

FUNDAMENTALS OF RESEARCH

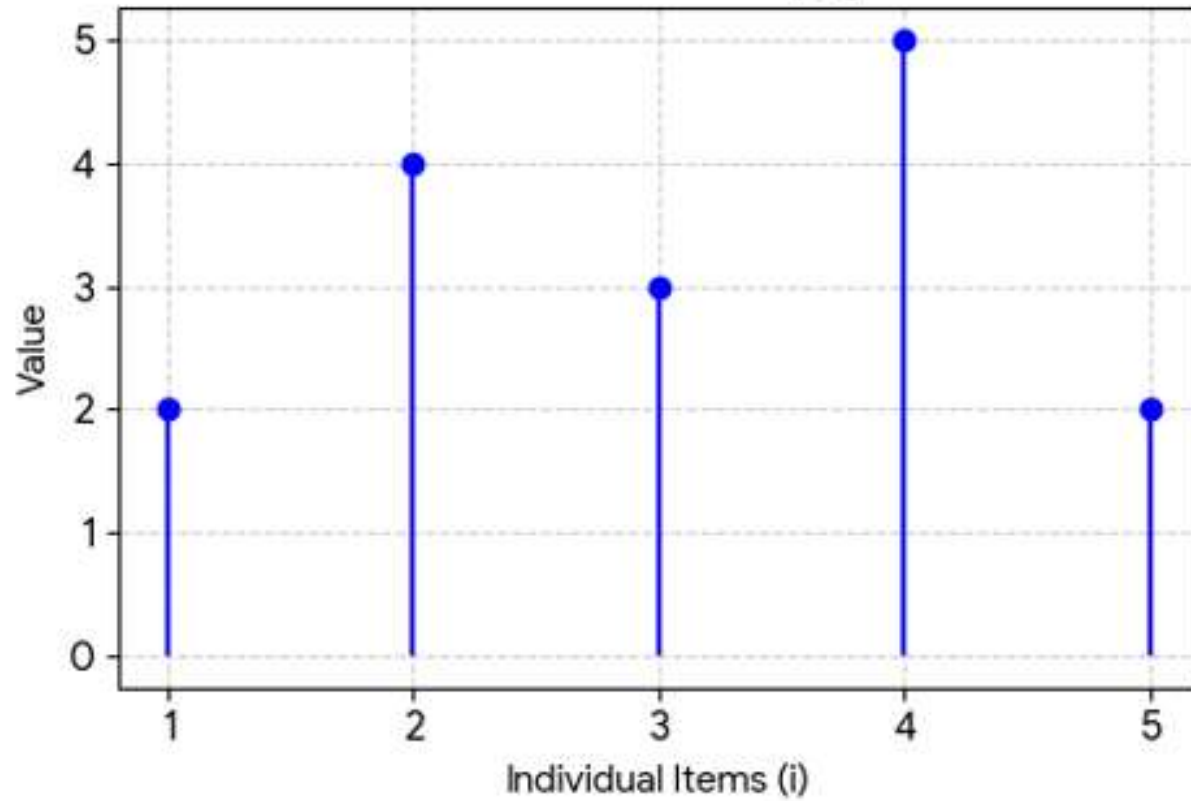
PROF. SAUMYA SENGUPTA

PROFESSOR OF HISTORY

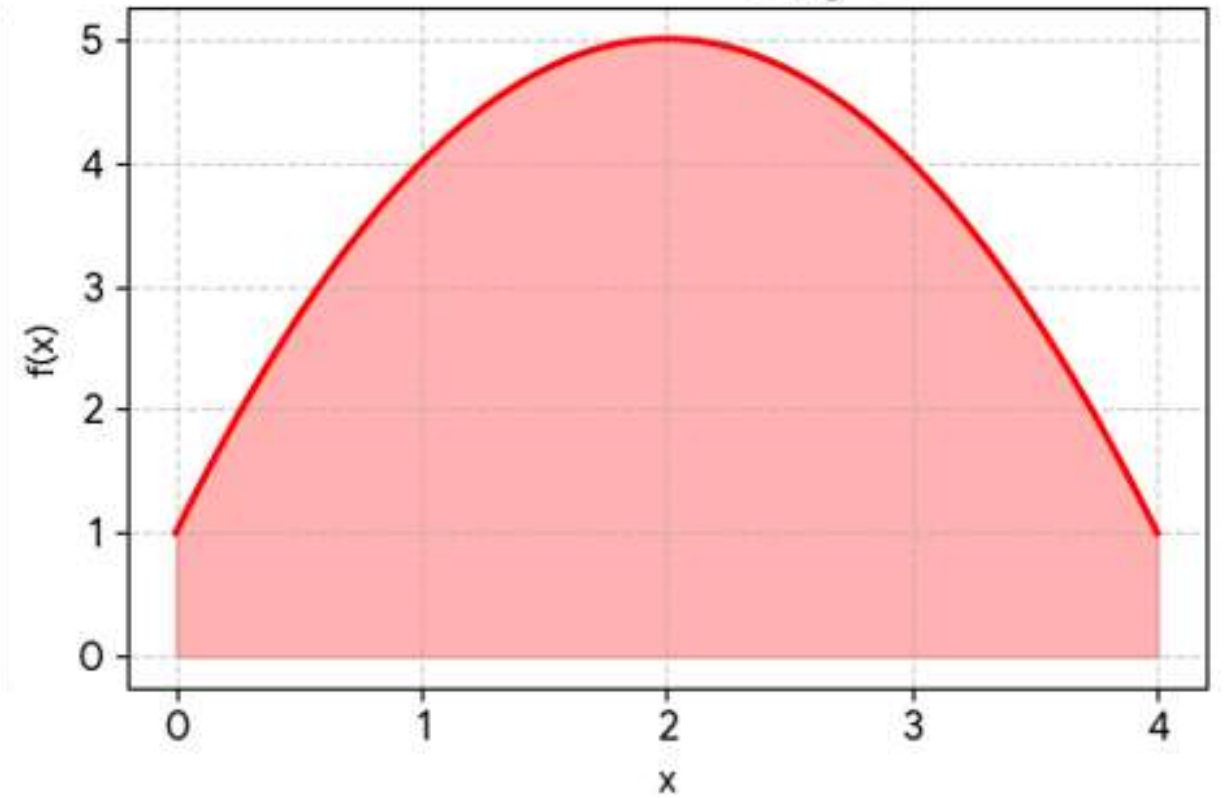
D.A.V. POSTGRADUATE COLLEGE, AZAMGARH. UTTAR PRADESH. INDIA.

