GLOSSARY

Cognitive Science and Behaviour

absent mindedness

Interaction between memory and attention

See also *inattention blindness*

ACME
analogical constraint mapping engine

A mechanical technique to perform analogies. A situation is linked set of a frame and slot structures, as in the examples below. A table is constructed, mapping objects in one situation to the other, and may be appended at each stage. An exhaustive search is employed to construct this mapping, but cannot build initial situations. Sufficiently similar elements are considered analogous.

Holyoak, Keith; Paul Thagard 1987

see also *ARCS, frame, idealized cognitive model, mapping*, *resolution procedure, SME, unification*

ARCS

Similar, but includes a dictionary of definitions

***Table 1:** Situation 1*

#	*Rule*	*notes*
m1	causes m2 m3	
m2	helps obj:midwife obj:mother	i.e. the var is of type mother
m3	gives-birth-to obj:mother obj:child	

***Table 2:** Situation 2*

#	*Rule*	*notes*
s1	causes s2 s3	
s2	helps obj:Socrates obj:student	
s3	Knows-true-or-false obj:student obj:idea	

***Table 3:** Mapping*

Situation 1	*Situation 2*	*notes*
Midwife	Socrates	
Mother	Student	
child	idea	
gives-birth-to	knows-true-or-false	

ACT
adaptive control of thought

A symbolic cognitive architecture. Primarily uses:

John Anderson, Acquisition of Cognitive Skill *1983*

- Declarative memory is a semantic network (aka spreading activation network)
- A goal stack, allowing subgoals to be pushed onto the top of the stack
- Production rules represent memory, with the pattern recognition system selecting the rules. Production rules can check the top of the goal stack, as well as the problem space.
- Nodes include text, images, numbers, propositions, sequences
- Learning: new rules and weighting to select which rules to use. The

weighting (based on probability / Markov power) is # activations, Sum of square of activation duration, Sum of activation duration, and to minimize either duration or variation.

Has learning components. It was the first theory cognitive architecture with sufficient detail and completeness.

action

Jens Rasmussen

Broadly levels of skilled performance:

Skill-based: smooth, automatic (not conscious, and not available to conscious thought), highly integrated, in a normal environment.

rule-based: conscious, rule based, for less frequent situations (but must occur in order to be learned). No clear distinction / stage with skill-based. This may become a brittle organization of procedures. With practice a cache of common procedures, or of ones we've forgotten how to reason about.

Knowledge-based domains have no rules to inform what to do, require thought and reasoning.

action cycle (rule based)

Don Norman

Start:

1. Form the goal or state to be accomplished

Stages of execution:

2. From this form an intention to accomplish it
3. Form a plan or specification of action, possibly unordered
4. Carry out the steps

Stages of evaluation:

5. Perceive the state of the world
6. Interpret this state
7. Evaluate the progress with the goals and intended outcomes

activity level

self-esteem, compliments received

goal visualization, and self-esteem

does introspection or reflection affect activity level?

advertising

Different types of advertising use different communication styles:

Imperative: Buy, Eat, See, Drink, etc.

Comparative: Better, Faster, Cheaper, Richer, Finer,..

Nominative: The Name,

affect

Refers to the cognitive judgment system; tendency to positive / negative outlook / mood

See also *amygdalia*

affordances

The sorts of operations actions and manipulation can be done to an object.

perceived affordances

What a person perceives can be done to (or with) an object. These perceptions aren't always the same as the intended affordances (e.g. the perceived actions can cause an item to break). These perceptions trump signs, warning or instructional.

aggression

Aggression can be governed by rituals and set patterns of threat & response, including rituals for backing down.

See also *competition, cooperation, hormones (esp. testosterone)*

AI
artificial intelligence

Encourages us to think of any problem as a search of a problem space:

1. Decide what problem is to be solved
2. Figure how to characterize any solution to that problem;
3. Settle on a search space that includes all such solutions.

Thru the use of sensors, and reliance on some forms of calculation, inference, and tabulation, AI could allow more refined, robotic pets and assistive robots. A few small core operators repeated a very large number of times.

Occasionally has a model of others beliefs.

See also *ACME, ART, classifier, expert system, machine learning, problem solving, QA, regression*

allophilia

How much we like others. Peoples attitudes towards immigration, charitable giving, study, voluntary work, and travel are guided by what sorts of groups make them feel good –based more on how much they like Latinos than party affiliation, social and economic status. Tolerance has limits: despite years of peaceful symbiosis, age-old distinctions between in and out groups can quickly reappear (e.g. Bosnia and Rwanda). Groups accepting a fiat-based truce may compete violently once they get a chance.

See also *altruism, attachment, trust*

altruism

Three kinds – kin selection (nepotism), reciprocal altruism (keeping score, reciprocity, sharing, building trust), altruism to strangers (charity).

AM

Hierarchy of concepts. Heuristics, learning is composed program create new heuristics. Agenda of tasks. Human's screened the output for interestingness (the program couldn't tell what was dull). Mathematical reasoning.

Lenat 1979,1983

ambivalence

Emotions that are in contrast, even in conflict. Techniques used in narratives.

AMBR
associative memory based reasoning

Based on his theoretical cognitive architecture. A collection of agents simultaneously perform small symbolic tasks which operate on representational structures. Agents are estimated to have a degree of relevance to the subject, this in turn controls how fast they carry out their tasks. Properties, causes, relationship. Parallel search strategy.

Boicho Kokinov

amygdalia

Needed to determine threatening faces, social affect.

See also *theory of mind.*

analogical reasoning

MAPPING. The same cause-effect structure of a baseline story is kept, while the objects, people or other referents are changed to the current situation (a process called *mapping)*. Similar to logic structures and unification procedures, without their strict categorization.

REPRESENTATION. A skillful choice of a representation eases work. Many representations are essentially longest-string match (with edit distance) algorithms, similar to copy-paste detectors. Most mechanical methods represent each situation as a schema, seeking to identify a mapping and construct a stylized result. Many analogies are made against a set of standardized schemas considered accepted, useful, or interesting.

APPROPRIATE SOURCE ANALOGY. Finding an appropriate source analogy for mapping.

INFERENCE.

ADAPTATION. Most analogy systems work, if given the precise data needed in the discovery (e.g. a law of nature). The difficulty is getting an analogy specifically (and a system in general) to work when the data has misleading, erroneous and irrelevant aspects. A robust system needs to adapt an analogy in appropriate ways.

One method is to employ a *metric* for analysis: cost of differences between two situations, less costly if the differences are shallow, more costly when they are deep

– that is to say, deep structures should be the same.

SCHEMA INDUCTION.

see also *ACME, case based reasoning, cognitive blending, exemplar based judgment, folk reasoning, idealized cognitive models, ill-formed, mapping, memory (method of Loci), mental spaces, possible worlds, small-world assumption, text fusion*

criteria

The criteria for validating models and analogies include

- Some sense of elegance (although these researchers are notoriously narcissistic)
- Clarity in the mapping and richness of many things are mapped to the target.
- Abstractness of relations on relations being the most abstract.
- Systematic mapping into a coherent system
- A ratio of how similar two subjects are to how much they differ

The ways subjects resemble each other, the way they differ from each other. Ideally virtually identical in every respect, except for occupying the same space.

As a moral form, tries to argue that because two cases are similar we should extend the treatment already given to one to the other. Another form attempts to sow that an instance in which an actions legitimacy is in doubt resembles an instance in which the action would be justified.

perception

Perception may be influenced by our beliefs, goals, external context, can be radically reshaped when necessary.

When examining a set of or sequence of examples. Recognize any pertinent properties of the elements. Make a guess about properties (eg base is constant but last digit is always 7). When considering the rules, noticing that one part is constant while the other is independent and giving priority to those that are. Attempting to find a notation that is consistent for the whole set.

A:B as C:D

Either a short list of C & D pairs or C is given and D is to be provide. Structural relations among concepts, weighting to prefer certain ones. Constraint satisfaction.

schema inducement

List of properties; integrating those into a schema. elementary image schema.

Gilles Fauconnier Mappings in thought and language *1997*

Archetype: "an exceptionally good and readily accessible representative of the abstract schema." "The similarity between domains that gets exploited here is one of structure not of substance."

Induced schema. "Very high level of abstraction" "ignores the technical aspects of each domain."

Typically "understanding of the input domains is itself limited to highly schematic and nontechnical interfaces."

Issues: "Given the richness of the domains and their complexity, how are the 'right' schemas consistently extracted, elaborated, and applied to further mappings?" "What are the schemas and generic frames that structure our conceptual systems so pervasively?"

see also *blending*

ANALOGY

Microworld: did the SAT type A:B as C:D. Did not create an answer – it selected one of five given possibilities as the answer. (It inspected, ranked, then selected). In a limited sense tried to build its own representations.

Thomas Evans 1968

Search strategy: exhaustive

analysis

1. Identify inference indicators
2. Consider the larger context: The context in which something occurs often provides information that enables proper interpretation
3. Identify each claim. Each claim could be a premise or a conclusion with

respect to any other. Recognize when claims are separate: do not treat dependent claims as independent claims!

4. Reformulate sentences to clarify them
5. Discard any portion that is not a premise or conclusion
6. Identify the main argument: the final conclusion and it's supporting premises.
7. It is necessary to understand each sub-argument to understand the whole argument
8. Sub-arguments that counter objections to the central argument often play an important role by removing objections that stand in the way of accepting either the main conclusion or an intermediate one.
9. Start with what is clear and build from there.
10. Treat an explanation that occurs within an argument as a single claim
11. A conditional sentence makes only one claim.

anchor & adjustment

People appear to first come up with a broad (or categorical) estimate, then refine or tune it. This affects quantitative estimates.

see also *cognitive narrowing, fixation, focus*

anchoring effect

Concerned with the persistence of a judgment of opinion, (little change), despite relevant change in the facts. This can be a solid part of character, as well as a weakness.

see also *cognitive narrowing, fixation, focus*

animals

Animals that co-adapt to human ecosystem: cockroaches, squirrels, malaria/mosquitoes pigeons, rats, corvids. Adapt so fast that it is hard to eliminate them. Some – squirrels and corvids – are very smart and can be trained. (Pigeons have already been trained).

anxiety

Anxiety reduces creativity. Too much anxiety produces tunnel vision. People are less able to overlook or cope with minor problems as their anxiety or stress increases. Overtraining to compensate for the high focus in the high stress situation.

see also *creativity, peptide Crh, stress*

apprehensive
learning to be characteristically apprehensive

Long-term socialization

Socialization includes learning

Importance of learning

Learning to fear by observation

Learning as a consequence of reward and punishment

Resiliency factor

Consequences of inconsistency

archetype

Important roles in our lives.

ARGUS

Reaction to General Problem Solver. Parallel search strategy

Walter Reitman, 1965

Aristotle
3 basic principles

In the practical sphere, all men by nature desire to be happy;
In the theoretic sphere, all men by nature desire to know;
In the productive sphere, all men by nature desire to build up the life of fellowship in a well-ordered government

arousal

See also *awareness*

Yerkes-Dodson law

Certain levels of arousal are optimal for performance; too little – or too much – arousal hinders performance.

misattribution of

See also the bit of sexy images and gratification

ART
adaptive resonance theory

It calls 'similarity' resonance, to reflect not just similarity of entities, but concepts and abstract analogies as well.

aspiration

Aspiration properties have many dimensions: i.e. an aspiration for each of many things. "For each dimension, expectations of the attainable define an aspiration level that is compared with the current level of achievement. If achievement exceeds aspirations, satisfaction is recorded as positive; if aspirations exceed achievements, there is dissatisfaction"

Herbert Simon, Sciences of the Artificial*, p30*

"There is no simple mechanism for comparison between dimensions [Typically] a large gain along one dimension is required to compensate for a small loss along another."

See also *happiness, satisficing*

aspirational treadmill

Happy people, who are better off, have ever-higher aspirations as they gain more. This theory was put forth as an alternative to the hedonic treadmill, which is counter to public opinion. Aspirational treadmill asserts that the *happiness* (self-)reported in the hedonic studies is relative to *aspiration* – that the well off are happier but have more aspirations, the poor are unhappy but have low aspirations. This theory is considered to be false based on empirical evidence

Kahneman, Krueger, Schkade, Stone and Schwarz, 2004

assimilation

message is reshaped into a new interpretation (distortion) by the psychological characteristics and culturally learned habits of the receiver. A feature of the embedding process.

association

Associates items in some relation. We associate items selectively, in part based on their temporal contiguity, and frequency of co-occurrence (as measured by availability estimates)

attachment

Strong bond with others. Mammals have a very strong attachment – families, friends, pets, etc. spring from this. Hormone oxytocin. This may be a key element to some types of religious behaviour, i.e. a belief or trust in a deity. This is an important mechanism in forming complex social interactions and institutions, to those viewing *gene protection* as the biological imperative. Attachment to things has a build-up of experiences, memories; developing emotion, and feelings (especially lasting ones) takes time.

Fussy infants find it difficult to detect responsiveness in their parents care. Sensitive parent cultivates secure attachments, helps children learn how to defuse anger, fear and frustration. Republicans see this as spoiling the child.

Attachment to things has a build-up of experiences, memories.

Has a role in motivation: the motivation becomes greater when you can't get it; keps you trying irrationally.

See *infatuation, love,oxytocin, social network, trust*

attention

People can be very aware of what they pay attention to, yet unaware of what they ignore.

