4th Spring Course | Year 1

Anderson Academy (Modelled on Harvard & MIT Health Sciences & Technology)

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Welcome to MED 514 B

Introduction to Biostatistics



Collecting → Summarising → Drawing conclusions

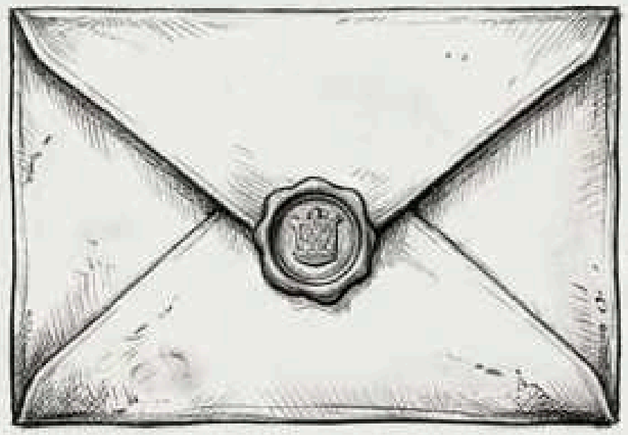
...from data about health and disease.

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Questions & Feedback

Always Welcome.





Email: garyanderson @
mail.grokbot.com

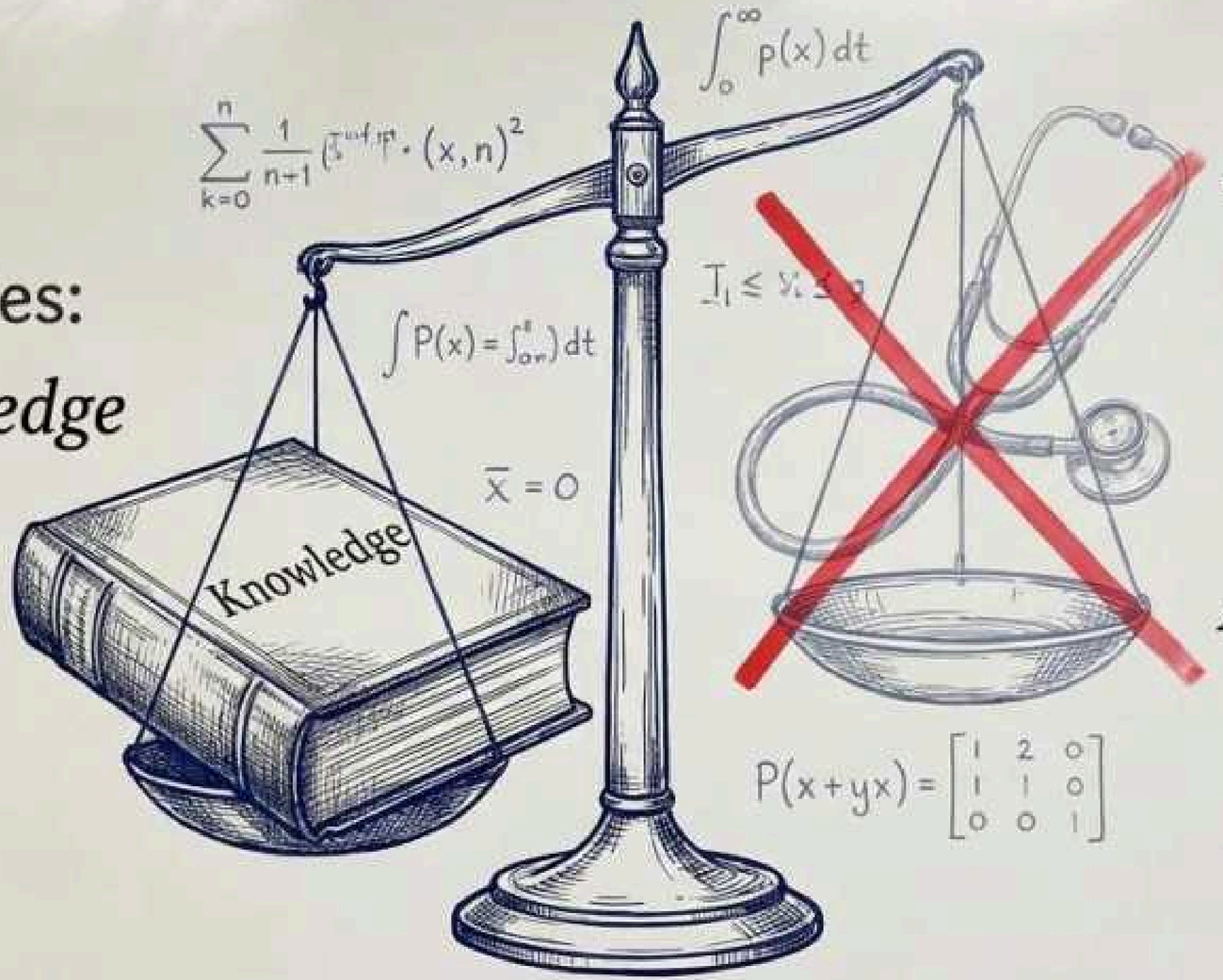
X (Twitter): @garyanderson

A Plain Reminder

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This Course Provides:

Medical Knowledge



This Course Does NOT Provide:

Medical Training

Clinical Skills

A Medical Licence

Medical Advice

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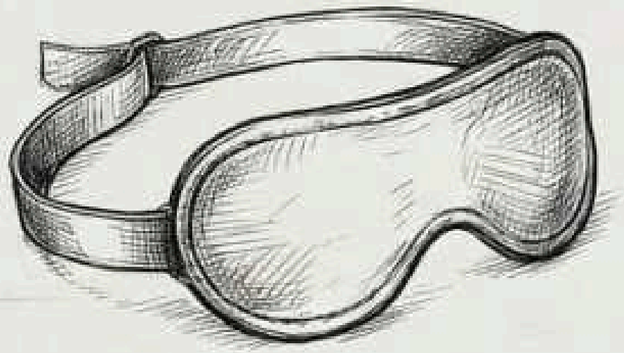
The Foundation of Care

Every treatment offered and every test ordered rests on statistics.

$$\mu = \frac{2\sigma}{n-1}$$

Without Statistics:

Taking others' word for what works.



With Statistics:

The ability to discern the truth.

