

Psychology and scientific methods: What is psychology? What are psychological theories? How do scientific explanations differ from commonsense ones?

Scientific study of mind and behavior.

Psychological theories are scientific explanations – predictive, testable, tentative, rigorously evaluated, objective.

Commonsense explanations are not tested.

Independent variables, dependent variables, internal validity and confounds, ecological validity and generalizability

Independent variables – controlled by the experimenter.

Dependent variables – measure for statistics and results.

Extraneous variables or confounds – not interested in them but could affect the results.

Internal validity – if your measure relates to your questions

External validity – if your measure relates to the real world

Levels of psychological explanations

Computational level specifies input output relationship.

Algorithmic level specifies representations and processes of mind and behavior.

Implementational level specifies how representations and processes are implemented.

Operational definitions

Precise descriptions of how you measure variables.

When operational definitions are not precise enough – low inter-rater agreement

Naturalistic observation vs. observation with intervention

Naturalistic observation – can observe natural behavior but hard to know cause and effect

Observation with intervention – cause and effect, but artificial

Correlation and causation – third variable problem ($x \leftarrow z \rightarrow y$)

Modules in brain: Neural level, lobe level, hemisphere level

Neural – feature detectors, hyper-complex cells

Lobe – Broca lesion, Phineas Gage's inhibition problem when frontal lobe is damaged

Hemisphere – one of split brain patients' example

Double dissociation: What is it?

A pattern of evidence that demonstrates that two distinct modules exist.

There are two tasks, X and Y, and two groups of subjects. One group does better on Task X, while the other group does better on Task Y. For example, damage to a certain area of the brain disrupts mental process X while sparing mental process Y, and that damage to a different area of the brain disrupts mental process Y while sparing mental process X.

Lobes: Location and function

Frontal – reasoning

Temporal – memories

Parietal – association

Occipital – vision

Limbic – emotion regulation

Perceptual constraints and illusions

Interposition – near things block farther things – illusion of a square blocking circles.

Linear perspectives – things recede into distance – illusion on line length

Lateral inhibition – brightness activates neurons more than darkness, and neurons inhibit each other, resulting in edge enhancement.

What are the Gestalt laws of grouping?

Proximity, similarity, good continuation, common region, etc.

Needed to interpret stimuli – figure and ground

Bottom-up and top-down perception: What are they? Examples of top-down perception.

Bottom-up: Physical characteristics of stimuli drive perception

Top-down: Knowledge, thoughts, expectations influence perception

The Cat, ABC 12 13 14, Word superiority effect, Culture and perception (race, aha! phenomenon) are examples of top-down perception.

We search for best interpretations using both bottom-up and top-down perceptions.

Change blindness: What is it? What does it suggest about our perceptual abilities?

Hard time detecting changes when pictures are flipped quickly.

Much of what we perceive is transient and only information in focus of attention remains.

Three theories of object/pattern recognition: What are they? What are the problems?

Template – too many templates needed

Feature – same features can result in different objects (T, L, +)

Structure – sometimes you can't describe relations among features

Simple and conjunctive search: Results? Interpretations?

Time to find simple features does not depend on the size of distractors, but time to find conjunctions does. This suggests you process basic features independently and later combine features.