Selective attention has a relationship with memory. Principles of association, associations items in some relation. We associate by contiguity, perceptions, thoughts, feelings, and frequency. There is a focus of attention and a periphery area, which can be demand attention. Only one item (or task) can be focused on at a time. These two often motivation *attention management* consideration: skills training, and in product design. Remembering details, noticing, in depth analysis to yield positive remarks.

The more attention person A pays to B, the more B (generally) feels comfortable with A.

Selectivity of attention; affects what is remembered. Focusing of awareness on narrowed range of stimuli or events. Filtering (early selection or late selection).

See also *change blindness, inattention*

attention management

Serial attention only one thing at center of attention; items at periphery may trigger demand to be at center. (esp movement)

attitude

What a person is thinking, believe, or intends. People are not good at estimating the attitude of another person – we're even worse if we don't see the faces. Men are less sensitive than women to the emotional states – except anger in other men. Men are faster than women in that case.

Mark Williams, Jason Mattingley, Current Biology

attitude theory

Components:

- Beliefs about the subject
- Emotions and feelings the subject brings out
- Predispositions to act a certain way with respect to the subject.

Specific behaviour is poorly predicted by attitudes. Social norms, local and general, may have a more significant effect on our behaviour.

RT LaPiere, 1934, "Attitude and Actions," Social Forces, ***13*** *p230-237*

Icek Ajzen, Martin Fishbein, 1980, Understanding attitudes and predicting behaviour, *Prentice-Hall (Englewood Cliffs, NJ)*

attraction effect

See *decoy effect*

attributions

Concerned with attributing to an individual various personal qualities, conditions, as well as the external social pressures that we believe to cause or influence some aspect of their behaviour. Maps the causes of outcomes and behaviours to a set of personal traits, dispositions, abilities, feelings, situational demands and environmental constraints. Can the behaviour be attributed to internal or external factors?

- Internal attributes ascribe the cause of behaviour to personal disposition, traits, abilities and feelings.
- External attributions ascribe the behaviour to situational demands, and environmental constraints.

see also *error management, folk reasoning, ideology, relationships, social hierarchy*

Jones, EE; KE Davis, 1965, "From acts to dispositions: the attribution process in person deception." In L. Berkowitz (ed) Advances in experimental social psychology. ***V2*** *Academic Press (New York)*

Kelley, Harold H. 1967, "Attribution theory in social psychology" Nebraska Symposium on Motivation ***15*** *p192-241*

Weiner, B. (ed) 1974, Achievement motivation and attribution theory. General Learning Press (Morristown, NJ)

frequency

Attributions are more frequent when:

1. Unusual, attention-getting events are involved
2. Events have personal consequences
3. People behave in unexpected ways
4. When others ask us for our explanation of events

factors in how attributions are made

People appear to examine the following factors when making attributions:

1. Consistency of behaviour over time
2. Distinctiveness of behaviour to the circumstances (the variety in their behaviour) – is it unique to these circumstances, or everywhere?
3. Consensus – would others respond similarly to the circumstances?
4. Approval – do people generally approve or disapprove of the behaviour?

Low distinctiveness and low consensus → The prevalent attribution is to characteristics internal to the subject.

High distinctiveness and high consensus → The attribution is environment and circumstances.

Consistency is a weaker trait; low consistency implies an attribution to the circumstances, while a higher level of consistency can be attributed to either internal or external factors. If the behaviour is disapproved by others, they will tend to attribute it to negative personal qualities (or internal causes). If the behaviour is approved, they will attribute it external factors beyond your control.

Harold, H. Kelley 1973, "The processes of causal attribution" American Psychologist, **28** *p107-128*

Heider, Fritz, 1958, The psychology of interpersonal relationships*, Wiley (New York)*

Fiske, ST; SE Taylor, 1984, Social Cognition: Reading*, Addison-Wesley (MA)*

Weiner, B, 1955, "'Spontaneous' causal thinking," Psychological Bulletin*,* **97***, p74-84*

outcomes of success and failure

There are specific modes of attribution for types of situations or outcomes. People seem to quickly identity whether the person or the circumstances are the overall cause. The factors in how success and failure are attributed:

- Stability of the underlying causes of behaviour: are the causes stable or instable?
- Controllability of the outcome and situations: Are the events controllable?
- Scope of implications about personal qualities: universal or specific to the individual

Then they form specific causes to describe or explain the outcome.

Weiner, B, 1980 Human Motivation, Holt, Rinehart & Winston (New York)

Weiner, B; I Frieze, A Kukla, L Reed, S Rest, RM Rosenbaum, 1972, "Perceiving the causes of success and failure." In EE Jones, DE Kanouse, HH Kelley, RE Nisbett, S. Valins, B Weiner (Eds) Perceiving the causes of behavious, General Learning Press (Morristown, NJ)

impact outlook

Do the attributions have far-reaching or specific implications about personal qualities?

Impact on depression most when: internal, stable, and far-reaching attributions.

Abramson, LY; MEP Seligman, J Tessdale, 1978, "Learned helplessness in humans: Critique and Reformulation," Journal of Abnormal Psychology, ***87**, p32-48*

biases

Qualities and motives can have mistaken or distorted attributions:

- People think of their own actions as consequences of what came before, but
- Think of other people's actions as causing what came after
- Most bias the causes into a success-failure mold

There biases include

- Fundamental attribution error, favoring internal attributions to explain behaviour of others, while favoring external attributions for behaviour of self.
- Defensive attribution error

Russ, L 1977, "The intuitive psychologist and his shortcomings: Distortions in the attribution process," In L Berkowitz(Ed) Advances in experimental social psychology, ***V10**, Academic Press (New York)*

Jones, EE; RE Nisbett, 1971, "The actor and the observer: Divergent perceptions of the causes of behaviour," In EE Jones,DE Kanouse, HH Kelley, RE Nisbett, S Valins, B Weiner (Eds) Attribution: Perceiving the causes of behaviour. *General Learning Press (Morristown, NJ)*

- Self-serving bias: internalize-success, externalize-failure (a cornerstone of ideology). It is common in positive, optimistic, personal relationships to attribute success to others, failures to circumstances.
- Relationship with availability of recall (of excuses)

Bradley, GW, 1978, "Self-serving biases in the attribution process: A re-examination of the fact or fiction question," Journal of Personality and Social Psychology, ***35** p56-71*

Forsyth, DR; JH McMillan, 1981, "Attributions, affect, and expectations: A test of Weiner's three-dimensional model," Journal of Educational Psychology ***73** p393-403*

- Externalize-success, internalize-failure. Common with low self-esteem, when subject is self; tend to publicly exhibit more self-serving bias, although privately not. Common in poor personal relationships when talking of the other. Common to attribute victims as the cause of problems. Links to this may be to affirm that 'we' would/will not suffer a similar fate (under similar circumstances)

Lerner, Mjl DT Miller, 1978, "Just world research and the attribution process: Looking back and ahead," Psychological Bulletin ***85** p1030-1051*

competence

Once person A makes a judgment about B's competence, more information does change their judgment. But it is slight, and much less than is warranted by the information. No matter the amount of information, judgment doesn't change much. Study for cases where A doesn't interact with B.

see *anchoring effect*

attunement listen attentively and think about how others feel? Attuned to others moods.

see also *empathy.*

automatic personality perception (APP) Predicting the personality traits of a person based on others

automatic personality recognition (APR) Inferring the personality of a person based on their behaviour

automatic personality synthesis Generate artificial personality

availability of construction the availability hypothesis

Availability is concerned with the ease of imagining a scenario or different outcome. This native technique speeds judgment and decision-making, but it can be misleading or dangerously erroneous.

Emotion and mood affect availability. It is also easier to master the concepts of the more typical items than the les typical ones.

see also *choice, decision (intuitive, and integrated), exemplar based reasoning, focus, intelligence, representativeness, selective recall.*

Summary: High SAT scoring students could name alphabets faster than low SAT students

Hunt, Edward B. "Mechanics of Verbal Ability", Psychology Review, *85, p109-130 1978*

availability error Easier to recall vivid examples, rather than truly representative exemplars. With experiments the most vivid or easily recalled items are employed as typical examples:

- When positive terms are followed by a name, readers respond that they think positively about that person or thing.
- When given a list of names, 1/2 male and 1/2 female, people will judge the list to be mostly male if some male names are famous

The vividness may be, in part, an effect of vivid events forming in multiple (even all) forms of the memory, allowing increased probability of recall.

see also *first availability hypothesis, intelligence*

Tversky, Amos; and Daniel Kahneman "Decision making under uncertainty: Heuristics and biases" Science, *185:1124-1131, 1974, or*

Judgment under uncertainty: Heuristics and Biases. *1982, Cambridge University Press, New York*

awareness Consciousness and levels of awareness. Controlled processes:

Alert awareness – absorbs the entirety of our limited attention; interferes with ongoing activities.

Automatic processes – little awareness, requires minimal attention. Does not interfere with our activities.

see also *arousal*

BACON Represented information at multiple levels of description. Field of scientific discovery.

see also *stack, glauber*

Langely, 1987, possibly involved with Newell & Simon

barbie bird Airplane flights, predominately between LA and San Francisco, with lots of models that serve as booth babes at conventions.

see also: *booth babe, companion girl, Good-time Charlotte, khaki-whacki, victory girl*

Bayesian network invented by Judea Pearl

behaviour modeling

"Several sets of variables in each character describe and control:

- The instantaneous needs of the person
- Their preferences for activities
- Their abilities, and
- Their relationships to other[s] and their environment"
- "emotions such as hunger
- "adjust[able] personality values, such as neatness."

Jamie Doornboos, The Sims lead programmer

Michael Macedonia, "Using Technology and Innovation to Simulate Daily Life." IEEE Computer, April 2000, p100-112

Autonomy. "Individual.. attempt[s] to find the best action[by considering] every object and each interaction with that object." Drawback: cost of investigating every possible object. Actions that can be done:

1. "Search, move, reach, and use the variety of objects available."
2. "Each object in the world describes.. how it operations. For example, a stove would contain the following behaviours: put food in, cook food, take food out, serve food, and eat at table."
3. "The objects advertise their capability to satisfy each [individual's] needs, such as hunger, as part of an interactive protocol. The benefit attenuates depending on distance and intensity of need."

Actions are determined "via path planning that uses a modified A* search algorithm." "This algorithm finds the optimal path.. to its goal by using a best-first search in which the cost of any search state is the cost of getting to the state from the start state, plus a heuristic estimate of the distance from the state to the goal."

See also *burnout*

market — Marketing departments seek to manipulate thse

reinforcement — Positive and negative reinforcement motivate behaviour – hard to predict what will be reinforcing.

punishment — Consequences that inhibit certain behaviour – hard to predict what will be punishing.

behavioral conditioning operant conditioning — When one acts on environment there are consequences, and these affect what will be repeated in the future.

shaping — Increase/decrease times activity is done

stimulus control — Happens before target behaviour

Premakc principle — find things the subject likes to do, and link it with the target behaviour

reinforcement — has the goal of repeating the behaviour

conditioned reinforcers — If you do X, Y happens

variable reinforcers — A schedule of if you do X n times, Y happens.

extinction — Repetition of (desired?) behaviour stops without reinforcement, controlled with that.

punishment — has the goal of not repeating the behaviour

	Techniques
positive reinforcement	something (usually rewarding) added to situation after behaviour
negative reinforcement	something (usually negative) is removed after behaviour
positive punishment	something (usually punishment) added
negative punishment	something (usually a reward) is removed from situation after behaviour

behavioral segmentation

Based on behaviour variables (rather than demographic descriptive variables):

- User status
- Brand loyalty
- Product usage
- Sought benefits
- Usage occasions
- Lifestyle
- Social class
- Economic standing

see also *attitude theory*

behavior shaping constraints

Both a descriptive method and prescriptive technique for groups. Limits on how much, duration, and available actions. Although this does not directly specify a behaviour, these limits often serve control or implicitly specify the behaviour. This can make systems normally governed or described by differential equations manageable by regular people.

Example: Drunkards walk, control to limit how long one is considering and alternative that is not panning out.

see also *coin system, mechanism design*

belief

Degree of strength, treated as a relation. Not necessarily logical. This may be a context for interpreting concept, a set of different belief contexts. Beliefs are about things, with propositional content, they represent the world, or some aspect of it.

The belief structures serves a purpose – trust is built on this. Fast path learning, approximate, polarized, but needs decay to allow forgetting.

See also *theory of mind, trust*

affective

Some 'truth' that the individual accepts with positive or negative emotions.

factual

A kind of statement of truth that an individual accepts about some object. With judgment of any kind and without emotional orientation.

persistence

Beliefs can persist despite contrary evidence or uncertainty. Persistence can be irrational – we'll continue to internalize a belief even though we know the basis for it was a lie.

prior

Belief modification, especially in a Bayesian system

revision

Often depends, partly, on prior beliefs. It also depends on the ability to adopt other peoples viewpoints.

belittle

see *insult*

benefit segmentation

Segments target markets by the benefits they are seeking.

bias

Possibly deliberate deception. It is possible to measure and counter-act many of these biases. Often there are many biases at play.

see also *anchoring effect, availability error, centration bias, confidence bias, expectation bias, experimenter bias, halo effect, response set, sampling bias, social desirability bias*

binocular cues

The use of both eyes to perceive depth. The eyes can distinguish different images (the retinal disparity) for the objects within 25ft. One element is the kinesthetic sensation of convergence, the feeling the muscles move the eyes, especially closer together as they focus on close objects.

