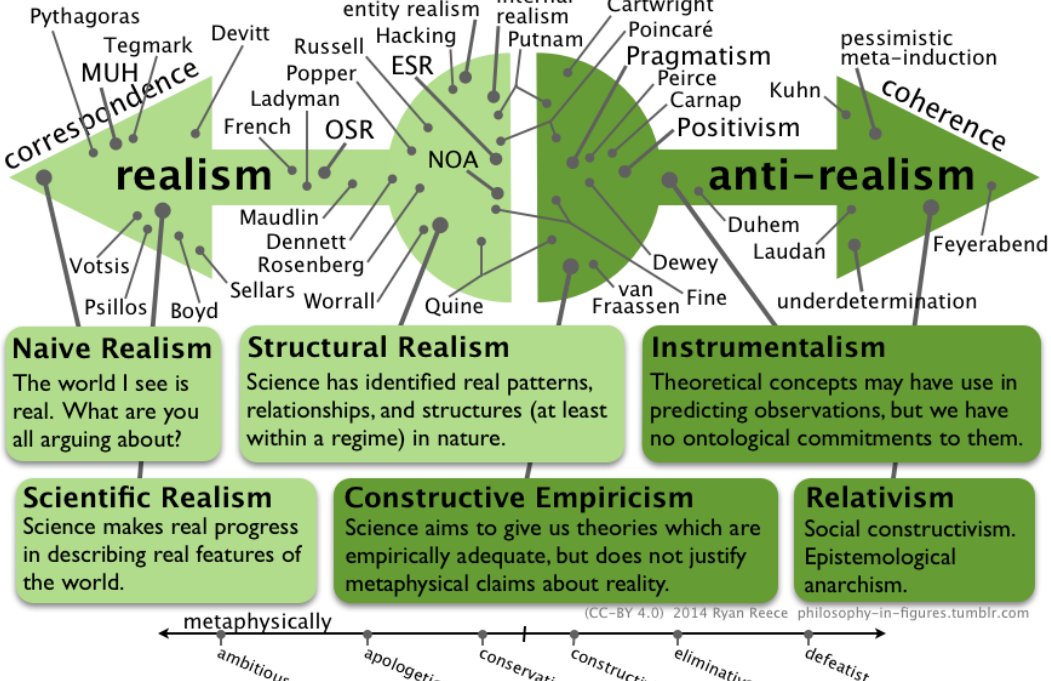
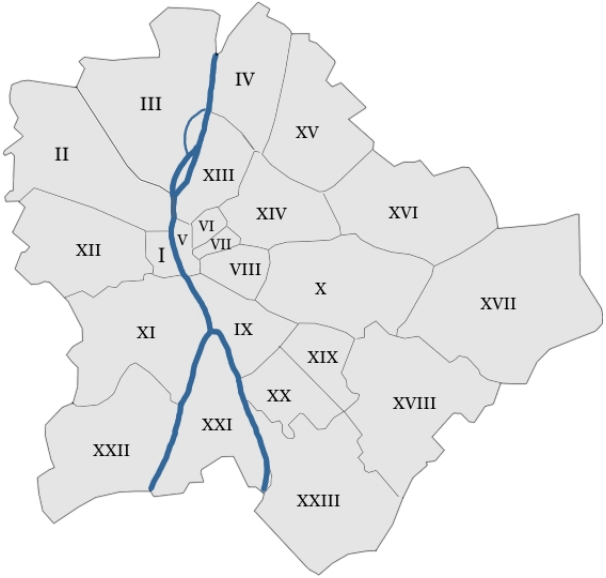
?


Pythagoras
Tegmark
MUH
correspondence
Devitt
entity realism
Russell
Hacking
ESR
Popper
Ladyman
French
OSR
realism
NOA
Maudlin
Dennett
Rosenberg
Sellars
Worrall
Quine
Votsis
Psillos
Boyd
realism
Cartwright
Poincaré
Putnam
Pragmatism
Peirce
Carnap
Positivism
Dewey
van Fraassen
Fine
pessimistic meta-induction
Kuhn
coherence
anti-realism
Duhem
Laudan
Feyerabend
underdetermination
Naive Realism
The world I see is real. What are you all arguing about?
Structural Realism
Science has identified real patterns, relationships, and structures (at least within a regime) in nature.
Instrumentalism
Theoretical concepts may have use in predicting observations, but we have no ontological commitments to them.
Scientific Realism
Science makes real progress in describing real features of the world.
Constructive Empiricism
Science aims to give us theories which are empirically adequate, but does not justify metaphysical claims about reality.
Relativism
Social constructivism. Epistemological anarchism.
(CC-BY 4.0) 2014 Ryan Reece philosophy-in-figures.tumblr.com
metaphysically
ambitious
apologetic
conservati
constructi
eliminati
defeatist