Gathering/ Collection

Discrete Gathering: $\sum_{i=1}^5 x_i$



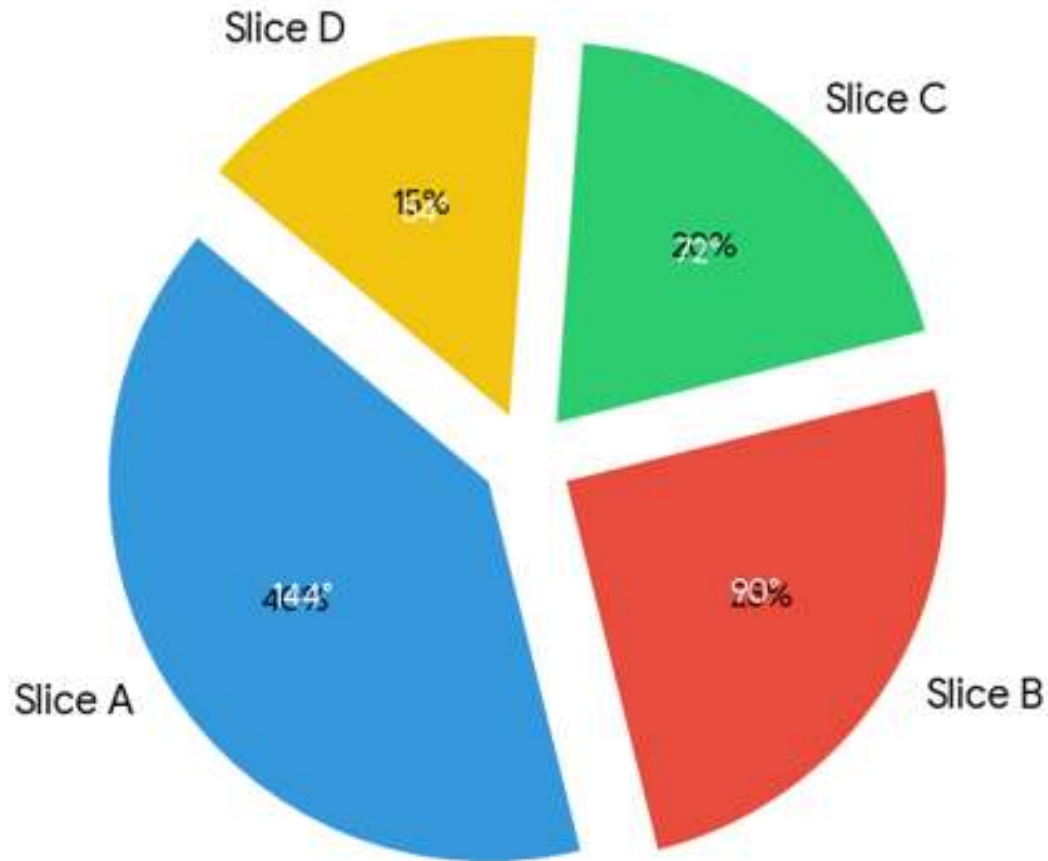
Continuous Gathering: $\int_a^b f(x)dx$



Analysis

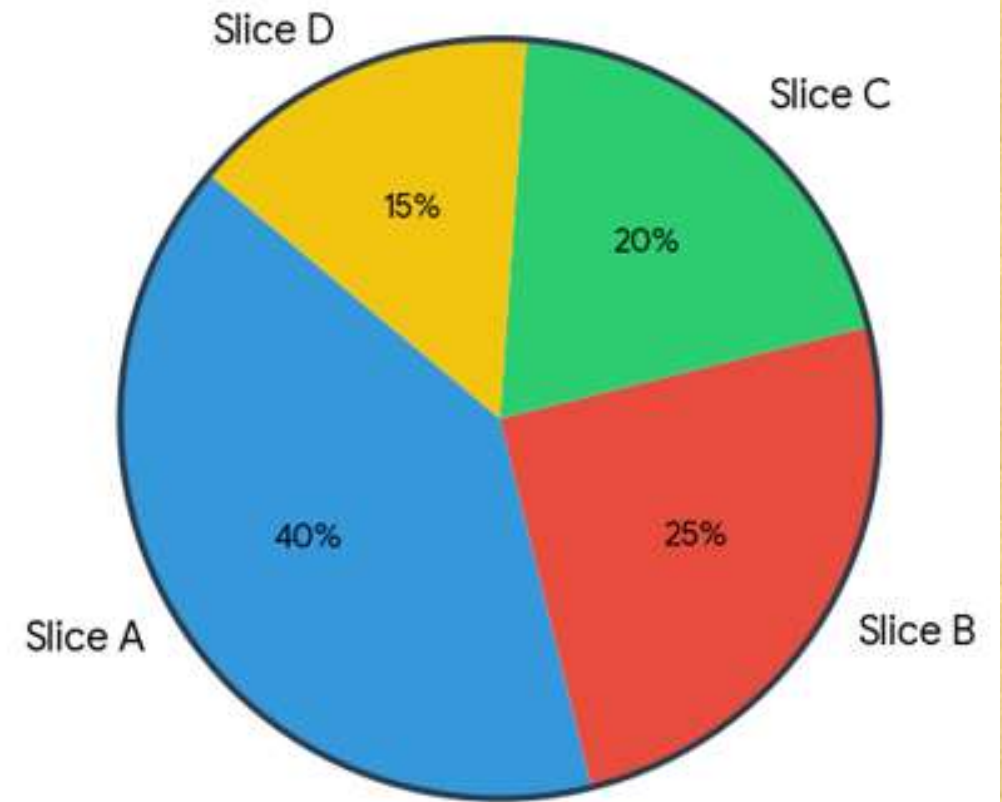
1. ANALYSIS
Isolating & Sizing Segments

$$w_i = \frac{x_i}{\sum x}$$



Gathering

2. GATHERING
Reconstituting the Whole
 $\sum \theta_i = 360^\circ$



The Three Steps of Data Interpretation

1. **Contextualisation:** Placing the clean data chart alongside real-world conditions (e.g., economic shifts, competitor behavior, or cultural factors).