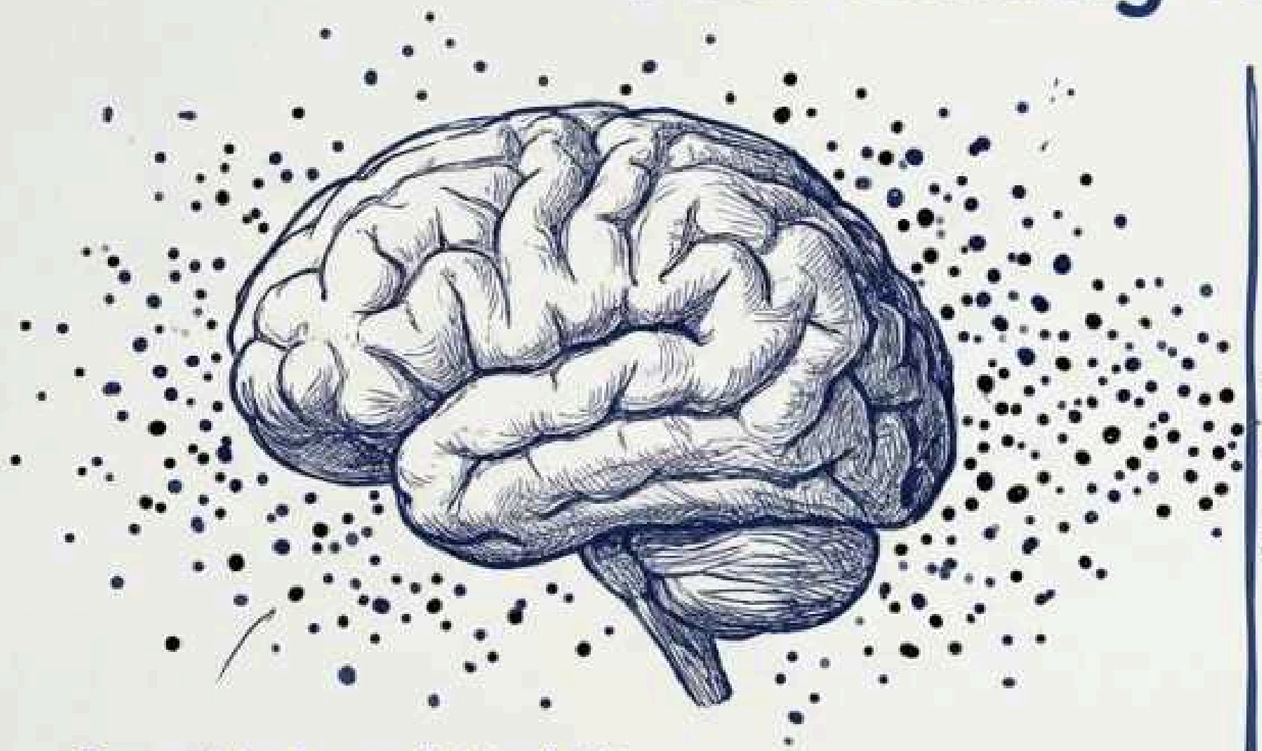
Strong finding » Weak finding

Large benefit » Trivial benefit

Real effect » Lucky accident

Overcoming Natural Habits

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$$f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}$$

Our Natural Habits:

- Seeing patterns in noise
- Remembering striking cases (forgetting ordinary ones)
- Judging by the most recent patient

The Statistical Shield:

- Provides disciplined ways to ask:
  - Is the pattern real?
  - How big is it?

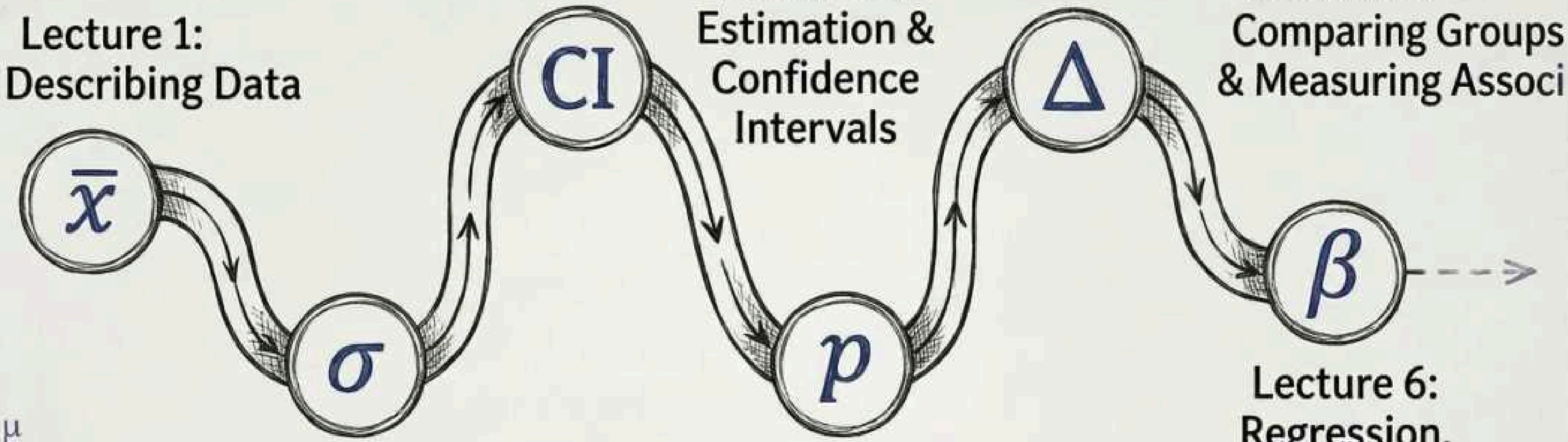
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Course Roadmap

$$\int f(x)dx = a, , r \ , \sum_{i=1}^{\infty} (a_{in}e^2)^2 = \mu$$

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}}\left(\frac{x-\mu}{\sigma}\right)^2$$