Motivation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III
XV
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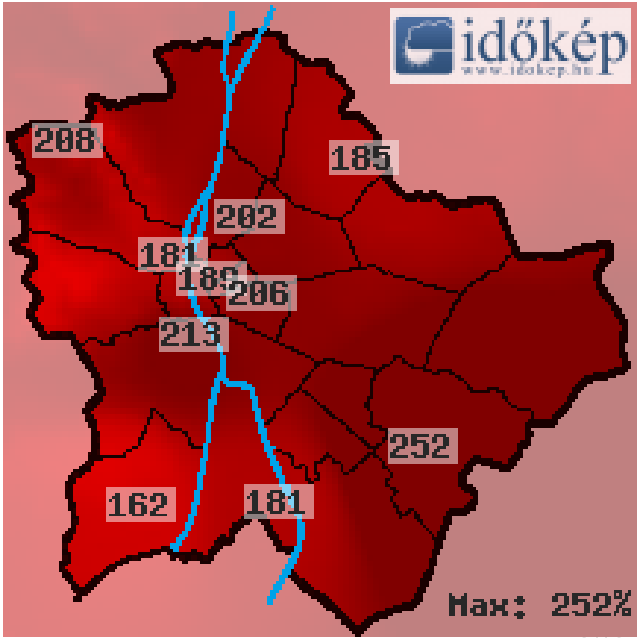
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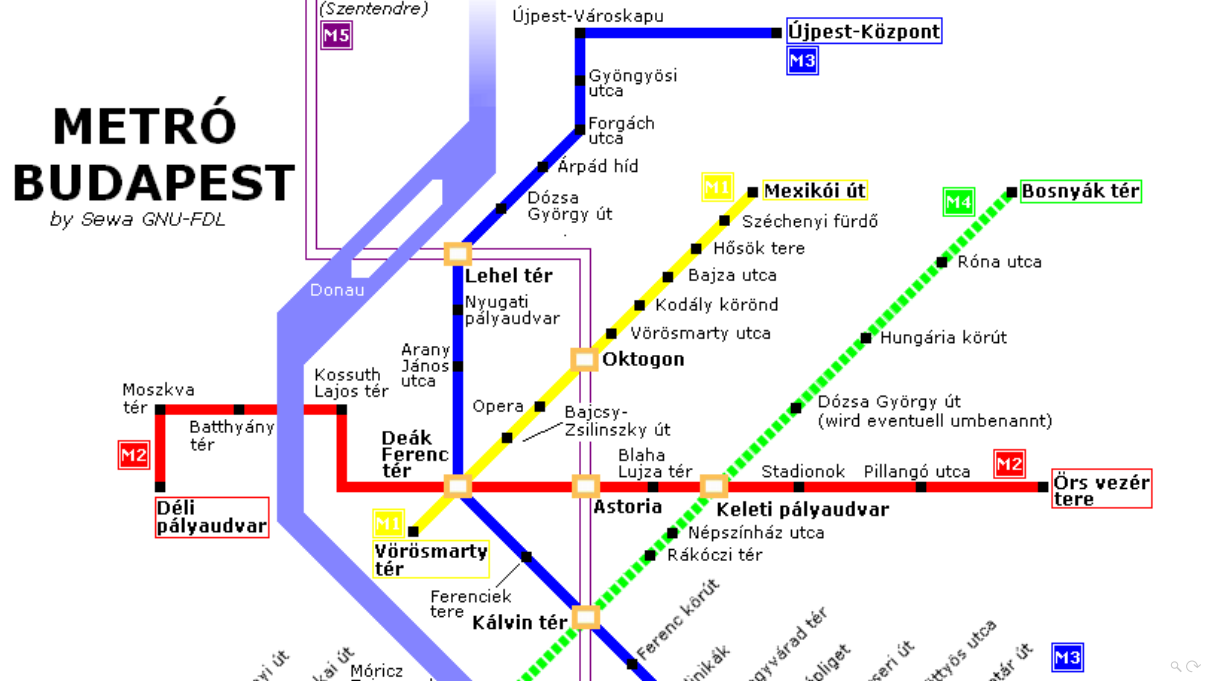
METRÓ
BUDAPEST
by Sewa GNU-FDL
(Szentendre)
M5
Újpest-Városkapu
Újpest-Központ
M3
Gyöngyösi utca
Forgách utca
Árpád híd
Dózsa György út
M1
Mexikói út
Széchenyi fürdő
Hősök tere
Bajza utca
Kodály körönd
Vörösmarty utca
M4
Bosnyák tér
Róna utca
Hungária körút
Dózsa György út
(wird eventuell umbenannt)
Donau
Lehel tér
Nyugati pályaudvar
Arany János utca
Oktogon
Kossuth Lajos tér
Moszkva tér
Batthyány tér
M2
Déli pályaudvar
Opera
Bajcsy-Zsilinszky út
Deák Ferenc tér
Blaha Lujza tér
Stadionok
Pillangó utca
M2
Örs vezér tere
Astoria
Keleti pályaudvar
Népszínház utca
Rákóczi tér
M1
Vörösmarty tér
Ferenciek tere
Kálvin tér
Ferenc körút
M3

© Historic Cities Research Project. Courtesy of Ogur Tufekci

?