2. **Hypothesis Testing:** Evaluation of whether the final results match your original expectations or if an unexpected glitch or variable caused a shift.

3. **Action Induction:** Moving from a historical

HISTORICAL EVENT
(e.g., The French Revolution)

Political Causes

Absolute monarchy, corruption,
weak institutional control

Economic Causes

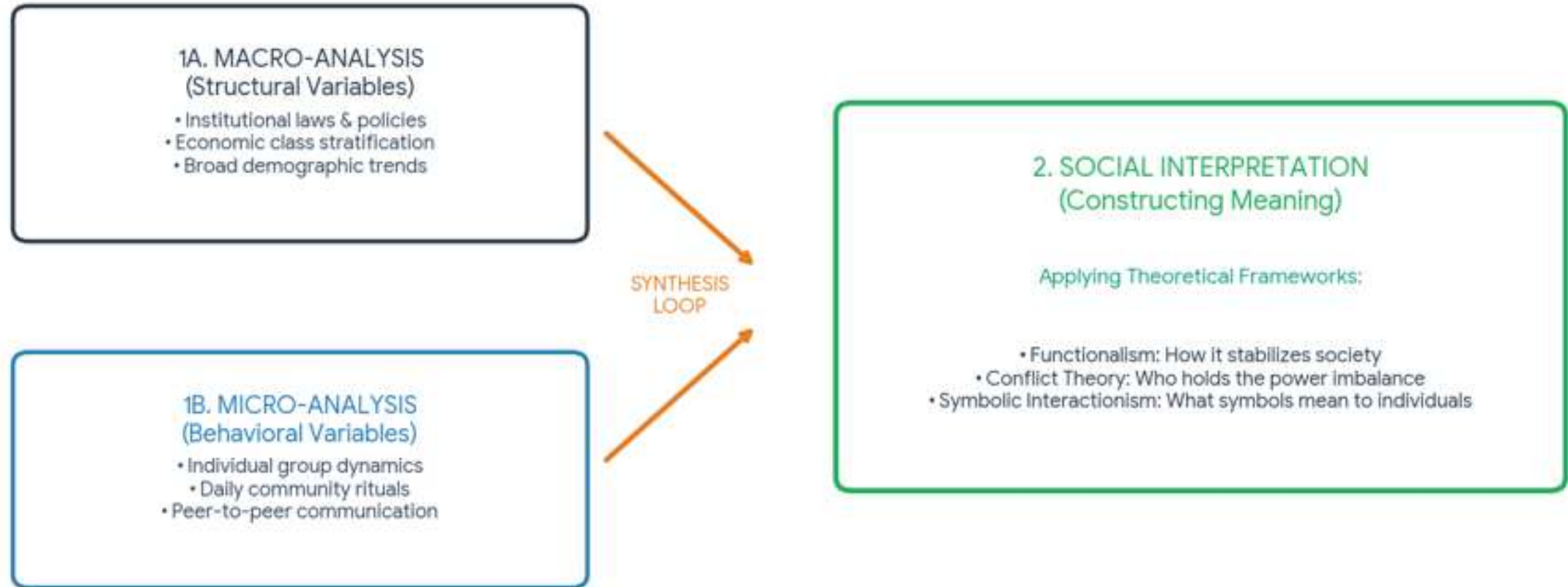
Severe national debt, crop failures,
unfair taxation systems