Infinity point is useful, and much easier to find and use in machines.

see also *depth, fundamental matrix, just noticeable difference, stereo geometry, vision*

biomimetic Design that is inspired by the perceived operation of living organisms.

blend A type of analogical reasoning. Builds a new "space" from two (or more) others with a mapping between the objective and the sources, akin to ACME.

See *inference*

Blending: "consists in integrating partial structures from two separate domains into a single structure with emergent properties within a third domain."

Gilles Fauconnier Mappings in Thought and Language *1997*

"amounts to a formation of novel categories denoted by single terms." The terms "are now conceived to be 'the same kind of thing' not just counterparts in an analog or domain specific schema." "Members of the new category are not restricted to members of the input domains. The blend opens up a possible search for members in other domains."

"The generic induction schema is usually insufficient to define what will fall into the blend. It is too skeletal and abstract. The blend, on the contrary, is typically richer than its input structures; it elaborates a category in many directions, containing specific instances and the fine details that go with them."

"When a blend gains consistence, it reorganizes over categories and allows thoughts to move in new directions."

blindness See *change blindness, dichromata (color blindness), inattentional blindness, prosopagnia (face blindness), willful blindness*

body integrity identity disorder Person is sure that a limb doesn't belong to them (invariably the left) and seek to amputate it.

booth babe Pulchritudinous woman employed at convention booths. Serving as sexual appeal, they also humanize the otherwise stodgy. Appearance is often stylized at some conventions – such as Game or Sci-Fi conventions.

see also: *Barbie bird, companion girl, Good-time Charlotte, khaki-whacki, victory girl*

bounded rationality See *rationality (bounded)*

brain The brain can also be divided into the levels:

Reflective.

Behavioural – below the conscious. The reflective layer can enhance or inhibit the behavioral.

Visceral: fast, rapid polar judgments: good/bad, safe/dangerous. Starts affect processing: prepares the motor system muscles and brain for action. This is biologically determined.

See also *hippocampus, nervous system*

areas of functions Common method of studying the brain 1900-1990 was to study effect of lesions and damages;

Left hemisphere: language deficits

Medial temporal lobe: Anterograde amnesia

Posterior Parietal Cortex: Loss of the capacity to attend to the opposite side of the body.

See also *hippocamus*

hormone Besides hormone that stimulate or mediate activity, and receptors to receive.

	Modeled on generation, decay, receptivity (e.g. a predator-prey) model.	
mapping	atlas: lays out composition by types of cells (neuron, supporting, grey matter vs white). connectome: neuron connections, circuits, modules toplogical: trace folds traffic map : networks of fibre routing signals, thoughts, control, motion, action, sensation mri & thin slices: small structures in a volume	
size	may be bounded by diet. Raw food isn't enough to develop a brain	
breastfeeding	Breastfed babies are 6 IQ points smarter, as adults, than formula fed – but only if the child inherited atleast one version of the C-FADS2 gene. Oxytocin stimulates the release of milk See also *intelligence, nutrition, oxytocin*	*Dr. Terrie Moffitt, King's College, London; Dr. Avshalom Caspi*
buffers	Used to hold 'memory' between systems with difference modes and/or processing rates. Cognitive tasks use at least the short-term memory, and performance seems to be governed by it. Short term memory, to some, is like cache memory.	
burn out	Approximately twelve scales. Professional achievement: proportioned by how much achievement means to them (how much do they think about the profession?), how satisfied they are. Satisfaction and building something lasting. See also *depression, procrastination*	
buyers remorse	Relates to expectations and trying to deeply consider a purchase.	
buying decision process	▪ Recognizing problem ▪ Seeking info ▪ Evaluating alternatives ▪ Make purchase ▪ Evaluate purchase see also *decision process*	
bystander effect	People are less likely to assist, even if it is necessary, when in a group. See *conformity (dissent)*	*Darley, John M; Bibb Latane, 1968, "Bystander intervention in emergencies: Diffusion of responsibility,"* Journal of Personality and Social Psychology ***8*** *p377-383*
carbohydrates	trigger hunger and set points in consumption.	
Cartesianism	Error is a defect of memory (but can be prevented by returning to first principles). Doubt is a function of thought; anything we doubt must be assumed to be false. Ontological proof. Absolute perfection. The complete composite of all possible perfections.	*Latane, Bibb; SA Nida, 1981, "Ten years of research on group size and helping,"* Psychology Bulletin ***89*** *p308-324*
discovering truths	Four rules for discovering (simplest) truths: INTUITION. When studying a problem, first look at it intuitively ANALYSIS. Decompose complex problems into smaller problems, each as simple as possible SYNTHESIS. Order truths by their complexity; these are derived from other truths ?. Attempt to see the link between first principles and their deduced consequences. See also *Mill's method*	
types of truths	REVEALED TRUTHS. Inaccessible to intelligence SIMPLEST TRUTHS. Can be discovered	

case-based reasoning

A technique for taking what is known how to solve a set of problems, applying, and adapting that a new set of problems. Research in CBR focuses on how to store, retrieve, match, and adapt descriptions of solutions (called "cases") to new problems.

see also *analogical reasoning, evolutionary reasoning, expert system, frame-based reasoning*

Example: http://www.cs.indiana.edu/~bmastenb/documents/bmgecco03.pdf

categorization

Similarity and contrast. Recall exemplars, and similarity (by comparing and contrasting) guides categorization, fitting them into a category (often by salient features). People are able to categorize more typical items (instances) faster than less typical ones.

see *availability of construction, classifier, critical thinking, folk ontology*

centration bias

Tendency to focus on just one feature of a problem or situation.

see also *functional fixedness, halo effect.*

certainty factor

A prescriptive method for working with the user, their preferences, and desires. This is a method of complementary duals.

$$\text{Certainty}(a) = \text{Certainty}(a) + (1 - \text{Certainty}(a)) \circ Factor$$

Final:

$$\text{Certainty}(a) = \text{Certainty}(a) - \text{Certainty}(\neg a)$$

Ball and urn model

An urn for each relation, eg city(X).. A word is in the urn if the phrase "X is a city" (or similar). Is city(X) true?

P(X is a city|x appears k times in n total samples) $= \dfrac{\sum_{r \in num(city)} \left(\frac{r}{s}\right)^k \left(1 - \frac{r}{s}\right)^{n-k}}{\sum_{r' \in num(city \cup Error)} \left(\frac{r'}{s}\right)^k \left(1 - \frac{r'}{s}\right)^{n-k}}$

chaining
backward

BACKWARD CHAINING starts with a desired goal to be proved (eg an unsubstantiated hypothesis) and tries to prove it is valid. It does this by finding rules that demonstrate then hypothesis (or positing such hypothesis), then verify those. This works its way down to verifying facts in the database.

If A→C is to be proved, checks to see if B→C is proved, a given, or an axiom, and tries to prove A→B.

forward

FORWARD CHAINING starts with a set of known facts, and repeatedly applies a series of rules generating more known facts until a desired goal is reached.

If A→C is to be proved, checks to see if A→B is proved, a given, or an axiom, and tries to prove B→C.

change blindness

A person fails to perceive (sometimes large) changes in a scene. The blindness requires some sort of momentary interruption coincident with the change – an eye movement, a flicker, a blink, etc.

See also *attention, situational awareness*

character

Consistency of behaviour & attitudes (they tend to be interlocked. Individuality, vivid & memorable. Complexity of insights.

In narratives there is a dimension of *complexity* – plausible contradictions, awareness of development of more than one aspect of character.

charity girl

Young woman who engages in sexual favors for fun or gifts.

see also: *Barbie bird, booth babes*, *companion girls, good time charlotte khaki-whacki*

chatbot

May be a QA bot.

see also *discourse, ELIZA, sentiment analysis*

child-rearing recommendations

Summary: Children can develop a lack of morality if their upbringing discourages self-control, social responsibility and realistic expectations.

Damon, William "The Moral Development of Children" Scientific American *August 1999, p72*

The following are recommended criteria for rearing moral children:

- "Consistent rules,
- "Firm limits
- "Encourages open discussion
- "Clear communication to explain [rules] and
- "Revision of rules (when justified)

"In contrast, the permissive mode avoids rules entirely; the authoritarian mode irregularly enforces rules at the parent's whim – the 'because I said so' approach.

"Although permissive and authoritarian parenting seem like opposites, they actually tend to produce similar patterns of poor self-control and low social responsibility in children. Neither mode presents children with the realistic expectations and structured guidance that challenge them to expand their moral horizons. Both can foster habits – such as feeling that mores come from the outside – that could inhibit the development of a moral identity. In this way, moral or immoral conduct during adulthood often has roots in childhood experience."

[Note the last sentence was to distinguish concerns about moral behaviour being traced to too much TV or other simplistic popular explanations]

see also *feedback, Kohlberg's stages of development*

choice

Often a synonym for decision-making, for a narrow range of decision types. The choice may be selecting from a variety of options, selecting different 'baskets' of combinations. There might be decision models, sensitivity analysis, and processes for making choices.

See also *error management theory, satisfactory conclusion bias*

how to

The technique needs to be practical in the sense that it provides: procedures for finding good alternatives, within a limited, given time frame, within the abilities of the practitioners. The logical frameworks include: utility theory, statistical decision theory, and optimization theory.

Often the number of admissible alternatives explodes: can't generate and compare it, nor can the best be known until all have examined. If you have competitors or a definitive opponent:

- Record a window of the opponent's responses (or all of them), calculating the probability of actions, or a decision tree that predicts
- Try to force the opponent's action
- Observe various opponents strategies and try to emulate the mot successful ones.

individual's choice

An individuals choice roughly depends on the complexity of the situation:

- Can the choice be explained via preferential ordering of the options? If not,
- Is there certainty in the options and their outcomes? It may be tractable to calculate the options, possibly effecting a preferential ordering. Otherwise,
- Is there uncertainty in the options and their outcomes? Would calculations be too slow or difficult? There are techniques for strategic or probabilistic choices.

elimination by aspects

Different choices or possible categories are eliminated from further consideration by their independent attributes, traits or other features. This can produce suboptimal results if some features, in combination, have a much different value than independently.

over-consideration

Some people *over consider* their choices:

- They have a need to compare their purchases with other people's purchases.
- They have a need to 'comparison shop' and need to consult many reviews.

- They seldom feel as positive about their purchases as others do.
- They are more likely to feel regret.
- They endlessly consider alternatives.

see also *availability error, Edward Fredkin's paradox, evaluating experience, impulsiveness, regret*

Hick's law

Calculating the average reaction time given a choice of n items:

$\langle t \rangle = bH$

$H = Entropy\ of\ decision$

$H = \log_2(n+1)$ For n choices with equal probability

$H = \sum_i^n p_i \log_2(p_i + 1)$

p_n =Probability of choosing decision *n*

This may be the reaction time of a person, animal, machine, etc…

see also *entropy*

choiceboard

Create 'custom' products by choosing from a menu of attributes, components (or ingredients), prices and delivery options. Similar to Noodles & Co, Chipotle that use a few basic ingredients to create many different meal offerings.

chunking

some groups of letters operate as one thing.

circadian rhythm

The suprachiasmatic nucleus (in the hypothalamus) regulates circadian rhythms by signaling the pineal gland thru the production of *hormones*. Being next to the optic center, production influenced by light levels. Production decreases with age, but it may be the cells dormant with reduced light levels associated with more sedentary lifestyle. The circadian cycle may explain how interrupted sleep cycles interferes with depression.

See also *hormones, synchronization*

circadian effects

at 1am post-surgical death is most likely;
at 2am peptic ulcers flare up;
at 3am blood pressure bottoms out;
at 4am asthma is at its worst.
at 5pm alcohol is least toxic to the body
When you wake up, your hay fever is at its most tormenting,
blood pressure rises quickly in the morning, increasing the probability of a heart attack or stroke
rheumatoid arthritis improves through the day
osteoarthritis grows worse through the day

Cancer drugs have different effectiveness (and toxicity) based on the time of day they are taken.

classifiers

see *mathematics glossary*

Clever Hans effect

The mistake in believing that language is employed because of complex response or the source initiates behaviour using combinations of signs and signals. Other animals include Nim Chimpsky

See also *compliance*

clustering

see *mathematics glossary*

cognition

Memory and its processes, judgment, tracking complex relationships, valuation & estimation, emotion, deduction, and imagination

experiential

Perceive events around us, react to them with little effort (event processing), mode of expert behaviour (pattern recognition)

reflexive

mode of comparison, contrast, of though and decision making

cognitive aids

This might include machinery that aids memory, deduction and tasks, improves or assist what we are weak at, and helps stimulate those things we are good at,

cognitive behaviour model

Cognitive processes: including perception and memory,
Physiological factors: sleep, nutrition, hunger, health, injury, drug use, ambient temperature; the level physiological arousal
Stress & coping style
Model of world: value judgments, culture, Subjective feelings in response to events
Intention & goals
Social relationship: alignment with society, credibility/trust with others, valence & social network.
Social identity: demography, social group, role.
Attributes: moral outlook, religions feelings, political affiliations
Personality dispositions: Response to time pressure, work load, anxiety
Resources: time, money, skills
Emotions couple feelings to an action: self-maintenance, fight-flight

An individual is subject to constraints on actions by those items, but vary with state

see also *emotion, stress*

cognitive dissonance

"the psychological mechanism that creates self-justification and protects our certainties, self-esteem and tribal affiliations."