all models are false,
but some are useful

George E. P. Box

눈물 아롱아롱
피리 불고 가신 님의 밟으신 길은
진달래 꽃비 오는 서역 삼만리
흰 옷깃 여며 여며 가옵신 님의
다시 오진 못하는 파촉 삼만 리

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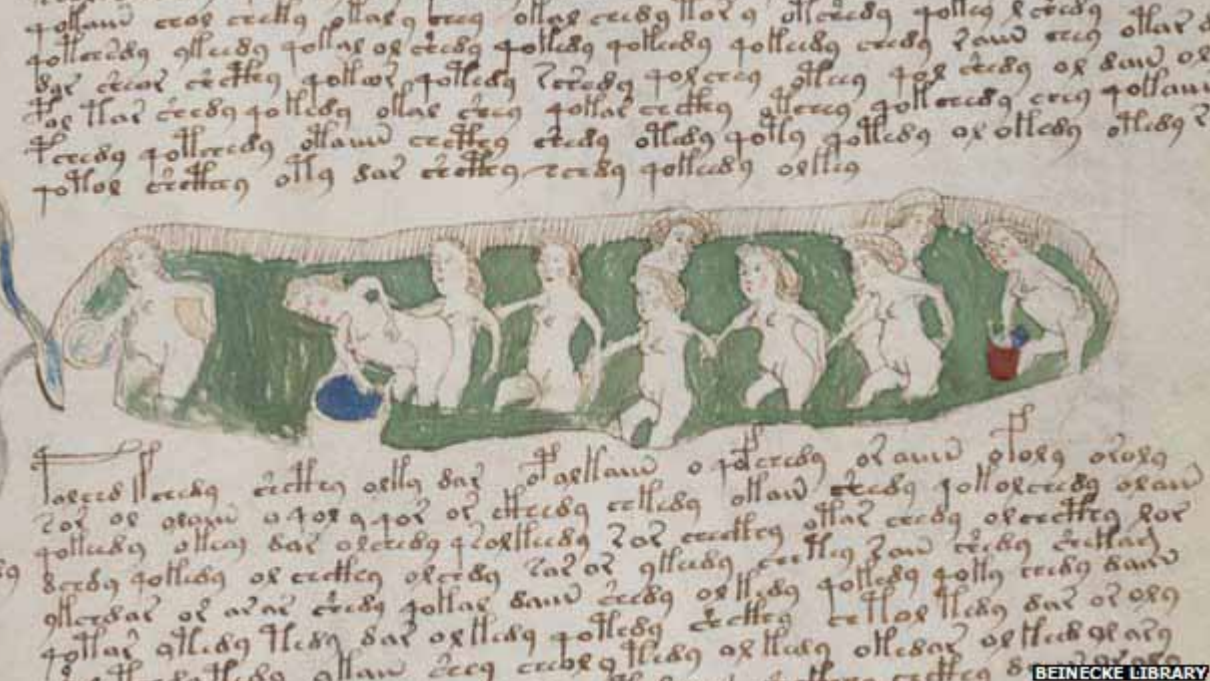


BEINECKE LIBRARY

?

DATA

Data

- Write down what comes to your mind when you hear the word **data**.

Data

- **data** is plural, what is its singular?

Data

- **data** is plural, what is its singular?
- **datum**

Datum

- **datum**

Datum

- **datum**
- a single piece of information

Data

- ‘any form of systematic empirical observation’

Data

- **systematic**
- **empirical**
- **observation**

Data

- What do we need data for?

Data

- Where does data come from?

Measurement

- What does it mean to measure something?
- What are some examples of measurement?
- Why do we measure?

Measurement

- In this context simply **any collection of data**.
- It does not need to be numerical.

Two Kinds of Measurement

- Quantitative
- Qualitative

Quantitative

- Numbers

Qualitative

- Something else than numbers

Indicator

- What is an **indicator**?

Indicator

- What is an **indicator**?
- In this context simply something observable that indicates – or simply **shows** – something.

The Two Criteria

- **Validity**
- **Reliability**

JAMES BROWN

Validity

- What is **validity** of a measure?

Validity

- What is **validity** of a measure?
- Do we measure what we want to measure?

Validity

1. We have defined a concept X.
2. We want to measure it.
3. The Q: 'Is this a way how to measure X?'

Conceptual Substance

- **Validity** different from **conceptual substance**.

Validity & Conceptual Substance

- Conceptual substance:
  'Is this a good definition of peace?'
- Validity:
  'Is this a good way of measuring peace?'

Validity

How do know if a measurement is valid?

- 'Common sense,' i.e. always think it through.
- Robustness.
- Try different measurement procedures and compare the results.

Situation 1

- We want to measure how happy Mervonians are. We prepare a survey and go ask students at the best university in Mervonia.
- Is there a problem with validity?

Situation 1

- Students might be very differently happy from the rest of the society. This is an **external validity** problem.
- On the other hand **internal validity** might be fine, i.e. we might measure very well how happy the students are.

Validity

- **Internal**
- **External**

Internal Validity

- Are we measuring what we want?

External Validity

- Are we measuring in the right place?

Reliability

- What is **reliability**?

Reliability

- What is **reliability**?
- If you apply the same procedure twice to the same thing, it should return the same result.

Situation 2

- We want to see if a finance minister's speech presents tax increase positively or negatively.
- We hire a student and instruct them to look at each sentence and score each of them.
- We give the same speech and instructions to a different student.
- The results are completely different.
- What might be the problem?

Situation 2

Less bad option:

- Maybe at least one of the two students did not follow our instructions.

Situation 2

More bad option:

- The procedure is not reliable: each time it is applied it might return a different result.
- It lacks **inter-coder** reliability: each coder produces a different result.
- Or maybe even **Intra-coder** reliability problem when the same person cannot get the same result twice.