Social Causes

The Estate system, massive inequality,
rise of the bourgeoisie

HISTORICAL INTERPRETATION: 'A class struggle driving human liberation' vs 'An anarchic collapse of institutional order'

Social Science Blueprint: From Measured Variables to Human Insight



Core Analytical Approaches in Social Sciences

1. Quantitative Analysis (The Structural View)

- The Approach: Social scientists isolate independent variables (like income level) and dependent variables (like educational attainment) using statistics.
- Example: Running a regression model to prove that neighborhood zoning laws correlate directly with localized wealth gaps.

Core Analytical Approaches in Social Sciences

2. Qualitative Analysis (The Human View)

- The Approach: Researchers use systematic coding to pull key themes out of unstructured data like interviews, field notes, or cultural artifacts.
- Example: Organizing hundreds of hours of immigrant testimony into categorized emotional nodes like isolation, adaptation, and hope.

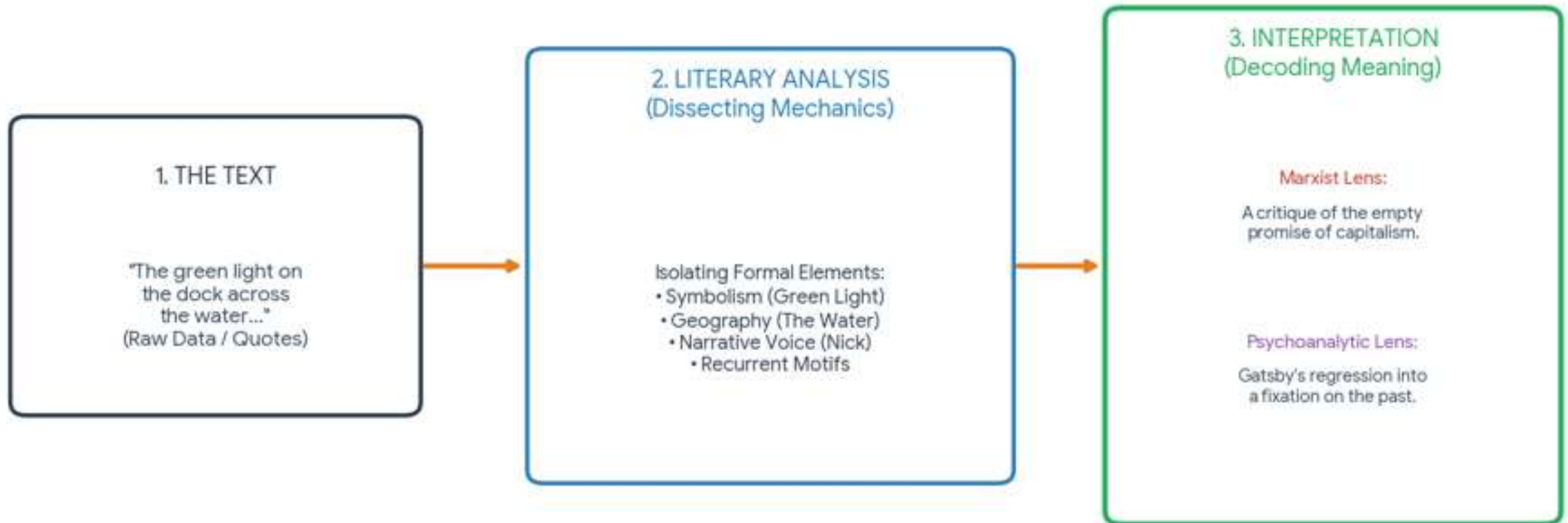
Core Analytical Approaches in Social Sciences

3. Interpretation (The Theoretical Lens)

The exact same data can mean completely different things depending on the interpretive framework applied:

- A Conflict Theorist looks at low voter turnout and interprets it as systemic voter suppression by elite power structures.
- A Structural Functionalist looks at the same low turnout and interprets it as societal complacency born from overall systemic stability.

Literary Architecture: From Mechanics to Critical Meaning



Key Analytical Lenses in Literary Theory

A text's analysis yields static facts, but your theoretical framework determines how those facts are interpreted:

- **Formalism / New Criticism:** Focuses strictly inside the text. It analyzes how literary elements (metaphors, imagery, tone) work together to create an organic unity, ignoring historical context entirely.
- **Marxist Criticism:** Analyzes power structures, socio-economic class, and money. It interprets the green light as a symbol of unattainable upper-class commodity fetishism.

- **Psychoanalytic Criticism:** Analyzes character behaviors using psychological frameworks (like Freud or Lacan). It interprets the light as the object petit a—the ultimate, unattainable object of human desire that drives human neurosis.
- **Feminist Criticism:** Analyzes how gender dynamics, patriarchy, and female agency are represented or suppressed within the text's structure.