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Lecture 1: Describing Data

Lecture 2: Probability & The Normal Distribution

Lecture 3: Estimation & Confidence Intervals

Lecture 5: Comparing Groups & Measuring Association

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Lecture 6: Regression, Survival Analysis & Literature

$$\sum_{i=1}^{\infty} a_{in}e^2\mu$$

$$x) = \sum^{m}(x)$$

$$\int p(x)dx\mu = \frac{2\sigma}{n-1}$$

$$f(x)dx = \sum_{i=1}^{\infty} x.\frac{(x-\mu)^2}{\sigma}$$

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Prerequisites & Philosophy

$$V(\eta) = \int e^x dx = \int_0 f(n)dx, \ldots + 1, \sum_{i=1}^{m} [y(k_i - \omega_i)[i_i(1 - c\nu_x)].$$

Recommended
Recommended Background:
Math 230 B & 231 B
(Foundations of Statistical Thinking).

Note: We explain every idea from the start.



Our Philosophy:
You will meet a few simple formulas...

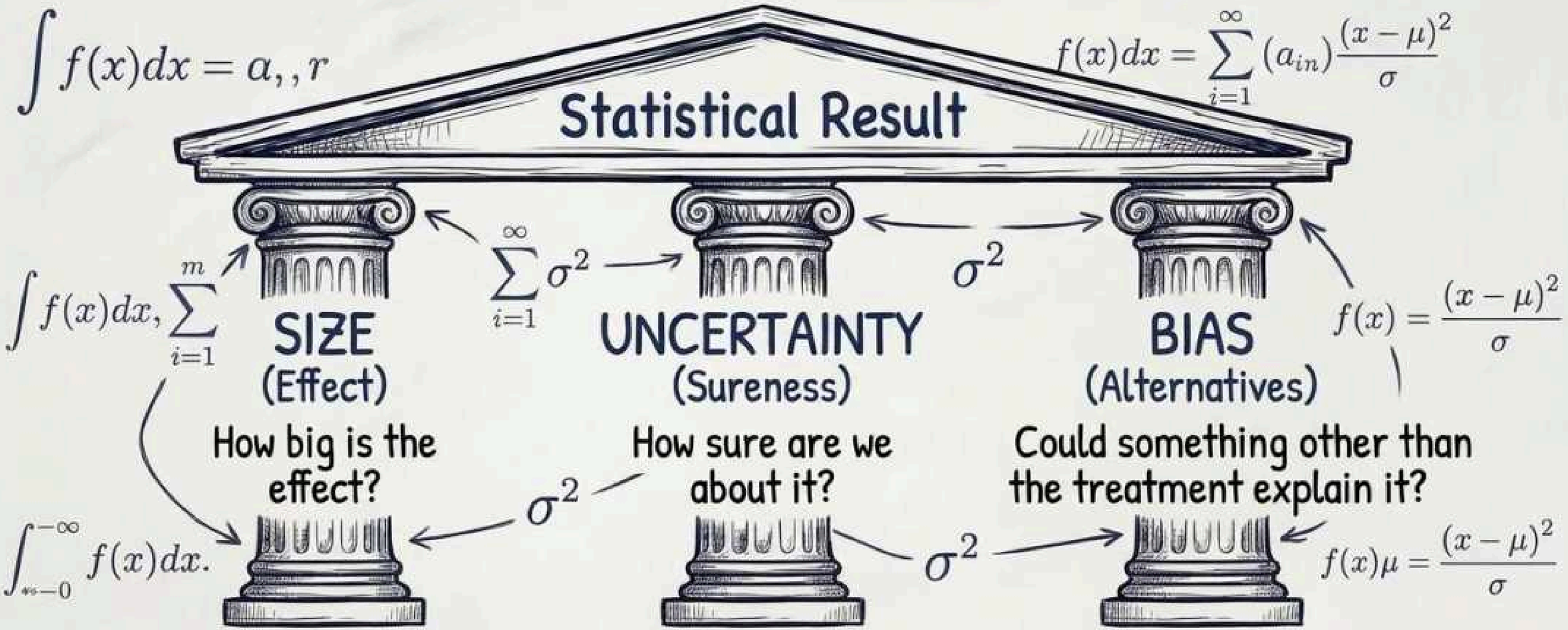
...but the ultimate emphasis is on understanding what the numbers mean.