Reliability & Validity

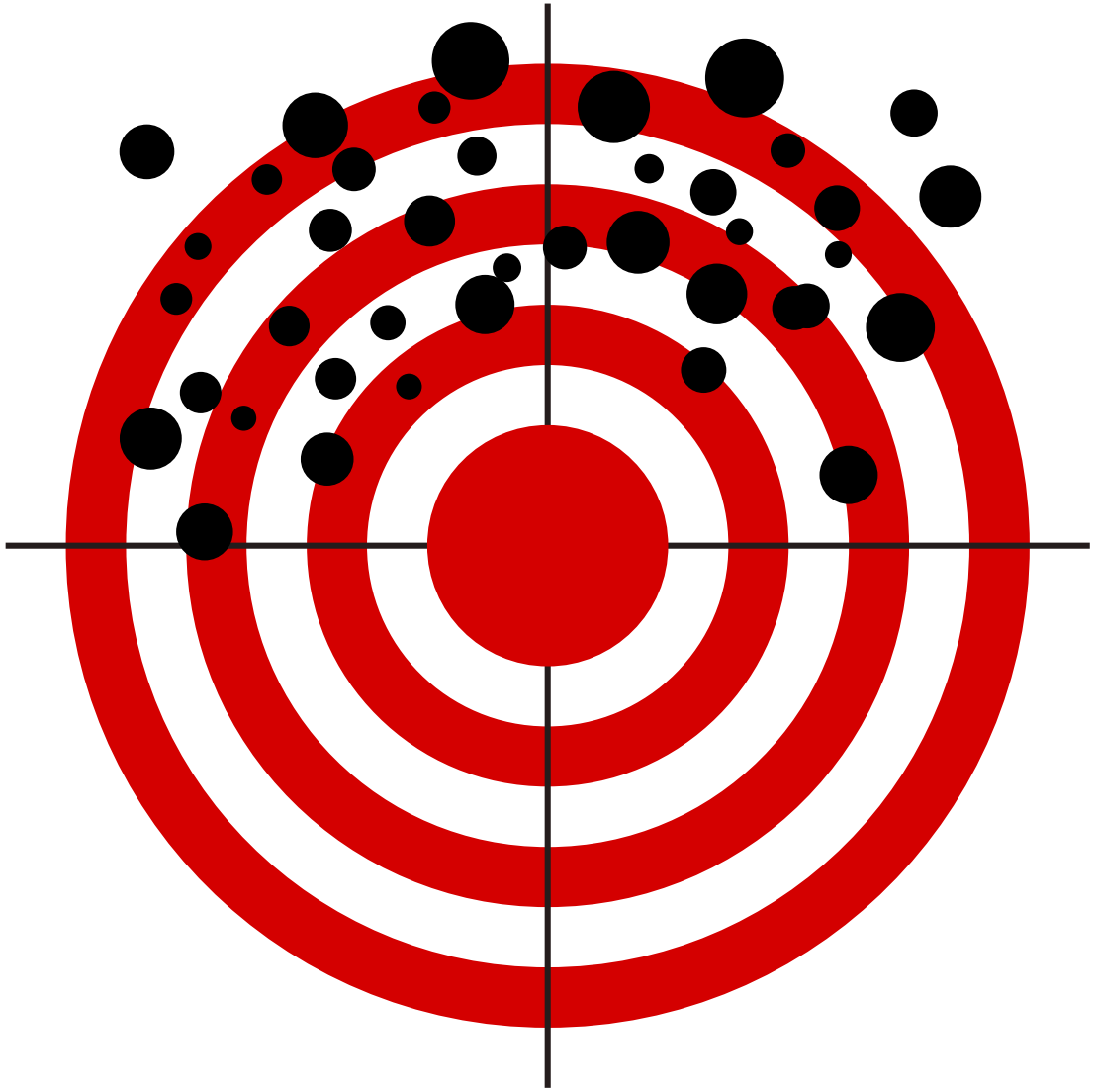
- How are they related?

Reliability & Validity

- How are they related?
- They are independent, i.e. there are four options.

Reliability & Validity

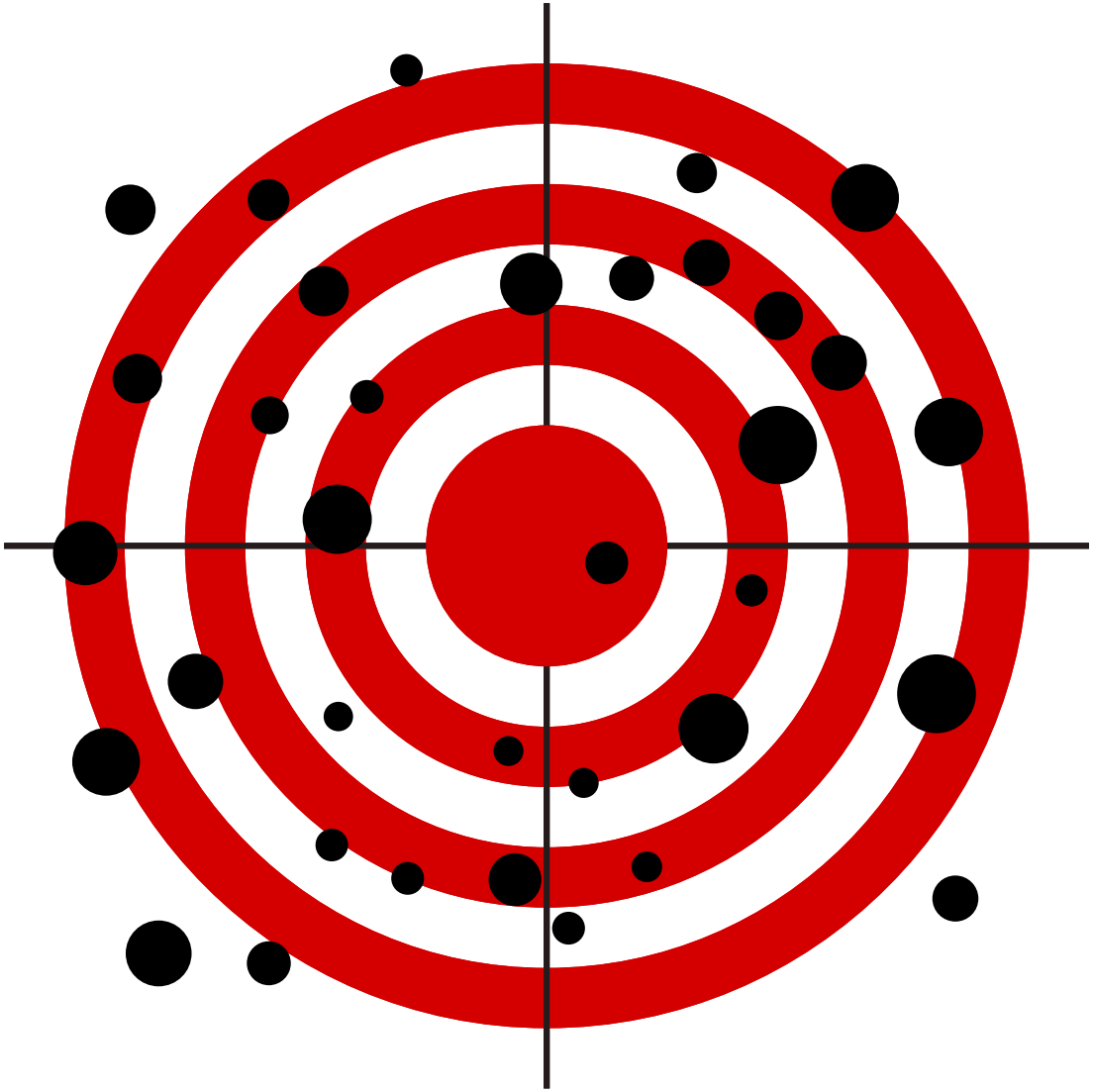
	Invalid	Valid
Unreliable	1	2
Reliable	3	4