The 4 Core Quadrants of Research Design

FUNDAMENTAL (BASIC)

Objective: Expand Pure Knowledge

- Driven by intellectual curiosity
- Builds core theories & laws
- E.g., Mapping human DNA strands

APPLIED RESEARCH

Objective: Solve Specific Problems

- Driven by commercial/social need
- Creates practical, real-world fixes
- E.g., Engineering a new vaccine

DESCRIPTIVE RESEARCH

Objective: Map Out 'What Is'

- Identifies traits of populations
- Does not manipulate variables
- E.g., A national census survey

EXPERIMENTAL

Objective: Prove Cause & Effect

- Tests isolated hypotheses
- Controls independent variables
- E.g., Clinical trials comparing drug A vs B

How to Select Your Quadrant

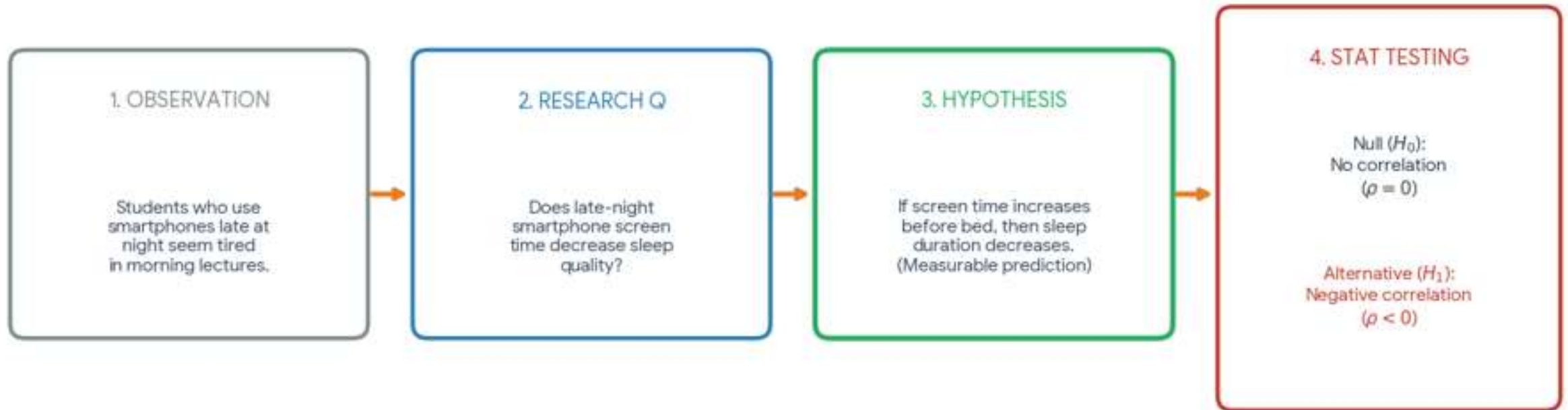
- **Look Left (Fundamental & Descriptive):** Choose these methods if your project aims to **discover baseline facts** or **build a conceptual roadmap** where very little prior literature exists.
- **Look Right (Applied & Experimental):** Choose these methods if your project must **test an exact variable interaction** or **deliver immediate utility** to a client, business, or community problem.

The Literature Synthesis Matrix Technique

The Synthesis Matrix: Transforming Linear Sources into Thematic Analysis

Sources (Authors / Year)	Theme A: Methodology Used	Theme B: Core Findings	Theme C: Identified Gaps
Smith et al. (2021)	Quantitative Survey (n = 500)	High correlation between remote work and fatigue.	Fails to consider socio- economic background.
Ahmed & Patel (2023)	Qualitative Case Study (Interviews)	Isolation drives drop in creative output.	Small sample size; not generalizable.
Your Project (2026)	Mixed-Methods Approach (Survey + Interviews)	Combines scale data with real human narratives.	BRIDGING THE GAP: Your explicit focus area.

The Hypothesis Pipeline: From Curiosity to Data Verification



Methodological Alignment: From Selection to Controlled Execution

1. SAMPLING METHODOLOGY (Selecting Your Data)

Probability (Unbiased & Generalizable)

- Simple Random: Equal chance for all
- Stratified: Random within subgroups (e.g., age)
- Cluster: Selecting intact geographic groups

Random
Selection



Non-Probability (Fast & Exploratory)

- Convenience: Testing whoever is close by
- Purposive: Choosing specific expert targets
- Snowball: Participants recruit future subjects