Tarvris, Carol; Elliot Aronson Mistakes were made (but not by me). Harcourt 2007

cognitive map

The ability of the human subconscious to accumulate and construct spatial and temporal information. Acquire, code, store, recall and decode information about the relative locations and attributes of phenomena in a common or metaphorical spatial environment.

Tolman, EC, Cognitive maps in rats and men. *Psychological Review, 55 (July 1948) 189-208*

cognitive narrowing

This makes it hard to revise beliefs, correct errors, or discern errors. This can be very dangerous, groups are not guaranteed to mitigate, may be worse and reinforce.

cognitive restructuring

1. Introduction to the principles
2. Negative self-statements are identified
3. Coping statements are learned
4. Practice coping.

cognitive theory

"a theory that is based on the capacities of the human mind rather than the capacities of the mathematical systems that happen to be used by logicians."

Gilles Fauconnier

coin system rational

Rational coin system serves as an example of how structure simplifies complexity and reduces demand on cognitive skills. The goal for a rational coin system is to have the average number of coins needed for a purchase should be as small as possible. In a rational system the fewest number of coins can always (or nearly always) be found by the intuitive method:

1. Choose the largest denomination coin that is less than or equal to the amount still owed
2. The next coin's denomination is less than or equal to the denomination of the previous coin.

Similarly, coins of with greater size and mass should be of greater denomination than coins of smaller size or mass.

see also *behaviour shaping constraints, rationality (bounded)*

colinearity

Different explanatory variables often change together – but which is the best explanation? Collinear variables that are easier to measure can be used a proxy for those that are harder to measure.

See also *regression*

collaborative filtering

People (as a group) have very regular similarities. Many people share related purchases. e.g. AI

collections

Animals and people collect things. There may be a relationship to speculation and auctions. A collection (rather than a simple accumulation) should have:

David Gregor (of Gregor Books in Seattle, WA)

1. Theme
2. Direction
3. Arrangement & organization
4. Be challenging to create
5. Have some worth, impassion the collector, and thus have a chance of being important in some way when passed on.
6. Have demand or potential
7. Invoke envy and other emotional responses from competitors

Artic squirrels forget where they stored things due to sleep/hibernation, which causes some brain damage (which they later recover from).

Using knowledge about what a large population of people has collected, and/or desires to collect, can construct recommendation system.

communication styles

Table 4: *Communication styles*

	status	*status*
values	respect	friendship
decision style	makes own mind up	asks advice
style	authority	empathy
focus	task	relationship
speaking style	reports, authoritative	rapport, approachable
in a team	competitive	collaborative

companion girls

Japanese booth babes. Their appearance is very stylized.

see also: *Barbie bird, booth babe, charity girl, Good-time Charlotte, khaki-wacki, victory girl*

competitors

completion guarantor

A type of business insurance for a specific "project." In the worst case, this a man sent by the insurer – representing the backers – who is allowed to take control of a failing project. The role is to ensure that the deal is completed; that is, the emotional and small issues are put aside. Needs to be able to blend in, be tactful, yet forceful.

complex idioms

With some idioms it is hard to verify that the programmer implemented them properly

Just extend the language to make it easier to verify and be used by the programmer. Example: exceptions.

complexity

coping strategies

Six coping strategies: spend less time on each input/event, disregard inputs/events, shift the burden to others, block reception, filter, and create specialized institutions to offload the work.

Stanley Milgram, "The experience of living in cities." Science, *March 3, 1970, p1461-1468*
Summary: A tasteful mathematical background deepens the understanding of current events and the ideas of others.
John Allen Paulos. A Mathematician Reads the Newspaper. *1995. p120*

horizon

complexity horizon builds on the idea that concepts, ideas, etc. have many related key elements. Simple ideas, for instance, have a small number of elements with a simple relationship. Individuals have a limit to the complexity they can handle:

> "The limit or edge beyond which all social laws, events, and regularities are so complex as to be unfathomable, seemingly random. … Happily for us, most laws and regularities essential for life are not beyond our complexity horizon and are compressible enough to be grasped. Compression and simplification certainly seem essential to short-term political success. James Fallows...has even suggested that presidents who overanalyze fail, while those who oversimplify succeed."

Situations beyond ones complexity horizon are *compressed* in an irrational manner.

Some techniques, such as compression and simplification, help manage the complexity. Some devices, such as fax machines, copiers, computers, help extend this horizon.

see also *availability of construction, bounded rationality, experts, persuasion (latitude of acceptance)*

compliance see *organization glossary*

See also *Clever Hans effect, conformity, guided recall, obedience, reciprocity*

compliance theory

- Reciprocity or indebtedness
- Commitment or consistency
- Social copying
- Authority
- Empathy and trust
- Scarcity
- Uniqueness

comprehension syntactic parsing, semantic, reasoning

concepts Properties and rules of operation. *What* is being represented, *how* information is used during categorization. Partition world into classes. Properties are invariant, favor properties with brief descriptions that discriminate among an exemplar set. Variability of property; may not know all defining properties. Inductive inference, similarity vs deductive. Prototype concept, exemplar

See also *mental model, schema*

integrated concepts Features used together must mesh easily

orthogonal concepts Different sets of feature must be usable independently

conceptual blending Similar to structures, unification, method, Fregaen, except such logic depends on a very rigid, strict linkage. *Gilles Fauconnier*

Does not credit John Anderson's ACT work. Mapping properties & salient characteristics of concept A to B. A space can be:

- A frame (logical structure, classic AI frame, thematic structure)
- A loose set
- A linear progression
- Another blend

see also *ACT*

blend A generic space, input spaces, and a blend space.

A mapping between each space. Each item linked between input spaces must have a link in the blended space. The linkage is akin to unification binding. The generic space seems little more than a ham-fisted hack.

Some are as simple as prolog style relations: father(tom, mary). female(mary). etc

Recall that people track numerous relations; memory is the method of loci, have context (familiar geometrical place), and items there, possibly with some arrangement. Text misses much of the mental spaces discussion (what is such space) and how the language constructs it.

mapping "F maps individuals onto times at which they live F(i)=t

"G(E)=T. G maps types of events onto the times culturally associated with them

"H(t)=E. H maps individuals onto types of events they engage in

"G*H(i)=T an automatic [composite] mapping linking individuals to the time, typical of the event they engage in."

confidence Confidence is a framework that allows us to take action. A lack of confidence requires "more input."

bias When a person's confidence is high they tend to be over confident. When their confidence is low, they tend to be under confident.

confirmation bias Tendency to seek or perceive evidence that confirms exists conclusions or beliefs. See *functional fixedness, survivorship bias*

conflict resolution There are various differing styles to resolving conflicts between parties

accommodating style A strategy for handling conflicts in which people 'give in' to their opponents. Accommodators are the opposite of competitors; they tend to be passive and non-confrontational foregoing their personal goals and preferring to let their opponents reach their objectives.

avoidance style A strategy for handling conflicts in which a potential participant choose not to be part of a confrontation by choosing to say away from situations where disagreements and disputes are likely to occur.

See also *procrastination*

collaboration style A strategy for handling conflicts in which people work jointly or willingly in cooperation with an opponent. This style is characteristic of persons who not only are seeking self-related goals in a conflict situation, but also have a sincere concern for their opponents.

competitive style A strategy for handling conflicts in which people narrowly view all conflicts as win-lose events. They believe that winning is their only goal – any concern for their opponent is unnecessary, unimportant, and a sign of weakness.

compromising style Participants reach agreement by making mutual concessions.

conjunctive fallacy People appear to prefer more specific conclusions than are warranted by a strict interpretation; less specific conclusions are less interesting or vivid, but more correct.

See also *procrastination*

connectionist system The major components of a connectionist system include:

- A set of processing units
- A state of activation for each of the processing units
- An output function for each processing unit that is based on its activation states.
- A pattern of connectivity among the units
- An activation rule for combining the inputs to a unit with its current state to produce a new level of activation for the unit.
- A learning rule where the connection pattern is modified by experience.
- An environment in which the system operates

see also *classifiers (linear), expert system, memory*

consistency principle People *don't'* trust people whose voice doesn't match their face.

consumer purchasing behaviour Consumers currently buy based on price, along with a set of *premium* products:

- Purchase of luxuries that define their passion and personality: iPods, leather coats, etc.
- Trading up on luxuries. Simple as bringing a moment of comfort, sensual pleasure, excitement (of owning fancy things) feeling of safety

conventional Gailbraith. Ease with which an idea may be understood. Ease of apply to personal

wisdom life. Degree to which it affects our personal well being.

cooperation Develops reciprocity, trust; hormones may aid or undermine cooperation.

See *team building, usufruct, virtue*

copy paste detection Applies longest common string matching to recognize similarity, redundancy, plagiarism, etc.

creative people Independence, autonomy, self-confidence, non-conformity.

Tend to think for themselves, less easily influenced by the opinions of others (than the average person). More tolerant of complexity, contradiction, and ambiguity. Not as troubled by uncertainty.

Barron, F; DM Harrington, "Creativity, Intelligence, and Personality" in MR Rosonzweig & LW Porter (ed) Annual Review of Psychology, *Vol 22, 1981, Annual Reviews (Palo alto, CA)*

creativity People are more creative when they are relaxed, happy and in a good mood. They are also able to overlook and cope with minor problems. People like relaxed gatherings to be creative, but put deadlines and challenges on themselves to help get things done.

See also *anxiety, stress*

criminal behaviouralism Criminals see the primary risk as of being caught, not the penalty. They don't say: "wow, if it was 7 years – not 5 – I wouldn't have done it."

see also *availability, impulsiveness*

motives Some disagree that profit is the motive: "few computer criminals are indeed motivated purely by profit. Employees become criminals during employment to solve personal problems that may involve money, sabotage, or espionage. They are often motivated by debt, relationships gone bad with other employees or spouses, personal dissatisfaction, or an attempt to hide poor or unethical business decisions."

Donn B. Parker, Letter to Communications of the ACM, June 2008, cites Crime by Computer (1976, Scribners), and Fighting Computer Crime (1983, Scribners)

critical thinking Encouraged to generate (for truth and relevance) arguments on *both* sides – esp. the other side.

Encouraged to search for possibilities and evidence. Try to find counter-examples to your 'side', try to exercise and stimulate mental facilities, link evidence

Require developing (reasonable) hypothesis on their own, and tests of these hypothesis – what kind of evidence do they need?

See also *decision making, procrastination*

customization Able to be unique and personal. See also *personalization*

complexity Having to choose among numerous alternatives; anything that requires the addition of numerous preferences or customizations choices is too complex to be used.

cynicism Cynicism has the role of suppressing taking action or risk, causing a near immobility.

see also *emotion, happiness, optimism*

cytokines Act on the sensory nerves such as the vagal nerve; this stimulates the dorsal raphe nucleus in the brain, which is connected to the limbic system (the emotional center). These release serotonin.

decision most techniques focus on predicting out come from various alternatives and selecting the one with the best results. A typical decision lacks information, and has uncertainty of outcome.

independence axiom rational choice between two alternatives should depend only on how they differ.

ideal Within organizations, decision-making is interrelated with planning, coordination, and control (e.g. behaviour shaping constraints, and the lack of). Typical decisions are simplified into a conceptualization of factors relevant to a making a decision, with the choices being actions that be taken, and an objective function. Many

processes are predicated on the actions being enumerated ahead of time – however creation of the action possibilities of greater importance.

The decision must involve clear decision criteria, and it must be clear what the most important aspects are.

A decision (i.e., on whether to change course) must be made, stated clearly and briefly. Any meeting must not decide merely by acquiescence; may be used to inform the decision

It should also acknowledge the strengths of other options, including consequences of not taking action. The remainder must focus on putting the new solution into practice.

individual

The study of individual choice examines 4 kinds of situations:

- Can it be explained via a preferential ordering?
- Is there certainty in options and their outcomes?
- Uncertainty in options and their outcomes: making strategic choices
- Uncertainty in options and their outcomes: Making probabilistic choices

theory

When you have a method to predict the future

When you don't have a method: Portfolio, Risk reduction (Mgmt+Workload+Potential Loss), Markov modeling

analytical criteria and objective

Charles Kepner, Benjamin Tregoe

1. Define the problem
2. Formulate a complete decision objective
3. Generate criteria
4. Generate alternatives
5. Rate each alternative in terms of how well it meets criteria
6. Compare these
7. Choose the best score

decision making process
normative

- Identify the problem
- Setting an agenda
  - determine what decisions will be made and when
  - simple procedures for setting an agenda
  - how opportunities are noticed
- Forming a representation of the situation, either by obtaining a conventional one, one being specified or constructing one
- Generate alternatives, by invention and development. Identify the risks. Build contingency plans.
- Analyzing the course of action.
- Collecting reliable data, Statistics
- Testing possible solutions
- Choosing an alternative or course of action.

In practice, decision and carryout are intertwined.

See also *feasibility study*

collective decision making

Two types:

- Consensus decision, group makes a single collective choice
- Combined decisions.

Summary: consensus decision making

Jury theorem, *Nicola de Condorcet*

Robust consensus. Times when this doesn't happen: when a population is isolated from crucial info sources or dominated by bad people.

incremental

Based on accumulation of information increments.

See *random dot motion, elective dissemination of information.*

influence

Attempts to influence include marketing, and politicking.

one time

Process for one time, or infrequence decisions. Presumes that information is known upfront, results or variables that affect decision aren't greatly altered by process of alternatives, etc.