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The 3 Vital Questions

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Whenever you meet a statistical result, always ask:

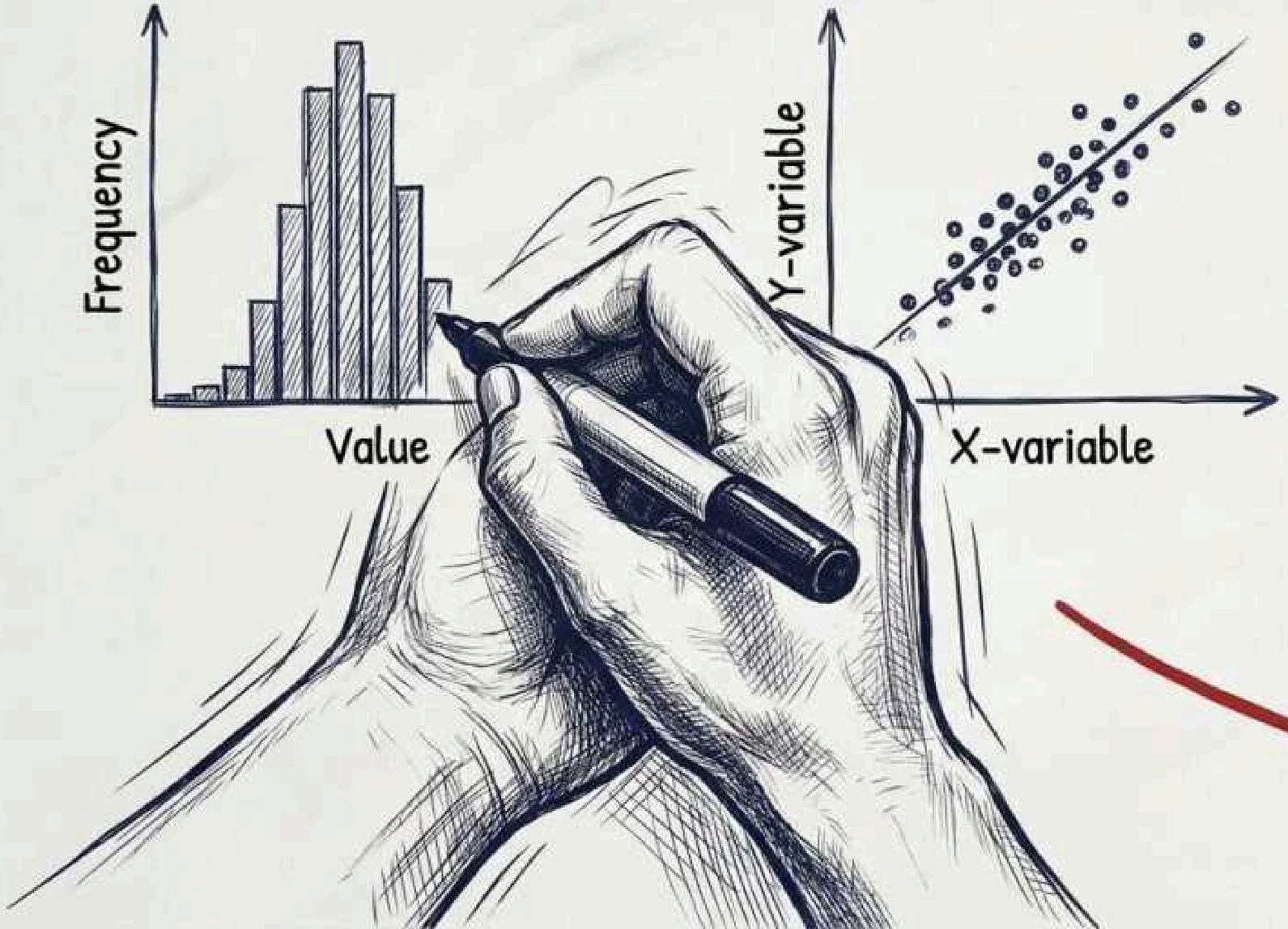


(This framework runs through every lecture).

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Let Us Begin

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The First Task of Any Analysis:

Describing what the data actually look like.

Proceed to Lecture One →

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