2. EXPERIMENTAL DESIGN (Structuring Your Test)

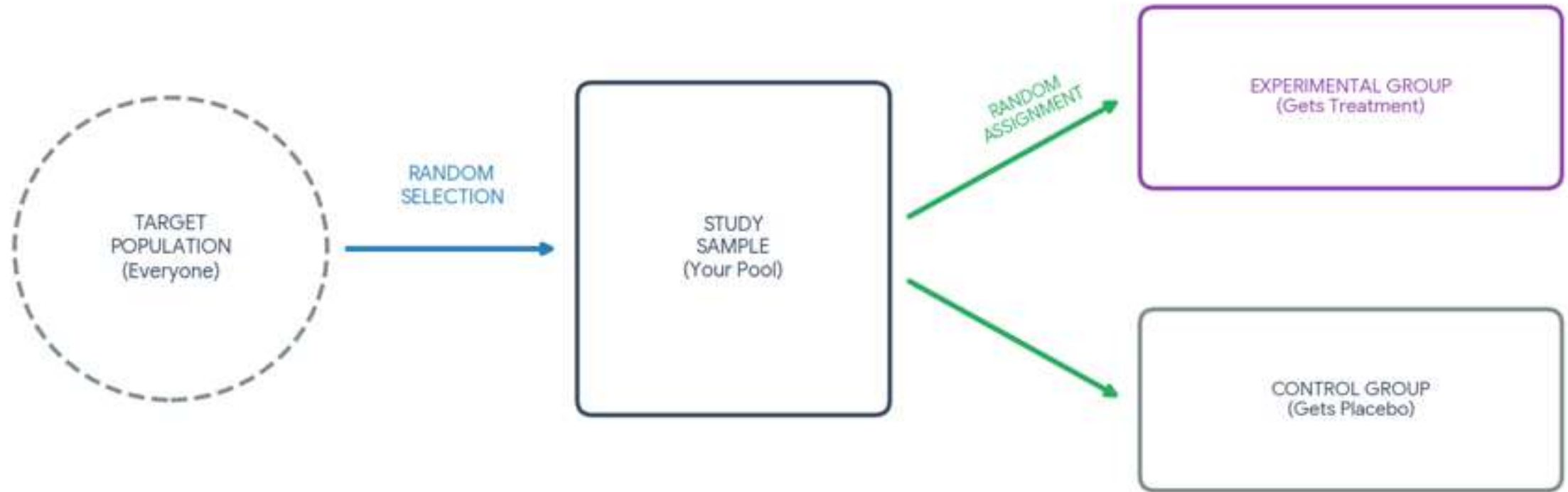
Between-Subjects Design

- Group A gets the real medicine
- Group B gets a fake sugar pill (placebo)
- Compares completely different individuals

Within-Subjects Design (Repeated)

- Group A is tested baseline without drug
- Same Group A is tested later with drug
- Removes individual personal differences

Methodological Pipeline: Drawing a Sample vs. Splitting the Sample



Blinding protocols

Blinding protocols are methodological controls used in research to prevent conscious or unconscious human bias from contaminating experimental results.

By hiding information about which treatment a participant is receiving, blinding ensures that changes in data are caused entirely by the independent variable, rather than by expectations, placebos, or observer preferences.

The Three Tiers of Blinding

1. Single-Blind Protocols

- **The Structure:** The participant does not know if they are in the experimental group or the control group, but the researcher administering the test knows everything.
- **Target Bias:** Eliminates the Placebo Effect and participant expectation bias.
- **Limitation:** The researcher might still showcase accidental, subconscious body language or physical cues that tip off the participant.

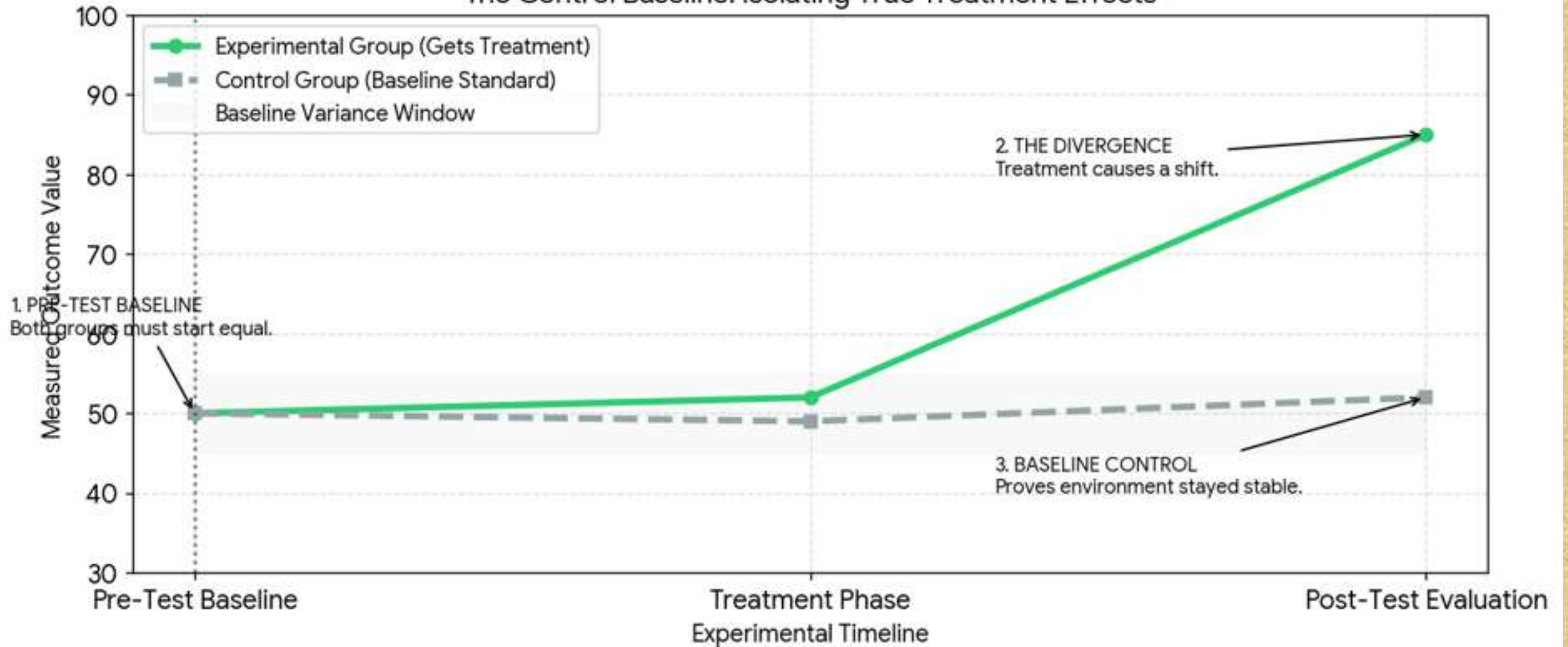
2. Double-Blind Protocols (The Scientific Gold Standard)