Unreliable & Invalid

Unreliabile & Invalid

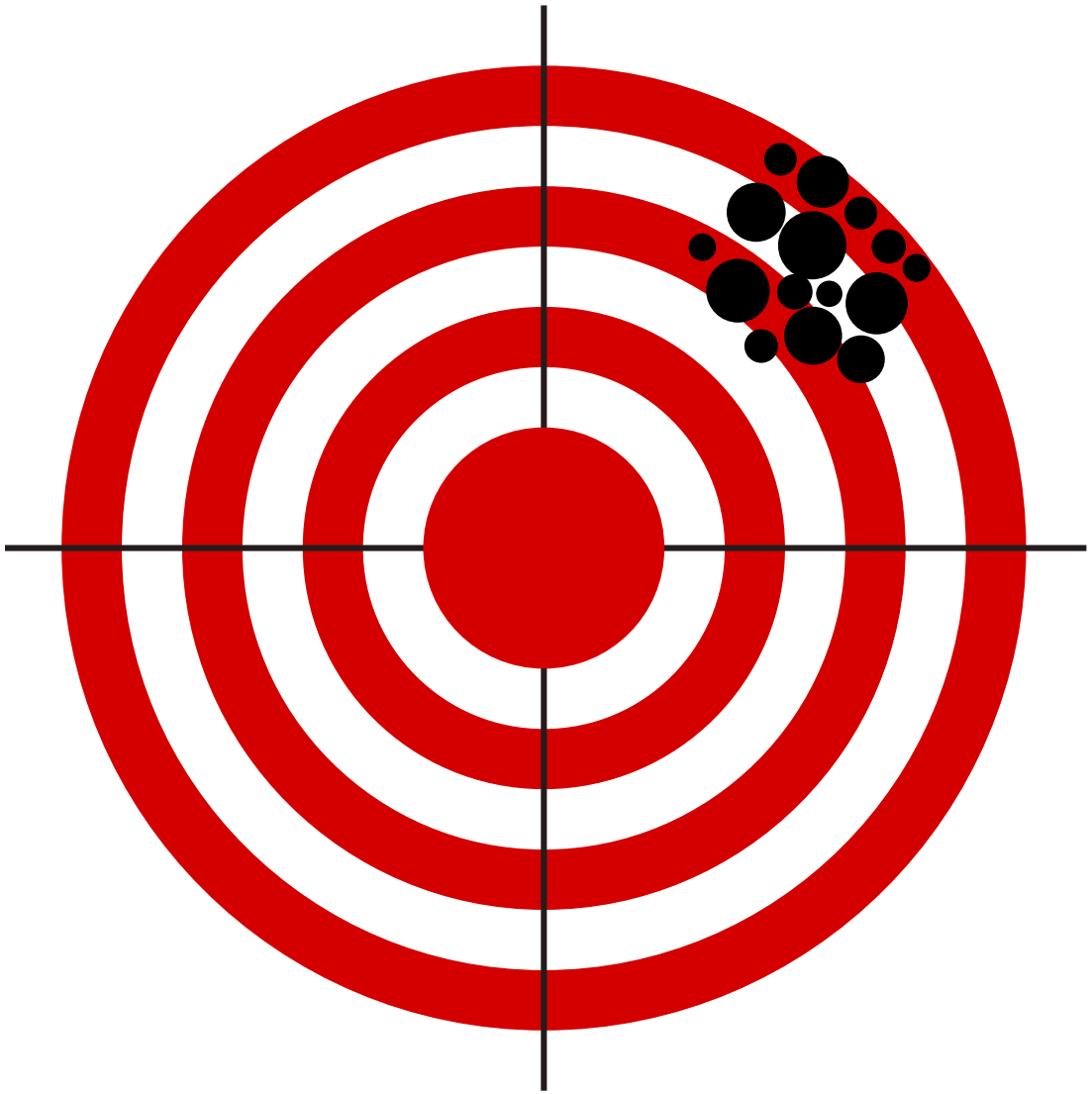
- Always off the aim, and in the same direction, i.e. biased.