1. Discover problem, opportunity or need
2. Identify alternatives, possibly modify alternatives
3. Complete analysis of alternatives with eye toward selecting the most useful
4. Select alternative, possibly with supplemental plan
5. Carry it out
6. Review to see how it turned out, to adjust process and/or new cycle

decision making styles

Decision making styles include the polar opposites of analytic and intuitive. Many people are more accommodating, favoring a dominant style but switching to others, or even integrating them to balance out the weaknesses.

accommodating

Have a dominant style, but switches to other style

Sauter, Vicki L. "Intuitive Decision Making" Communications of the ACM. *V42N6, June 1999, p109-115*

analytic

A process that "stresses analytical and quantitative techniques and employs rational and logical methods of reasoning… decompose problems approach each subprogram sequentially using logic and data… [This] works best when all relevant variables can be controlled or predicted, measured, quantified, and complete information is available… Models do not address critical but unmeasurable considerations. Problem solvers are encouraged to seek single causes when many (or no predictable) cause may exist – reducing uncertainty by ignoring the unpredictable, and simplifying the complex… Past data is given too much importance without adequately considering the appropriateness of the assumption that the future will imitate the past… Involves explicitly defining the problem, deciding on exact solution methodologies, conducting an orderly search for information, increasingly refining the analysis, aiming for predictability and a minimum of uncertainty."

There are different kinds based what is known or knowable, the nature of the situation or the form of the resulting decision.

see also *cash reserves*

***Table 5:** Analytical decision making techniques*

Major type	*Techniques*	
under uncertainty	when there is possible outcome per event; in competitive situations (game theory/game strategy);	
queuing	Markov modeling (birth/death process)	
cost control decisions	inventory reduction	
prediction	forecasting, and trends;	
project management scheduling	(planning) interdependent activities with target completion time	PERT, CPA
simulation	Markov modeling	Try out ideas without the risk of loss – or humiliation. Plan for large, sudden, and unexpected changes.

integrated

"Analytical though processes filter information, and intuition helps… contend with uncertainty and complexity" "reason, analyze and gather facts that trigger intuition. If intuition leads the thought process in a different direction, decision-makers reason and analyze again to verify and elaborate on it. These additional facts and analyses again trigger intuition and the process repeats… can also start with an intuitive hunch, and then analyze it to determine appropriateness… They can apply intuition at the end of

Sauter ibid

	the process to reveal false premises, invalid inferences and faulty conclusions." see also *exemplar based reasoning, folk reasoning, representativeness*	
intuitive	"place[s] more importance on feelings than facts… [Intuition is an] unstructured and spontaneous procedure of considering the whole rather than its parts, even when the information is inadequate. Brainstorming and emergent trends projection are characteristic examples of appropriate use…. avoids commitment to a particular strategy. The problem solver acts without specifying premises or procedures, experiments with unknowns to get a feel for what is required, and considers many alternatives options concurrently, while keeping the total problem in mind." can't be duplicated, and provides no testable theories. see also *folk reasoning, pattern matching, representativeness heuristic*	*Sauter* ibid
symptoms of defective decision making	1. Incomplete survey of alternatives 2. Incomplete survey of objectives 3. Failure to examine risks of preferred choice 4. Poor information selection 5. Selective bias in handling the information at hand 6. Failure to reappraise alternatives 7. Failure to work out contingency plans people "become impatient with routine, details, or repetition… They may reach conclusions too quickly, ignore relevant facts, or follow an inspiration when it is clearly bad." (sauter)	
models	Additive strategy: list the attributes that influence the decision, then rate the desirability of each option with respect to that attribute Compensatory model: allow attributes to have a desirability rating Elimination by aspects: gradually eliminate less attractive alternatives Form alternatives, options, candidate set,	*Tversky, A, 1972, "Elimination by aspects: A theory of choice,"* Psychological Review ***79*** *p281-299*
one-time	Decisions occur in an environment with unfamiliar language and terms, layered analysis and a broad range of information examined thru inquiries. This is seldom the native environment of the ones who want the decision made, or the environment that the domain experts are familiar with. Related notes: designs and planning without goals; directed unfolding.	
under uncertainty	There are knowns about uncertain elements – such as the predictability with the Normal Distribution (due to the Central Limit Theorem) The approaches are: ▪ Be optimistic, and choose the option with the highest possible reward ▪ Be pessimistic and choose the option with the least possible loss ▪ Attempt to select the option that has the best bottom line on average, assuming the outcomes are equally likely ▪ Use judgment to estimate the likelihood of events & outcomes, and weighting each outcome accordingly. Then, choose the option with the best-weighted outcome. see also *goal programming, risk*	
decision tree	in *mathematics glossary*	
declarative memory	Factual memory see also *memory, semantic memory*	
decoy effect	In a choice (or preference) situation, adding extra option that is always an inferior choice, changes the outcome; the outcome varies based on the extra option. There is	

	some hierarchialism in outcome ranging; we topologically sort a window.
	See also *attraction effect.*
deductive problem	People have difficulty with deduction puzzles. They have difficulty creating the diagnostic rules for a given hypothesis. Instead, they prefer direct tests where possible.
de-individuation	disinhibited, culture and contextual cues that help modify / shape behavior (the norms)
denial	The conscience will allow minor transgressions. People can be very aware of what they pay attention to, but are unaware of what they ignore
role of denial	Social groups need denial, self-deception and forgiveness to maintain groups and society after breaches of trust. We can be hyper sensitive about slights. Need skill to know when to ignore transgressions vs when to intervene.
	The more we trust someone, the larger number of infractions and scope that we are willing to tolerate.
types of denial	The varieties of denial and self-deception are ingredients:
	Inattention: benign; activity goes unnoticed
	Passive acknowledgement: little or no action taken
	Reframing: exploitation, betrayal of trust is recast as a mistake
	Willful blindness: keeps topics off limits
depression	Affects perception. Depressed people have better perception of importance, reputation, locus of control, abilities. Depressed subjects tend *not* to pick the most self-serving of explanations. 60% of depression cases can be dramatically reduced by occasional sleep deprivation. Characterized by an inability to handle stress. Interacts with effects of happiness. Affects immunity system and pain sensitivity
	Maybe related to how willing one is to giving up goals. Low mood stops you doing dangerous goals: e.g. unreachable goals. Some personalities types have difficulty following thru if they can't see every step clearly, and get frustrated; this may be related. Those with mild depression can disengage from unreachable (eg overly ambitious) goals, sparing resources that would be otherwise wasted; a part of dealing with failure. Severe depression can result if this does not work – linking persistence with clinical depression.
	see also *burnout, emotion, happiness, procrastination, sleep, stress*
central executive network	mediates working memory, decision making
default mode network	used when the brain is into highly engaged in a particular task. More activated when dpressed is engaged in self-focused, negative thoughts
salience network	activated when detecting/orientating to salient external stimuli/events. Excessive activation may lead to negative tone/depression.
monoamine hypothesis	hypothesis of depression; specific monoamine deficits, cause particular features of depressions (too few of the neurotransmitter, low receptors, too fast reuptake – eg monoamine oxidase A [MAO-A] too rapidly metabolizes it[1]).
	low on: result
	norepinephrine: reduced alertness, energy
	serotonin: anxiety, obsessions, compulsions
	dopamine: low attention, motivation, anhedonia
	(counter evidence)

[1] depressed adults do have increased levels; depressed teens do not.

depth Visual cues that indicate how near or far way an object is, especially the relative distance of two objects to the observer.

see also *binocular cues*

design Visceral: appearances

Behaviourial: pleasure & effectiveness of use

Reflective: rationalization and intellectualization

A sort of comment on aesthetics

audience Their needs include:

- Flow / enchantment – does it keep world full engage / drop
- Intuitive – natural don't have to think study or inference to use it
- Usability
- Learnability
- Correctness
- Functionality – does it do what I need?

diagnosis An interpretation and explanation of events and facts. On form, can be indistinguishable from a misdiagnosis. Both explain the facts, both are resilient in the face of new information. People diagnose quickly, before the facts, sifting the relevant from the irrelevant. It takes recognizing what is necessary, and what is sufficient.

dichromata aka *color-blindness*. Confusion of two-complementary colours, i.e. colours that produce gray when mixed. Most often red-green.

see also *color, eye, vision*

differential immunity

dignity When an individual acts on a higher principle even though it conflicts with self-interest or material benefit. Must be freely chosen.

display behaviour Behaviour, dress and appearance, typically to demonstrate group affiliation (few show *otherness)*. Motivated by immaturity, sexual desire or neediness. Includes conspicuous consumption and waste.

see also *distractor, dominance display, energy, signaling*

distractor Used in psychology: tests ask them to perform a task (called the *distractor*) then something outrageous happens. The subject does not notice this in the same level of detail as the task.

This phenomenon is often used illusion and manipulation to distractor from more significant items at hand.

don't fight the tape slogan of day traders. Useful advice to the effect that risk increases rapidly when you go against your peers.

drive Modulated by emotion. Loosely like motivation.

Social, seek stimulation

See also *oculesics*

dynamic range

eating

Digesting food consumes as much calories as 1 mile run.

Summary: Rats were placed in a closed environment, given equivalent meals that differed only in hardness. Rats given soft food weigh 30% more than their hard-food cohorts after 26 weeks.

Cooking allows for more nutritional options: starches become a digestible gelatinous form when heated with water. It eases digestion: proteins are denatured and more will be digested, and with less digestive energy. Heat also softens food, making it digestible in the stomach and upper intestine; otherwise fewer nutrients will be extracted and more shat.

Feedback loop estimates balance of energy, storing up energy during sedentary periods and reducing consumption during active periods. Seemingly counterintuitive, this may be an adaptation to seasons.

Feedback loops to the brain to estimate calories consumed and feel full. Natural sugars work with this loop, while artificial ones do not. The tactile feel of food does as well – very soft foods don't send as strong a signal as hard ones.

See also *carbohydrates, energy, exercise, satiety*, *satiation*

education

Education provides teaching, research, certification, socialization.

Edward Fredkin's paradox

The more equally attractive two alternatives seem, the harder it can be to choose between them – no matter that, to the same degree, the choice can only matter less.

see also *choice (and regret)*

einstellung

Familiarity bias in the choice of a plan or investment

See also *decision making*

elucidation

Repetitive process showing concrete examples.

See also *dialogue techniques*

embodied cognition

Physical body influenced by mental state.

See also *temperature regulation*

emotion

Emotions serve to couple feelings to action. Often they are related to physical body, in part preparing the body for both routine and emergency action, as well as maintenance activities. A non-formal approach or role to coming to a conclusion often reasonable results by emotions are easier, less work, or less refined skills than others.

Antonio Damasio

The perception of emotions is governed by at least four things: cognitive processes (include. perception and memory), subjective feelings & value judgments, the level physiological arousal, and one's behavioural reaction.

see also *cynicism, depression, nervous system, optimism, satisfactory conclusion bias*

as feelings

Emotions are feelings about:

1. Long-term preferences for the state of the world (if only specific to a small part of the world: who can control resources, control of who is allowed to do what)
2. Short-term goals
3. Standards of behaviour and conduct

Ortony, Andrew; Gerald L. Clore, Allan Collins. The Cognitive Structure of Emotions *1998*

Kismet's model

Motivation: Greed, curiosity, intimacy, monotony, avoidance, desire to control
Homeostasis: fatigue, hunger, drowsiness
Emotion: happiness, sadness, anger, fear, neutral

3 dimensions for an emotional feeling:

1. Level of arousal
2. Rating of how favorable / unfavoruable
3. Stance, or degree of how approachable it is

Factors used in assigning these:

1. The stimuli's intrinsic affect

2. Intensity of the stimulus (this becomes the arousal dimension)
3. Relevance and desirability of the goal
4. Is the stimulus goal directed?

PAD
pleasure, arousal, dominance

each PAD scale range from -1 to +1:

Table 6: *PAD emotions*

emotion	*pleasure*	*arousal*	*dominance*
angry	-0.51	0.59	0.25
bored	-0.65	-0.62	-0.33
curious	0.22	0.62	-0.01
dignified	0.55	0.22	0.61
elated	0.50	0.42	0.23
hungry	-0.44	0.14	-0.21
inhibited	-0.54	-0.04	-0.41
loved	0.87	0.54	-0.18
puzzled	-0.41	0.48	-0.33
sleepy	0.20	-0.70	-0.44
unconcerned	-0.13	-0.41	0.08
violent	-0.50	0.62	0.38

other

Feedback signals: prohibition, attention & approval, soothing & low-energy (or neutral)

Is the stimulus desired, annoying, a threat, play, escape, reject

Emotion dimensions: how pleasurable? How arousing is it (to action or desirability?), reject-accept, fight or flight, surprise, expectation or entropy.

It can also be done in response to color, as many movies choose a color palette and progression based on how the color maps to gender, tension, good/bad, emotions, and other. (this is culture specific)

role in moral choice

Emotions may be integral in guiding moral choices.

universal

anger, disgust, fear, joy, sadness, surprise

empathy

understand what motivates others, even those with different backgrounds. Sensitive to other's needs.