- **The Structure:** Neither the participant nor the frontline researcher administering the treatment knows which group is which. An independent third-party manages a coded key (e.g., Vial A vs Vial B).
- **Target Bias:** Eliminates Observer Bias or the Rosenthal Effect (where a researcher unknowingly treats the experimental group with more care or records ambiguous data in favor of their hypothesis).

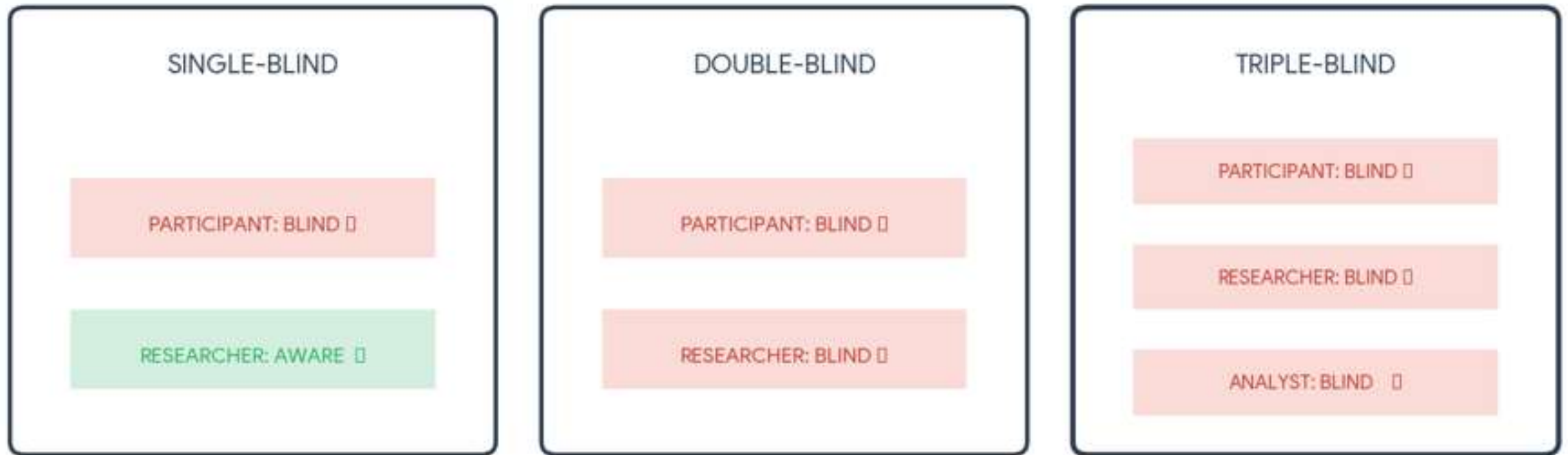
3. Triple-Blind Protocols

- The Structure: The participants, the administering researchers, and the data statisticians are all completely blinded. The data analyst receives clean spreadsheets where the group column names are stripped and replaced with random strings like Group_7X and Group_2Y.
- **Target Bias:** Eliminates Analysis Bias (where a statistician cleans data, handles outliers, or runs specific models selectively until they achieve a statistically significant p-value).