Unreliable, But Valid

Unreliable & Valid

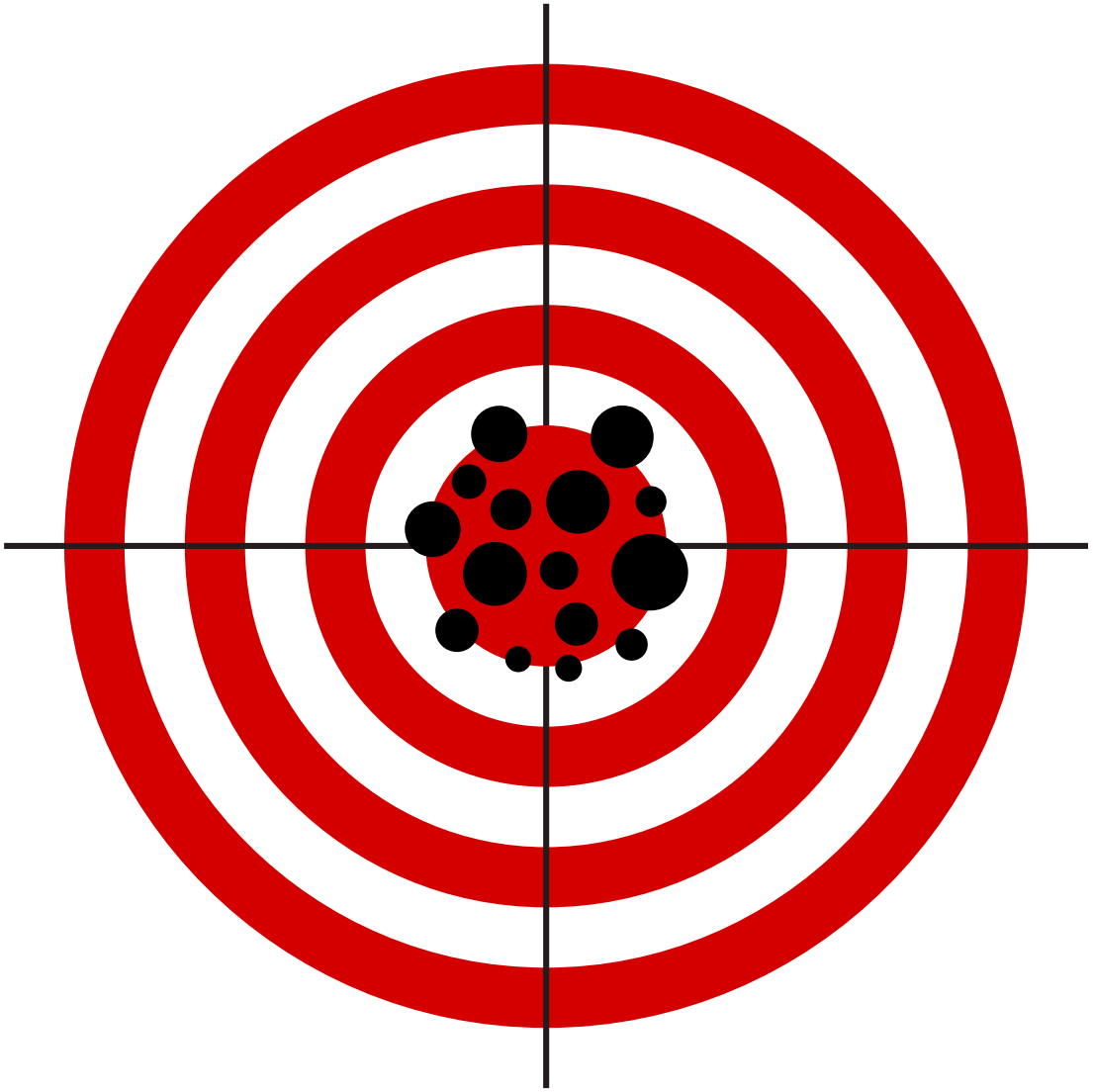
- Lots of error, but in all directions.
- If we have enough measurements we can figure out where the aim is.



Reliable, Not Valid

Reliabile & Invalid

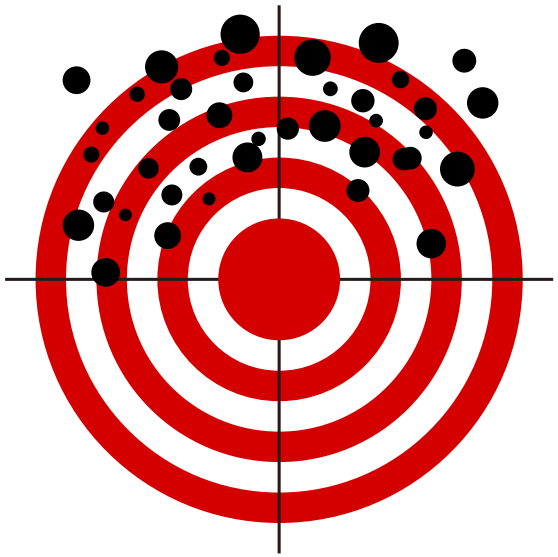
- Always hits more or less the same spot, but it's not the aim.