See *attunement, mirror neurons, morality, theory of mind*

encoding

A part of forming memories and associating items into relationships by forming a *code* to represent a memory, and a *code* to access it. There are several types of encoding, often related to the specific types of (hypothesized) memory. The cues at the time of learning are used to form the memory… even if they seem irrelevant. (The history of the concept and term are described in *information processing model*) Memory encodings are lossy, redundant and a variety of situations routinely interfere with or alter the encoding. For example, experience filters or acts as classification predicates.

Many experiences are decomposed and the constituents are encoded differently – the intensity of pain is encoded differently than the duration.

see also *information processing model, memory, neural cliques, selective recall*

Summary: summarizes research, concludes variable-sized chunks, *not bits (the coin-of-the-realm post* Information Theory*) are best describe memory processes.*

George A Miller, "The Magical Number Seven, Plus or Minus Two: Some limits on our capacity for processing information." Psychological Review *(1956),* **6***, p81-97*

dual coding

Employing both semantic and visual codes enhances memory. Visual imagery representing the word to be remembered.

elaboration

Links a stimulus to other information at the time of encoding

phonemic code	Emphasizes the sound of a word	
self referential coding	Involves deciding how information is relevant. There appears to be a filtering process that helps promote some memories, degrade others, and arbitrary ignore the rest.	
structural code	Emphasizes the physical structure of the stimulus. This coding is quite developed.	
semantic code	Emphasizes the meaning of a word or other verbal input see also *definition, semantic memory*	
generation of codes	Speech Sounds per second: 15 Words per second: 2 - 3 Visual / Olfactory / Tactile: 14ms longer[2]	*Levelt, W.J.M. (1989)* Speaking: From Intention to Articulation, *Cambridge, MA, and London, MIT Press. Preface, p22*
whole feature coding	Possibly based on all of such codings acting simultaneously. Treated mechanically, each is evaluated independently and combined to form a single key. Each is assigned a bit index, and sets the bit to a 1/0 as appropriate. An experience recreates largely the same binary image; this bit-map also appears to be access the full experience in an associative manner.	*Bower, Gordon H. "A multicomponent theory of the memory trace." In K. W. Spence, & J.T. Spence (eds)* The psychology of learning and motivation. *Vol 1, New York, Academic Press 1967*
endowment effect	People place extra value on things they already own. That is, if two people each have an item of equal value, they are very unwilling to trade them; they would rather trade for something of greater value. This effect is one reason why stockholders tend to hold out for even higher share values before selling. This effect can be diminished by learning to trade, and developing more experience. However, sellers tend to learn faster than buyers.[3] see also *behavaioural economics, behaviour shaping constraints, Coase theorem, halo effect, hysteresis, mechanism design, prospect theory*	*Bower, Gordon H. "Notes on a descriptive theory of memory." In D.P. Kimble (ed)* The proceedings of the second conference on learning, remembering, and forgetting. *New York: New York Academy of Sciences, ~1969*
energy	Brain consumes about 30% of bodies energy FMRI is based on the more active parts of the brain are replenished with more blood Perception Homeostatis: store of energy. Heart rate in anticipation of action. Two activity loops: Energy, sweating, respiration: autonomic. drive Energy management: see stress, mass regulation, temperature regulation Efficiency see *practice, experts* Conspicuous displays of energy, as mating ritual See *eating, exercise, satiety, temperature regulation*	
environment	The environment can serve as a mold for our behaviour, but a limited one: "In very many cases whether a particular system will achieve a particular goal or adaptation depends on only a few characteristics of the outer environment, and not at all on the detail of the environment." See also *behaviour shaping constraint, mechanism design*	*Simon,* ibid *p8*

[2] Klapp, S.T., Anderson, W.G. and Berrian, R.W. (1973) `Implicit speech in reading, reconsidered' *Journal of Experimental Psychology*, 100: 368-74

[3] "Neoclassical Theory versus Prospect Theory: Evidence from the Marketplace." NBER Working Paper no. 9736: www.nber.org/papers/w9736

envy People experience pain when a competitor does well, delight when he suffers

episodic memory Memory of personal experiences, often considered chronological or at least sequential. aka *temporal memory*

error management theory When people make errors they tend to make the error that is *least costly* (as rationalized by the principle investigator.)

Martie Haselton, David Buss

- Men see competitors as more attractive than they are; either moving on or trying harder to not lose chance of sex
- Men are see friendly women as more sexually receptive (than they report)
- Women are biased against men's advances to avoid single parenthood.

estimation How estimates are made, when unknown, uncertainty, or even unknowable

Estimation of probability. Done with a number of (unreliable) heuristics.[4]

Ease of recall of examples (the *availability hypothesis*) impacts the estimate. Media coverage and advertising are sources of error.[5]

The representative hypotheses: estimate is based on how similar to a prototype of the event

Frame of questions affects estimates.[6]

Note: share-price models will be wrong from time to time (every few months). Black-Scholes is good only for a few months.

see also *availability, group estimation, representativeness, selective recall, similarity, social judgments*

Summary: Illusory correlation, over-estimating the number of encounters, confirmation bias, and the association of social traits.

Hamilton, DL; RK Gifford "Illusory correlation in interpersonal perception: A cognitive basis of stereotypic judgments." Journal of Experimental Social Psychology*, 1976, **12** p392-407*

of satisfaction with outcome People are not very good at estimating how happy they will be with a circumstance, choice, or outcome. Use the measured satisfaction of someone else that has been in a similar circumstance.

event Facets: temporal, casual, spatial, experimental, informational, structural.

Properties: time, location, type,

Information: participants, characteristics

Experiential: text, audio, photos, etc.

exemplar based judgment One of several techniques people simultaneously employ in reasoning. A situation (perhaps a portion of a decision). One is positing a judgment, while quickly checking to see if he can recall contradictory or confirmatory examples. Once an initial conclusion rationalization is made, tend to anchor this; the number of contrary exemplars, and especially speed with which they are recalled, is critical to reducing any misleading effects from this type of judgment.

see also *availability, idealized cognitive models, judgment, representativeness, selective recall, similarity, social judgments*

exercise effects Mental response

muscle exercise

- releases dopamine, serotonin, norepinephrine

[4] Tversky, A; D Kahneman, 1973, "Availability: A heuristic for judging frequency and probability," *Cognitive Psychology* **5** p207-232

1980, "Causal schemas in judgement, under uncertainty," In M Fishbein (ed) *Progress in social psychology*, Erlbaum (Hillsdale, NJ)

[5] Slovic, P; B Fischoff, S Lichenstein, 1976, "Cognitive processes and societal risk taking," In JS Carroll, JW Payne (Eds) *Cogntive and social behaviour,* Erlbaum (Potomac, MD)

[6] Kahneman, D; A Tversky, 1984, "Choices, values, and frames," *American Psychologist* **39** p341-350

- counters depression
- improves mood, optimism, stress

blood sugar, insulin, diabetes

- anxiety, paranoia
- stress can start an attack
- lethargy

process

Decide which of the following types of exercise you want (pick one or two):

- size
- strength
- endurance
- aerobic

Use that to find out the # of repetitions

Use the number of reps to select the weight to use.

The next step is to determine how much to increase this by and how often.

Goal	*Repetitions*
size	13-20
size & strength	6-12
size & endurance	13-20
strength	1-5
endurance	13-20
strength & endurance	6-12
aerobic	> 20

Table 7: *The number of repetitions for a given goal*

expectancy theory Motivation of do X get reward Y. (How attractive the reward is to the person)

expectation bias Placebo effect, see also *confirmation bias*

expected utility theory Trades off an outcome's probability and its utility.

experience
evaluating

An experience is often evaluated by:

- Comparing it against what they hope it would be;
- Comparing it with what they expected it to be
- Comparing it with other experiences they have had
- Comparing the experience to the experiences of others

see also *choice, happiness (prediction), regret*

experimenter bias

Investigators in studies are prone to biases such expectation bias. Experimenter bias shifts data to favoring the hypothesis of the experiment, even if there is no known means of enacting the bias.

Summary: No known means of enacting bias, but biasing did change outcome of experiments.

Rosenthal, R; KL Fode. 1963. "Three experiments in Experimenter Bias." Psychology Reports ***12**, p491-511.*

experts
and novices

Experts tend to perform faster than novices (if required), are more accurate, and consider fewer items than novices. Novices consider mediocre options, as well as good ones, while experts focus more on the good options. Moderately skilled people and experts appear to use roughly the same strategy in any given problem or situation. However, experts appear to much better at monitoring their mental state and adapting. Experts don't require the ability to remember more, but invariably can recognize many more patterns and can recall faster.

see also *availability*

Summary: Recording mistakes favor the experimenter's hypothesis.

O'Leary, KD; Kent, RN; J Kanowitz 1975. "Shaping data collection congruent with experimental hypothesis." Journal of Applied Behavioral Analysis ***8**, p42-51*

expert system[7]

Software techniques for explicitly "embedding substantial amounts of knowledge into programs." Knowledge base, inference engine, user interface, knowledge acquisition facility.

Typically it asks questions of the user (rather than the other way round)

See also *frame based reasoning, inference, learning, logic*

exposure anxiety

Fear of appearing weak, inability to admit mistakes. Confirmation bias. Affects decision making process. Can reinforce failure

eye

accommodation: mechanism of auto-focus in the eye.

visual acuity: sharpness and precise in detail

receptor sensitivity

adaptation, to light: 1 minute
adaptation to dark: complete in 30 minutes, most in 10 minutes. 2-10 minutes for foveal cones 40 minutes for rod

aperture: F17
focal length 17mm
scene illumination sensitivity: 10^4ft-C (sunlight) to 10^{-4}ft-C (star light)
spectral sensitivity: response peak 550-560nm, dropping to 1% of max 410 & 720nm
contrast sensitivity: maximum at 10 lines/mm on retina
information sensitivity: 1400 photons/bit
detection quantum: 0.03; 0.05 low light to .005 in high light.
visual acuity: 1 minute of arc
resolution: 10 lines/mm at 1 sin or 200 lines/mm on retina
Threshold of vision, in a trained observation: 20msecs (at fovea) for red and green, 100nsecs (at fovea) for blue.

see also *binocular cues, color perception, depth, dichromata, lateral antagonism, retinal signals, vision*

genes

The rod, cone (all color) genes are on the X chromosome. There are different genes for the same rod or cone, with slightly different sensitivities – incl center frequency.

***Table 8:** The part of light sense*

Problem	*What*
deuteranope	missing green cone
protanope	missing red cone
tritanope	blue cone missing

color perception

rod bipolar cells – on bipolar cells

[7] "Inductive Knowledge acquisition: A Case study" J R Quinlan, Applications of Expert Systems, ed JR Quinlan, 1989 p157-173 Addison-Wesley, North Ryde, NSW

cones – bipolar; carry contrast, color signal

tetrachromat — two genes for the same cone, but with difference spectral sensitivies. One from one X chromosome, one from the second; so can happen in females

faces — We judge a person a great deal by how much we like their face.

See also *fusiform face area*

Summary: using "average" faces with major features from political candidates from several countries, subjects' ratings of who would make a better leader matched the outcomes of political elections. Anthony Little of University of Stirling

expression — Facial expressions represent social receptivity, signaling intent and actions we'll take. Paul Eckman attempted to code the different expressions using his Facial Action Coding System. See also *mirror neurons, oculesics*

anger, contempt, disgust, fear, happiness, neutral, sadness, surprise

features — The brain has separate areas that recognize features of faces, and they can be sensitive to the orientation. The fusing of the features into overall recognition is sensitive to orientation of the observer and the face being observed. The features include: eyes, nose, eye/brow bridge, mouth, lips (esp. upper)

locating — First identify regions based on their color temperature. Then it examines these regions for facial signatures. Use other hints as well – typically a camera is point right at a person, and so first examines a set of key locations the face is likely to be at. Sets of photos taken within a small time period are likely the same people, esp. if the color histogram is the same.

memory — Face memory seems to be a special area of the brain specific to the visual task of recognizing faces and recalling features. The area has several semi-independent processes – with an upside down face we can't tell that the mouth area is inverted.

see also *prospagnosia*

processing — Within the brain it is a network mostly within the occipital temporal region. Right occiptal face area, fusiform gyrus, fusiform face area, and superior temporal sulcus. (In a sense, very highly specialized variant of visual object processing

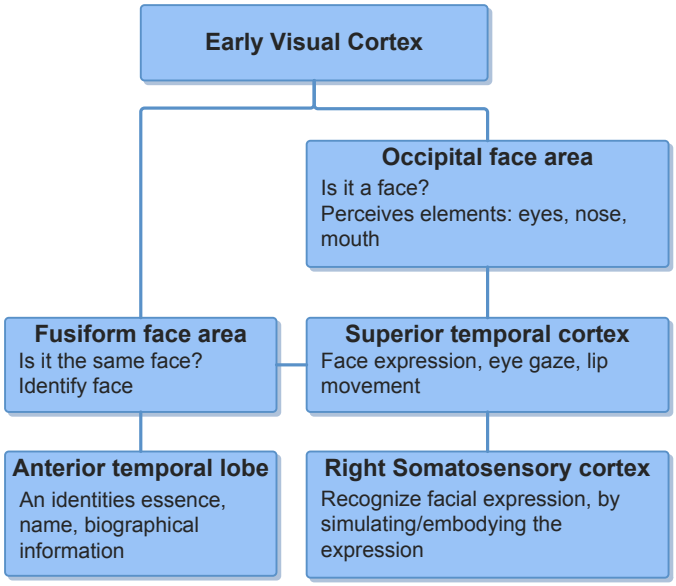

Figure 1: *The stages of face processing. Adapted from David Pitcher, Vincent Walsh, Bradley Duchaine, "The Role of the Occipital Face Area in the Cortical Face Perception Network"* Experimental Brain Research *209 (201):490*

recognition — The critical elements in recognizing a person by their face are the space between the eyes and the vertical length of the nose (i.e., from the bridge between the eyes down to the tip). Secondary elements include the gap between the nose and eye, the angle of the nose, and upper lip gap. The facial recognition process appears to rely heavily on functional decomposition

Thatcher effect — Experiment is based on shown a face upside down, but vertical flipping the mouth and eyes. The face is reported as normal when seen upside down, but horrifying when flipped around. Theory is that different portions of the brain interpret orientation, eyes, mouth, and so forth.

