3. REASONING

Reason or "reasoning" is associated with thinking, <u>cognition</u>, and intellect. Like habit or <u>intuition</u>, it is one of the ways by which thinking comes from one idea to a related idea. It is the means by which rational beings understand themselves to <u>think</u> about cause and effect, truth and falsehood, and what is good or bad. It is also closely identified with the ability to self-consciously change beliefs, attitudes, traditions, and institutions, and therefore indicates the capacity for freedom and self-determination. Psychologists have attempted to study and explain how people reason, which <u>cognitive</u> processes are engaged, and how cultural factors affect the inferences that people draw.

In order to solve problems, we utilize four major forms of reasoning: deduction, induction, abduction, and analogy.

Deduction

Deduction is the process of reasoning from one or more general statements, known as premises, to reach a logically certain conclusion. If all premises are true, the terms are clear, and the rules of deductive logic are followed, then the conclusion reached is necessarily true. An example of this would be if all NFL players are males, and given that a particular person is an NFL player, one can deduce that this person is a male.

Induction

Induction is often described as reasoning that derives general principles from specific observations. Unlike deductive reasoning , it allows for the possibility that the conclusion is false, even if all the premises are true. An example of this would be if all squirrels that we have observed so far are gray, we may induce that all squirrels are gray. We have good reason to believe the truth of the premise, but the truth of the conclusion is not guaranteed, as there are indeed squirrels of other colors.
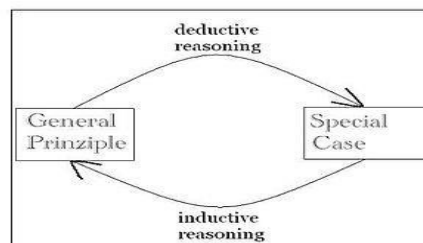
Deductive versus Inductive Reasoning

      Two of the major forms of reasoning which utilize general statements, or premises, as well as specific statements in arriving at a logical conclusion.

Abduction

Abduction is a form of logical inference that goes from an observation to a hypothesis that accounts for the observation. Abduction also seeks to explain the hypothesis with relevant evidence. Unlike deductive reasoning, the premise does not guarantee the conclusion, and is considered an inference to the best explanation. An example of this would be observing that a child is not riding on a specific amusement park ride, and abducing that the child must not be old enough to ride, as other children of similar age are not on the ride either.

Analogy

Analogy is a form of reasoning which states that two objects are like one another; from this it helps us through basic tasks such as identifying places, objects, and people. Analogy is an inference, or an argument, from one particular subject to another. However, unlike deduction, induction, or abduction where at least one premise (or the conclusion) is general, analogy concerns itself only with specifics and particulars. An example of this would be stating that the day is beautiful because there is no need for an umbrella. Here, we argue that days in which we have no need for an umbrella are beautiful because we relate beautiful weather with sunshine, not rain.

Heuristics

We also use a variety of heuristics, or mental shortcuts, when reasoning, solving problems, and making decisions in a limited amount of time. Heuristics help us save time and energy by finding a solution quickly. They are simplistic rules and habitual, automatic thinking responses that free us from exhausting ourselves by trying to process all available information. There are approximately fifteen generally applied heuristics in psychology:

- Framing: viewing a need in the real world as a problem that can be worked on solving
- Anchoring and Adjustment: assuming a starting point and thinking about adjustments from there
- Status Quo: leaving things as they are
- Sunk Cost: treating resources already spent on one alternative as an estimate of the resources to be spent all over again to start anew
- Confirmation: leaning toward an action in order to prove it's a good one
- Cognitive Overconfidence: being decisive and refusing to doubt
- Prudent Estimation: making conservative estimates
- Risk Aversion: avoiding the probability of something going wrong
- Selective Perception: knowing what you're looking for
- Availability: assuming that if an idea doesn't fit in with the obvious data, it must be wrong
- Guessing at Patterns: spotting a trend or 'big picture'
- Representativeness: assuming that if something looks like it is, then it must be what it is
- Most Likely Scenario: avoiding wasting time on possibilities that probably won't happen
- Optimism: thinking positively about moving forward
- Pessimism: avoiding unpleasant surprises by looking negatively upon the future

The processes of problem solving, judgment, and decision-making each require appropriate effort and involve a variety of psychological steps . Often, decisions are reached at the end of significant prior thought and reasoning. However, there are many situations when we decide something 'spontaneously,' with little or no time to reason. These spontaneous decisions are often associated with functional fixedness, confirmation bias, insight and intuition phenomenology, heuristics, and algorithms.