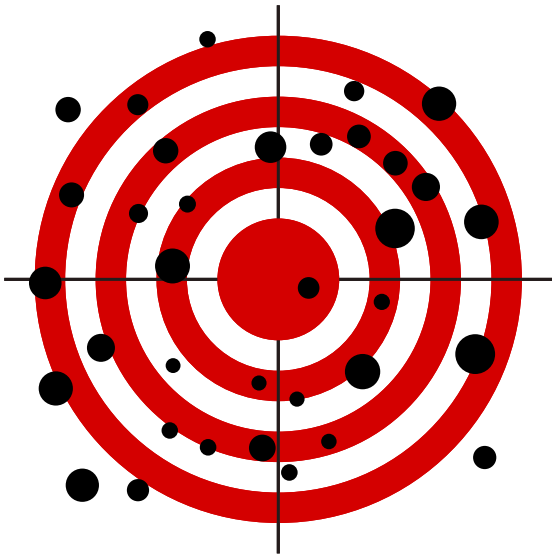
Both Reliable & Valid

Reliable & Valid

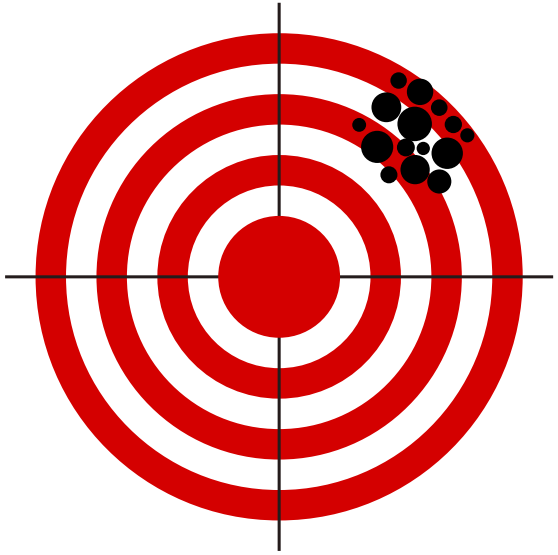
- Hits the same spot & its the aim.



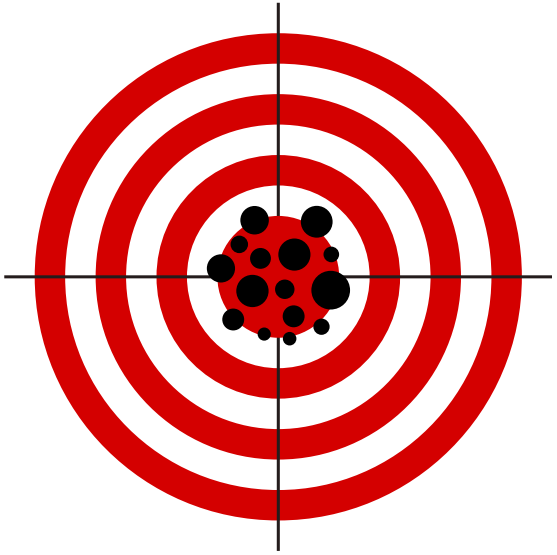
Unreliable & Invalid



Unreliable, But Valid



Reliable, Not Valid



Both Reliable & Valid

Rinse & Repeat

Rinse & Repeat

Data:

Rinse & Repeat

Data:

- **systematic**
- **empirical**
- **observation**

Rinse & Repeat

Two criteria for data collection:

Rinse & Repeat

Two criteria for data collection:

- Validity
- Reliability

Steps in Measurement

1. Conceptualize.
2. Operationalize.
3. Collect data.

Conceptualization

- Define concept.
- Link with theory.

Operationalization

- Another definition, one that allows to assign values.
- Link concept with empirical observation.

Two Kinds of Units

- Unit of **measurement**.
- Unit of **analysis**.

Four Levels of measurement

- **N**
- **O**
- **I**
- **R**

Four Levels of measurement

- **N**ominal
- **O**rdinal
- **I**nterval
- **R**atio

The Three Attributes

- Ranked?
- Meaningful distance between categories?
- True zero?

Ranked	Distances	Meaningful True 0	
Nominal			
Ordinal	Yes		
Interval	Yes	Yes	
Ratio	Yes	Yes	Yes

Dimension

- Take 2 minutes to write down what do you mean when you use the word **dimension**.

Dimension

- Take 2 minutes to write down what do you mean when you use the word **dimension**.
- Measurement in space – e.g. length, width, height –, scope.

Dimension

- What does one-dimensional mean?