Facanger, comp

false belief task

A child is told a story:

> Bobby puts a toy in the closet and closes the door. His little brother comes into the room to look for it. Where will he look?

If the child indicates the closet, he does not fully understand what Bobby's little brother would not know yet.

See also *theory of mind.*

Wianmer 83

features

Features are ranked on their discriminating power. Determining if an exemplar is the same as A – features that align with each other, and features that contrast.

See *visual features*

feedback

Receiving good feedback is key to learning and behaviour change.

Relevant feedback (esp. likely to be useful to a control loop), timely (delays can cause a control loop to behave much worse), with little distortion.

good feedback includes:

Clear goal

Means to evaluate progress toward the goal

Self-efficacy: how likely do we think we can reach goal?

flow

A state of altered consciousness with enhanced ability to concentrate and perform, where one feels fully involved & focused in what he is doing.

See also *burnout, stress, work (optimal experience)*

Summary: People tend to arrange work and social activities so that the work is irregular enough to require effort or attention, but not so difficult it brings on anxiety.

Mihaly Csikszentmihalyi, Flow: The Psychology of Optimal Experience, *Harper and Row 1990.*

focus

See *absent mindedness, attention management, functional fixedness*

folk reasoning

- Not methodological;
- Complex and sometimes evolving
- Replete with biases
- Specific modes of attribution for types of situations and outcomes
- Judgment of causes of behaviour and outcome (attribution theory)

see also *attitude, attribution theory, biases, decision making (integrated and intuitive), representiveness*

folk taxonomy

Typically a outlines relations such as *A is a kind of B***.**

Limited to a maximum depth of about 5 levels. The number of items in any category near the top level is small – usually around 5 to 10. Those near the lowest, most specific levels typically have the most items, usually round 500.

font

serif is more readable (ie the text can be understood) while sans serif is more legible (the letters can be identified). The serifs act as a guideline.

forgetting
role of

Forgetting serves a role such as preventing confusion, and allowing change in a person, beliefs and behaviour

frame based

Language understanding modeled by simultaneously tracking attributes that must be unified, e.g. gender, case, number. Simulations and graphic modeling work will with frames.

reasoning

Fill-in-the slot approach to modeling a wide variety of situations and puzzles. Frames organize knowledge into large, well-structured chunks representing a stylized or stereotyped situation. They emphasize the more typical elements of a schema. As a frame describes only a small part of the world, several work together.

Frames usually list

- The elements involved in the transaction,

- An *invariant proposition* that logical confirms some state should always be true (before, during, and after),
- A *precondition proposition* that checks that the frame can be applied, and
- The action rule.

see also *case (grammar), production*

framing effect Structure of a problem biases the mode of solution. This can narrow what we consider, by its form and can be misleading.

functional fixedness Perception of an item in terms of its most common use.

see also *centration bias, halo effect*

fusiform face area Merges features into recognition as a face. This can break (see *prospagnosia)* See amygdalia as recognizing it as a specific person (not merely looks like)

game theory The archetypal game theory involves:

archetypical

- In order to be better off, you must win
- Defeating the other guy (he must lose) is the best way to assume that; however it sounds better if you try to advertise both sides as wining
- You need a specific, identifiable opponent, especially the 'top dog' of opponents for a competition and to focus attention on that
- The competition being decided in the near future
- Your actions need to include substantial direct attacks against the opponent
- These attacks defeat the enemy or cause the enemy to self-destruct.

These leads to questions: What if the enemy is not specific? Or not defeatable by attacking them? E.g. Cockroaches, global warmth & dirtiness makes them win (e.g. avoid global warming, keep clean and you'll prevail). Actions to directly attack them will hurt & bankrupt you.

gene protection Not conscious of genets. Evolution selected against approaches that did not sufficiently protect genes (rest is side-effect)

genetic algorithm Iterative process of building a solution. A fitness function, ways of breaking apart and reassembling and adding new steps to solution.

glamour Emphasis on the subject. Very tricky talent and skill to create. Curve . Translucent, idealized, fantastic, no gritty realism. Allure. Draws us in. Flow of focus as story.

Remove guilt, fear. Style, fantasy as a way to achieve this unreality: facial expression to achieve guiltless-ness.

Removes distractions. Techniques: Keeps background simple – remove all items except what is necessary to establish scene. Hides and reveals.

Love of face, Eyes often look directly into viewer or into the infinite distance (eg at the horizon). See vision focus

Indoor and outdoor sense. Lighting, color palette. Visual props as devices, sunglasses, fashionable but go out of style.

May have different response in male and females. See *gratification.*

See also *visual feature*

goodtime charlotte Term dates from either the second or first World War.

see *charity girl, companion girl, khaki-wacki*

gratification Men who saw sexy images, touched lingerie tend to seek immediate gratification – e.g. purchasing next available thing presented. Also activated medial temporal

cortex – "tools" region rather than "empathy" region.

see also *happiness, satiety, satisfaction*

greedy method

A simplistic choice strategy where only the options immediately available are considered. The cheapest option or the one with the highest immediate payoff is chosen. This approach ignores how several choices work together for better results – that is, it cascades decisions.

see also *honey bee method.*

grid cells

Grid cells have studied in rats, (and hypothesized to exist in people) in the medial entorhinal cortex near the hippocampus. There are many overlapping grids working together. Each grid represents the environment as a mesh of equilateral triangles, anchored by landmarks. The rat's position is represented at the vertices (center of a hexagram in each grid); the rat's movement is announced to multiple grids. The position is determined my self-motion.

Knierim, James J. "The matrix in your head" Scientific American Mind*, June/July 2005.*)

Besides providing instantaneous location, decay effects track the path of movement. These are also used in relating episodic memories in a context. It is not clear if the environment projection onto the lattice is retained. These effects may relate to the *method of loci.* It is not clear if the planes must be layered, or what their possible orientations are.

Hafting, Torkel; Marianne Fyhn, Sturla Molden, May-Britt Moser and Edvard I Moser, "Microstructure of a Spatial Map in the Entorhinal Cortex." Nature *V432 p801-806, August 11 2005. (Norwegian University of Science and Technology) Sargolini, Francesca; Marianne Fyhn, Torkel Hafting, Bruce L. McNaughton, Menno P Witter, May-Britt Moser, and Edvard Moser "Conjunctive Representation of Position, Direction, and Velocity in Entorhinal Cortex."* Science *V213, p758-762 May 5, 2006*)

guided recall

Method of loci. Keyword method: concrete word associated with an abstract world, and a image to represent the concrete item. This helps involve more than one kind of memory. See also *compliance, iterative refinement, memory*

halo effect

Tendency to judge a person or group based on one salient characteristic; reflected glory. Can charge a premium. Branding

hallucination

See also *illusory perception*

happiness

Relative. see *hedonic treadmill*

Layard, Richard, Happiness: Lessons from a New Science *2005 ISBN:1594200394 http://www.economist.com/books/displayStory.cfm?story_id=3555887*

economic

By person A earning more (or working more), he creates a cost to person B (who is now less happy). Much of the costs of this externality can be delivered to A in the economist's preferred fashion: tax the externality with progressively higher income taxes. With or with taxes, this approach is preferred over a cap on the work-week (France's approach). Most people value freedom as a greater good than enforced happiness, even if that freedom does have some costs. Happy college freshman earn, on average, $25K more at midlife.

Note: happiness differs from motivation

see also: *emotion, externalities (managing), hedonic framing, hedonic immunity, hedonic treadmill, homo economus, hormones (and sex), motivation, optimism*

factors

Happiness in life is most influenced by what has happened in the last 3 minutes to last 3 months. This happiness appears to be *synthetic* in that the happiness has little to with the feeling we have when we get what we want, and more to do with happiness despite not getting what you want.

Logarithmically, the things that most affect happiness: your health, family relations, political & civil liberty in your country, job satisfaction, security in your country, social equality in your society, job security, material well-being, social & community activities

prediction

People are not good at predicting their outcome of happiness with respect to a choice, and this is an obstacle to good choices. Best to watch the outcomes of others.

spending

Spending more doesn't bring happiness. Experiences, esp good experiences leave us happier (than buying things). The number of experiences vs size of the experiences. Buy things for other people leaves both happier and with social bonds.

wealth — Richer people are happier than poor people – within a country – but the average happiness doesn't necessarily increase with the nations rise in wealth.

Richard Easterlin 1974

at work — Built something lasting see *motivation*

and pain — Happiness releases more pain-blockers. Depression suppresses some pain-blockers (that is, this reduces the amount of pain-blocking hormones) and a person is more sensitive to pain.

see also *optimism*

Hawthorne effect — Experimenter bias

hedonic — see also *liking, wants*,

hedonic framing — Maximizes total subject value by segregating gains and integrating loses.

hedonic immunity — Somehow the mind protects us from feeling bad over what you can't control – and punishes for taking too much control. People with choices removed from them are happier than with more choices. Correspondingly reversible decisions are more stressful (over the long term) than irreversible ones. This appears to come from over consideration that undermines the hedonic response.

see also *happiness*

The great source of.. misery.. seems to arise from over-rating the difference between one permanent situation and another. Adam Smith, Theory of Moral Sentiments

hedonic treadmill — *The grass is always greener; the rat race.* People are not satisfied with their absolute position, but relative gains and losses. They're always moving, but not (much) happier.

We are happier to earn $50K if our starting income was $25K, than we would be if our starting income were $100K. Similarly, we are happier to be earning $50K if the average income is $25K than we would be earning $100K if the average were $200K. Note the motivating aspects of this taper off once a threshold in income is reached.

See also *aspirational treadmill, motivation*

help system taxonomy

1) What must I know first?
   a) Short overview of application, concepts, methods
   b) Critical, need-to-know-first information, bugs, work arounds
2) How do I ___?
   a) Tasks that can and can't be done
3) What is ___ ?
   a) Description of control and components
4) What can I do next?
   a) Application state and next possible actions
5) Help on Help
6) Glossary: Meaning of Terms
7) UI Conventions
   a) Conventions, selection, activation, navigation
8) Related Product Info
   a) Related information and documents on the system, current application: user, reference, and tutorial. Disciple. Scope vs audience
9) Customer Assistance
   a) How to get outside expert assistance
10) Version Id

heuristics — Representativeness, overconfidence, hindsight bias, availability of construction

hindsight bias

Given the answer, think of the reasons why this must be correct; failing to think of counter-evidence.

hippocampus

Brain-structure related to remembering people, places, events (i.e., it links time or event with nouns). Signals to choices that are based on memory sequences. Do certain word types relate to brain structure? Some specialized areas of the hippocampus can grow new nerve cells; these have timestamp and a maturity cycle

See also *grid cells, hormones, neurogenesis*

Hofstader, Douglas

Themes. High-level cognition is hard to separate from perception. Conceptual structures are loosely coupled with others. There are heuristics that are vague but embody elegance, importance. Some of the weighting factors or heuristics are specific to context others are very broad. Many alternatives are explored, partly in order of some schedule. Analogues and variations on a theme are important. Sometimes the deep structure of analogy is considered. Inner structure of concepts and related concepts.

Search. Many of the analogy techniques are based on considering (a wide range of) possibilities, alternatives. Trial and error is one end of the spectrum.

Blowhard. Poor writing, excessive. Inflated rhetoric. Tends to make up new terms for existing things. Examples to sound like neural networks: annealing, temperature, spreading activation. Flashy: codelets, coderacks, parallel terraced

copycat

Table of applicable transforms – called codelets / coderack. Each has a different weight (called an activation threshold). Search strategy – similar to a graph search, but with a confused vocabulary to sound hip and like neural networks. The net search heuristic is phrased in terms of activation threshold, affinity between gloms, etc. These work to propagate styles or guide the system.

Working memory. Search similar to A* or genetic search to construct resulting analogy. (obnoxiously called parallel terraced scan; weights are called urgency, paths are called a glom).

Operations. There is a table of candidate steps (obnoxiously called coderack of codelets), each has an optional precondition. Preconditions can be very complex, requiring other preconditions to be true.

home bias

Consumers (or others) preference for products produced in their own country rather than otherwise identical imports. This includes financial instruments and ownership of securities and businesses.

Summary: proposed as a possible explanation for the mystery of the missing trade. Trefler (1995)

homo economicus

The term originated over the division between descriptions of human behaviour, and descriptions of normative economic behaviour. The rational economic actor is so different from normal people that it is derided as a separate, unseen, beast altogether. (Surely, such a beast would be called *homo sapiens economicus*.)