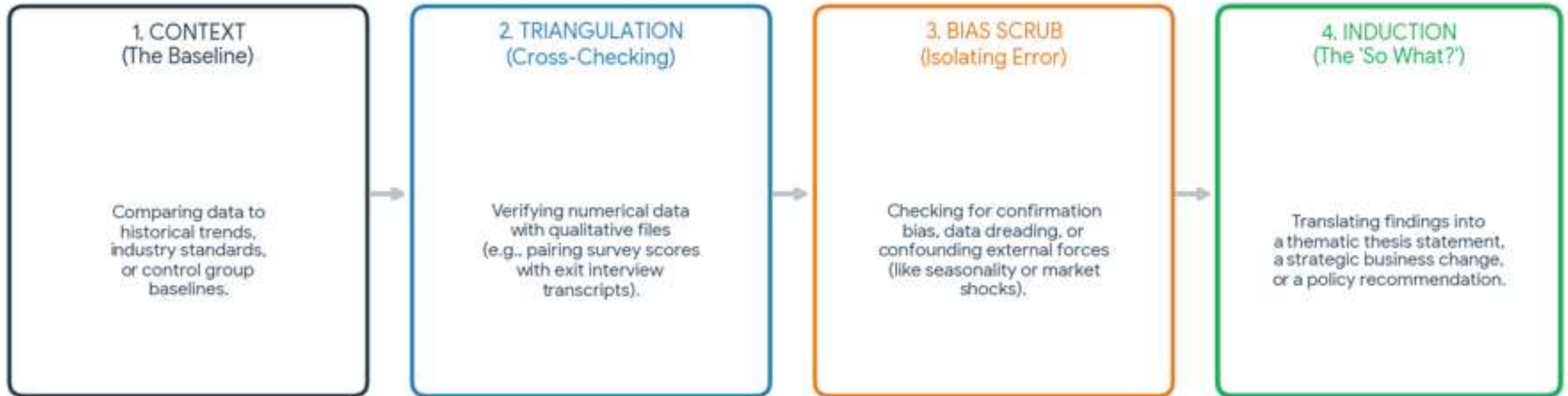
The Control Baseline: Isolating True Treatment Effects



Blinding Severity Matrix: Systematic Removal of Subjective Bias



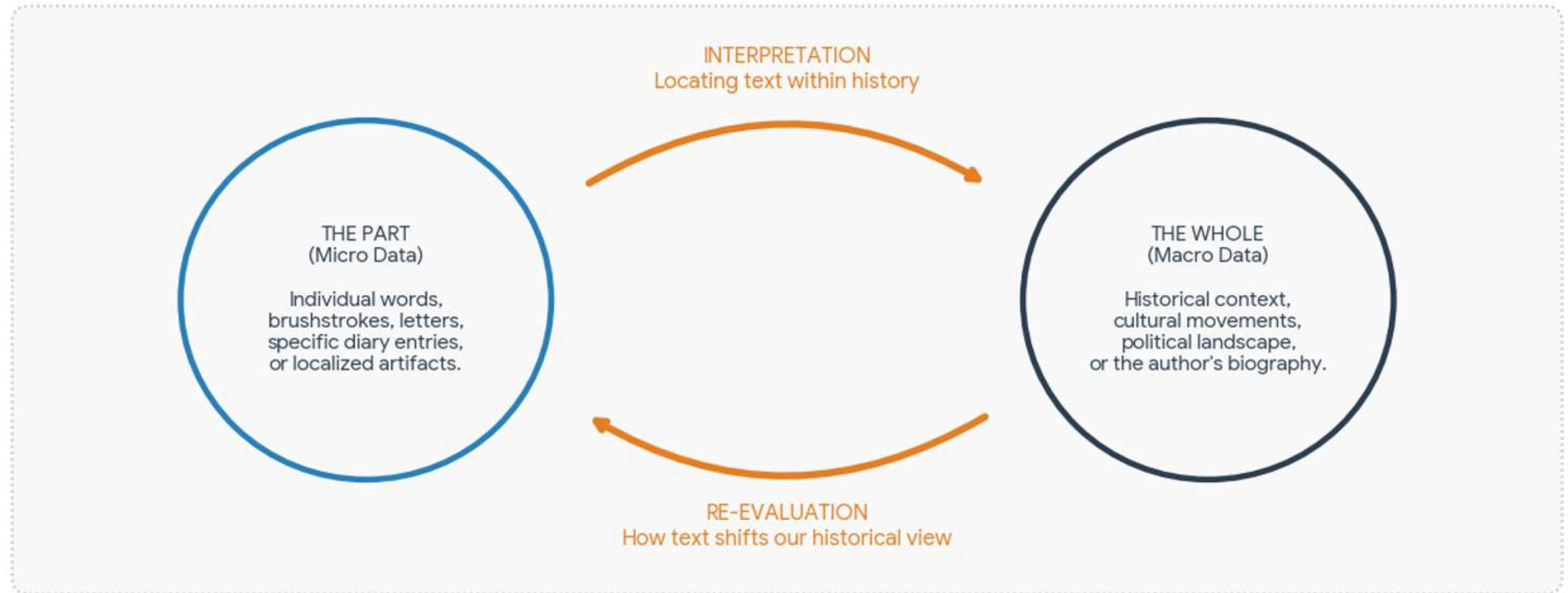
The Data Interpretation Pipeline: Turning Metrics Into Decisions



The Hermeneutic Circle Framework

Humanities scholars interpret data through a cognitive loop known as the **Hermeneutic Circle**. It states that you cannot truly understand a whole cultural artifact without analyzing its individual parts, and you cannot understand those parts without understanding the wider historical whole.

The Hermeneutic Circle: Interpreting Meaning in the Humanities



Quantitative vs. Humanities Interpretation

Feature	Scientific Interpretation	Humanities Interpretation
Data Nature	Discrete numbers, measurements, metrics.	Texts, images, material relics, ideas.
Primary Goal	Finding reproducible laws or proof	Finding nuanced layers of human meaning.
Validity Check	Statistical power, p-values, reproducibility.	Coherence, depth of evidence , critical consensus.
Outcome Type	A falsified null hypothesis or formula.	A critical essay, monograph, or thematic argument.

**THANKYOU
&
REGARDS**