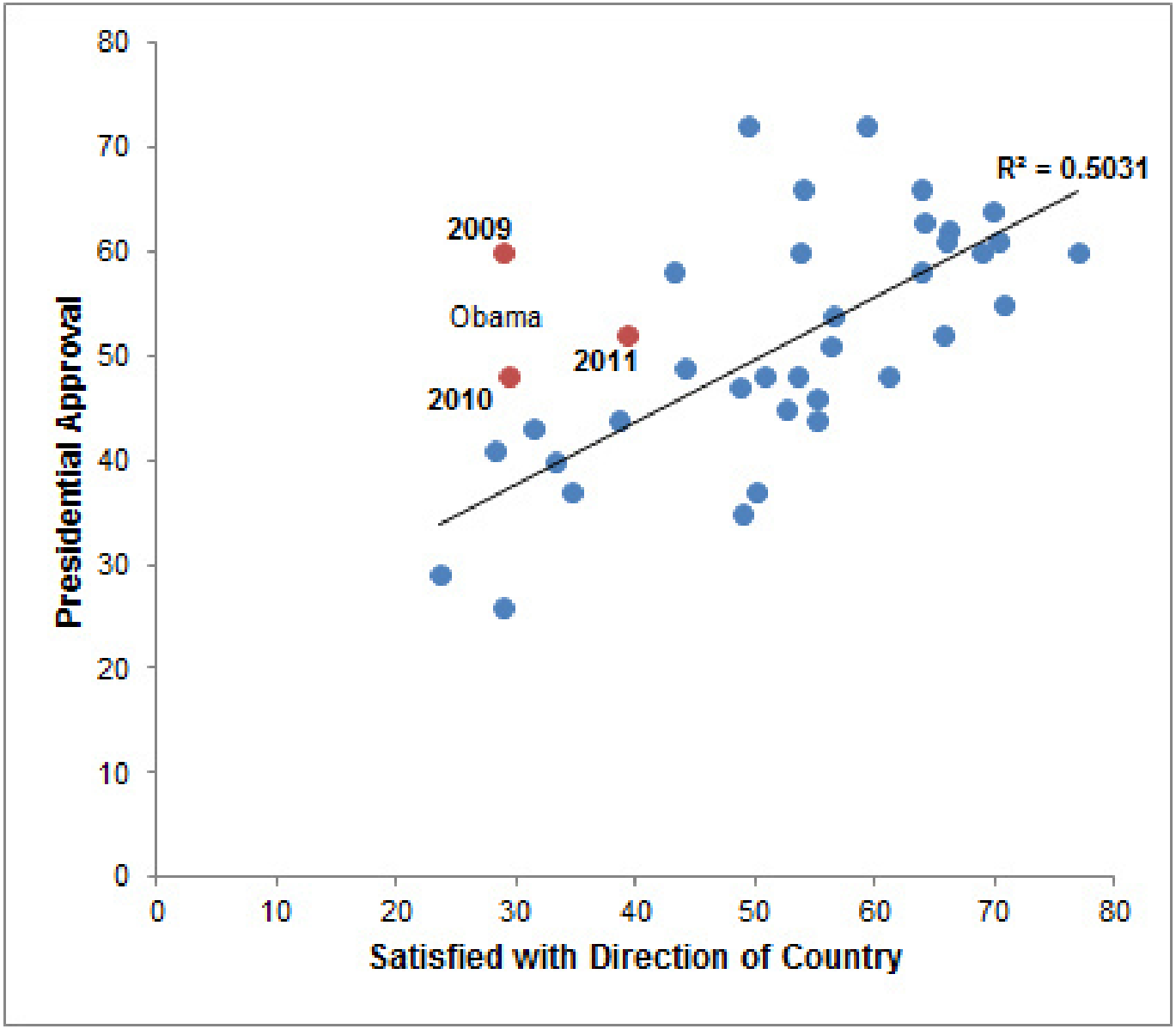
Dimension

- What does one-dimensional mean?
- What does multi-dimensional mean?

Association

- Generalizing.
- Focused on multiple attributes – i.e. dimensions – and their patterns.

Example: Association



66
ATLANTIC
Gulf
Miller
Lite
ODOUL'S
MATILDA
BUD LIGHT
Gulf
REGULAR

Type

- Take 2 minutes to write down what do you mean when you use the word **type**.

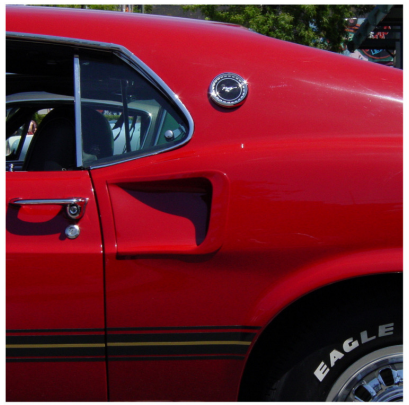
Type

- Take 2 minutes to write down what do you mean when you use the word **type**.
- A group of things that share a certain characteristics; a definition of this group.

WATER

BFGoodrich

Super


EAGLE

Typology

- Generalizing, i.e. about a defined group of cases.
- Focused on grouping multiple dimensions into multiple categories.

Typology

- Generalizing, i.e. about a defined group of cases.
- Focused on grouping multiple dimensions into multiple categories.
- Can you give an example?

Typology

- Generalizing, i.e. about a defined group of cases.
- Focused on grouping multiple dimensions into multiple categories.
- Can you give an example?
- Types of non-democratic regimes.

EVERYDAY TASTES FROM HIGH-BROW TO

	CLOTHES	FURNITURE	USEFUL OBJECTS	ENTERTAINMENT	SALADS
HIGH-BROW	TOWN Fuzzy Harris tweed suit, no hat — COUNTRY Fuzzy Harris tweed suit, no hat	Eames chair, Kurt Versen lamp	Decanter and ash tray from chemical supply company	Ballet	Greens, olive oil, wine vinegar, ground salt, ground pepper, garlic, unwashed salad bowl
UPPER MIDDLE-BROW	TOWN Brooks suit, regimental tie, felt hat — COUNTRY Quiet tweed jacket, knitted tie	Empire chair, converted sculpture lamp	Silver cigaret box with wedding ushers' signatures	Theater	Same as high-brow but with tomatoes, avocado, Roquefort cheese added
LOWER MIDDLE-BROW					

Some Kinds of Typologies

- **Matrix** is multidimensional.
- **Taxonomy** is hierarchic.

Description

a description of even the smallest slice of reality can never be exhaustive

Max Weber

Description

a description of even the smallest slice of reality can never be exhaustive

Max Weber

all models are wrong, but some are useful

George Box