- Real people judge their well-being relative to others, not in absolute terms
- Actions and decisions dependent on the way the choices are presented
- They fear loss more than they crave gain.
- Perform actions (e.g. buy goods and services) without gain
- Present signals that appear linked to underperformance

see *behavioural economics, bounded rationality, Coase theorem, prospect theory, signals*

homosexuality

There is a class of gay men who have more older brothers than straight men do. Only the number of biological older brothers is the factor (not how many adoptive brothers or older males that are present); these biological brothers do not have to be present.

Ray Blanchard, Toronto's Centre for Addiction and Mental Health

Anthony Bogaert, Brock University (St Catharines, Ontario), Proceedings of the National Academy of Sciences

honey bee

A biomimetic concept applied to choice-related problems. A hive has gatherers who get pollen and nectar from fields, giving it to workers (who place it into the honey store). How to fill the honey store reasonably fast? The strategy is to shift from relatively low yield fields (with little nectar) to higher-yield fields:

- Discourage relatively low-yield fields, and
- Encourage fields that have relatively higher yields, but
- There is low penalty to switching to another field

Each gatherer bee decides to advertise his field or switch to another field – are there many workers available to take pollen from the gatherer? If so, he will keep using the field and advertise it to others; including how long it took him to fill his load of pollen. If there are few workers to unload the gatherer, it is assumed that other gatherers are so successful that this field is not needed. The gatherer:

- Looks around to the fields being advertised – which includes information on how to get to the field and how long it took to load up,
- The gatherer identifies the field that was fastest-to-load up on, and
- Compares it with his load time; if it is faster than his, he switches to it (otherwise he goes back to the same field)

This method has been compared with the greedy method for routing on the internet:

- With highly variable internet traffic honeybee allocation bests greedy algorithm by 20%
- When traffic follows a trend, greedy is better

see also *greedy method*

Summary: computer management algorithms can work better if they mimic the social structure of honeybees

Ravilious, Kate "Honey bees and internet optimization," The Economist*, April 15th 2004.*

hormones

Bodily chemicals to aid in the body maintenance and "control loops" – exercise improves the conditioned response. Often produced as part of the *circadian rhythm,* affecting cognitive abilities by time of day, exercise, and what one did recently. Hormones are often inhibited under stress – reducing health and social cohesion. Affect trust, social cohesion, and thin-skinned behaviour.

See also *brain*

adrenaline

Can trigger some types of memory formation. See *memory (emotion)*

brain growth

Prolactin, produced by the pituitary gland, appears to promote new cells in female brain

- Can be found in high levels in pregnant women
- Prolactin levels also rise, in women, during sex
- Stress of all kinds causes the release of this hormone

see also *neurogenesis, protein*

dopamine

Neurohormone released by the hippocampus. Banana's and protein diet is hypothesized to have good effects on dopamine levels.

oxytocin

A peptide with a half-life: ~3 minutes; receptors are in the very old parts of the brain. Its effects are linked with love, attachment, trust, monogamy, and empathy.

Associated with OBGYN and pregnancy; oxytocin, in pregnant women, triggers uteral contractions. The brain releases a lot of oxytocin normally, and in response to positive social interactions. About 2% of people exhibit sociopathic traits (hardcore trust violators, enjoying it) but have high levels of oxytocin, suggesting dysfunction in the receptors.

See also *touch*

testosterone
dihydrotesterone

High testosterone levels and sensitivity correlate with social dominance. Competitive, even spiteful, behaviour; would rather accept less for themselves than allow a rival to prosper – feeling cheating releases *dihydrotesterone*, a strong form of testerone, in men. A population with too high a proportion of "high testosterone" members, the group will become a race to the bottom.

vasopressin — Hormone that controls salt and water balance,

hosting — psychology of

humor — Can create attention, generate affection; but masks underlying message.

hunger — an interaction of a variety of mental and physical processes that motivate eating. Components: hedonic, likes, wants, satiation, satiety

see also *leptin*

hysteresis — Stability and character; inaction and rigidity.

idea — An entity actually or potentially present in the consciousness. A thought, concept, sensation, or image.

generating variations on an idea — Take an idea and:

1. Adapt it, modify it to incorporate features of other ideas
2. Put it to new uses
3. Modify it; change a feature or add a new one
4. Add more of a feature, or make it more pronounced
5. Remove a feature or reduce it
6. Substitute a feature for another
7. Rearrange
8. Reverse
9. Combine

Osborn, AF, 1963, Applied imagination: Principles and procedures for creative problem solving, *3rd Ed. Scribners (New York)*

criteria for ideas

1. Efficiency
2. Effectiveness
3. Compatibility with human behaviour
4. Compatibility with goals
5. Is the timing right?
6. Is it feasible? Can it be done? Is it worth it?

Le Boeuf, M, 1980, Imagineering, *McGraw-Hill (New York)*

See also *feasibility study*

idealized cognition model ICM — Radially organized. Center is the features that most strongly characterize the category set / set

Prototype: members (of category) that most strongly fit the definition of items

Categories are graded: some items are a less perfect fit

Types of prototypes:

Central: core type adhered to and deviated from

Typical cases

Ideal cases: what we measure real examples against

Anti-ideal: demons- everything an item is not

Stereotypes: anecdotal / mythical properties associated with members

Salient exemplars: memorable examples, used in analogies

Essential prototypes: feature bundles associated with category.

See also *ACME, analogical reasoning, exemplar based judgement*

identity — The brain appears to have special regions – or connections – go the step from recognizing someone or something *appearing* identical to xyz to that person on or item *being* xyz. Some delusions are listed below,

See also *features, matching, names, necromimesis, prosopagnosia, recognition*

Capgras syndrome — An otherwise normal person (with respect to identity) sees a particular person or thing as an imposter. This "imposter" appears identical in all respects, but the person is sure they are not the same. (If the "imposter" is unseen, and communicates, via phone, the person will identify them correctly). This appears to be a disconnect between temporal cortex (face recognition) and limbic system.

Fregol delusion — Perceives different people are the same person

Intermetamorphosis — Believes that people change who they are

Subjective double — Doppelganger. There is an identical opposite present in the world.

ideology — My economics professor's definition of ideology:

1. An ideology provides a worldview; a history and interpretation.
2. An ideology tells you how to "behave" and what will happen if you do
3. The ideology tells you what will happen if you do not do as they say.
4. The ideology internalizes success, and externalizes failures.

See also *attributions*

1. explain the past in terms pleasing to the dominant subculture
2. identifies the reasons for success (internal) and failure (external); attribution
3. predicts the future if you behave / misbehave (very clear, distinct)
4. provides a paradigm for viewing the world

ill-defined problems — Something is missing, such as initial state, goal state, available operations, and constraints.

illusion — use a lead, Misdirection, trust, reciprocity, compliance, misinterpretation, relaxed lull, Exploit context and constraints, information and odds. Greed desire wishful thinking

illusion of asymmetric insight — "I know others better than they know themselves, and better than they know me."

see *attribution theory*

illusion of naive realism — "inner thoughts/perceptions are correct or very accurate."

illusory perception — Caffeine and sense of control. Perceive signal meaning, pattern, conspiracy.

image motive — Doing something more to impress someone you deem important rather than for the value of the act.

imagery — As figures of speech, as symbol in a story, clusters of images

See also *glamour*

imagination

imitation — Fast learning. See *mimicry, mirror neurons*

immune system — A line of inquiry hypothesizing that depression and allergies may come from an over-efficient immune system, one that is accidentally attacking portions of the nervous system. Bacteria or virus infection may spur an immune response to work properly.

See also *nervous system*

impression first — The first three things people notice on a first encounter are age, gender, and race

inattentional blindness — Four factors: conspicuity, mental workload, expectations, and capacity. Cell phone causes such a distraction; hands-free does not reduce the mental workload. Both the mechanics of operating the phone and the complexity of the cooperation

compete for attention with the dynamic demands of driving.

incentives

Incentives undermine responsibilities in many cases. Ethics courses make a person think of ethics as small & insignificant. Doing a task for principles / morals vs for incentives: conflict in brain, even they should reinforce.

infatuation

The person depends on the relationship for self-esteem
The person takes more from the relationship than they give
Each is jealous of the others separate activities
The relationship drains the person of energy
The person is afraid that the other person will lose interest in them
The person can only think of the other person

See also *love*

inference

By analogy: see *ACME, SME*

Inference broad attributes: *Categorization, clustering, latent semantic analysis, linear regression, singular value decomposition, Toulmin argument*

infomania

Obsessed with information

information processing model

Many terms, *encoding*, and others date from the 50's when information theory was the rage. The model has stood up well, but is incomplete in both functional, behavioural and strategic descriptions. It is divided between processors, memory, and communication to sensors and actuators.

see also *memory*

Summary: Provides an edited form of key papers, developing the modern model of mental processes.

Donald Norman, Memory & Attention; An introduction to human information processing. *1969, Wiley & Sons*

processors

the processor perform is characterized by:

cycle time: the time to do a single primitive operation

latency: how it takes to start doing operations, the time that must be waited from completing one action before a second one can be initiated. Decreasing the latency from 1.5 to .9 seconds, the productivity quadruples. (The number of tasks in a time frame).

For example: Voice Onset time is "the length of time between the presentation to the word and the point at which reading begins."

Table 9: *Performance of mental processors*

Processors	*Cycle Time (msec)*
Perceptual	100 [50 - 200]
Cognitive	70 [25-170]
Motor	70 [30-100]

sensors

eye

sensitivity

just noticeable difference

information system

- What questions can users ask of the information system?
- What part of the world do these questions concern, and what events happen there?
- How does system get access to these events?
- What is the system trying to minimize? Trying to maximize?
- When it is in a state or condition and event XYZ occurs == what is the system's action/response?
- When it tries to take action, and there is failure ABC, what is the response?

Information/datum: source and description

instruction
low guidance

Types of instruction:

- Constructivist
- Discovery
- Problem-based
- Experiential
- Inquiry based

Challenge to solve problems, esp real world

Knowledge acquisition thru experience

Guided, scaffolded forms of instruction

Completion problems: start the problem out, set it up and have student complete it

Performance approach: evaluates behaviour over course of career / tenure

insult

"Derogating a partner's value may cause her to feel that she cannot secure a better relationship partner, or that no one else would want her as a partner, with the result that she is less likely to defect from the relationship... the use of insults.. strongly predicts men's mate retention behaviors..."

Disparage other parties to show how others do things because they are stupid, while the speaker is reasoned.

Why do men insult their intimate partners?
William McKibbin, Aaron Goetz, Todd Shackelford, Lucas Lucas Schipper, Valeri Starratt, Steve Stewart-Williams, Feb 2007, Personality and Individual Differences 43 (2007) http://www.toddkshackelford.com/downloads/McKibbin-et-al-PAID-2007.pdf

intellect

Function: discriminate, divide, compare, measure, and categorize. Employs rational knowledge.

See also *categorization, clustering.*

in context

Judgments of intelligence often involve the stance, intention and response to the environment.

see also *rationality (bounded)*

intelligence$_1$
specific

Criteria for *specific intelligence*:

1. Existence of a discrete symbol system
2. Evidence for specialized representation in the brain
3. A distinctive evolutionary history
4. A distinctive developmental pattern
5. Identifiable core psychological operation
6. Existence of special populations that highlight or lack a capacity
7. Patterns of transfer across tasks that putatively involve a specific intelligence
8. Sometimes cited, is the existence of roles that foreground the intelligences in different cultures.

Summary: We change others minds thru combinations of connecting with them and explaining ideas.

Howard Gardner, Frames of Mind*, Chapter 4,*

Linked with memory and recall (availability of construction)

Higher intelligence people recall items faster than others, and can recognize larger numbers of items, although the number of items at a time they considers is the same as others. Can remember longer spans of arbitrary (even nonsensical) items. This allows them to consider more alternatives and contradictory evidence. The polar opposite of spending the time to recall or construct examples is impulsiveness, which negatively impacts intelligence – fewer alternatives are available as choices, and impulsiveness avoids contrary evidence.

See also *availability of construction, memory*

Summary: Compares impulsive students against those who consider more alternatives; the later score higher on IQ tests, tend to be older, and are less prone to disruptive behaviour.

Messer, S. B., "Reflection-impulsivity: A review." Psychological Bulletin, *83, p1026-1052. 1976*

measure systems

wechsler, WISC_III

terman

"Terman (1919) provided a lengthy list of the attributes of general intelligence captured by Stanford-Binet tests:

- "Memory

Stephen Jay Gould, The Mismeasure of Man*, p175*

- "Language comprehension
- "Size of vocabulary
- "Orientation in space and time
- "Eye-hand coordination
- "Knowledge of familiar things
- "Judgment
- "Likeness and differences
- "Arithmetic reasoning
- "Resourcefulness and ingenuity in difficult practical situations
- "Ability to detect absurdities
- "Speed and richness of association of ideas
- "Power to combine the dissected parts of a form board, or a group of ideas into a unitary whole,
- 'Capacity to generalize from particulars, and
- "Ability to deduce a rule from connected facts"

intimacy
behaviour

The warm, close exchange with others, marked by open communication. Disclose more about themselves to friends, laugh, smile, look at others more.

See also *motivation (intimacy)*

McAdams, Don P; S Heal, S Krause, 1984, "Social Motives and patterns of friendship," Journal of Personality and Social Psychology, ***47(4)*** *p828-838*

MacAdam, Don P; RJ Jackson, C Krishnit, 1984, "Looking, laughing, and smiling in dyads as a function of intimacy motivation and reciprocity," Journal Personality ***52(3)*** *p261-273*

intuition
illumination

"a sudden awareness of information,.. factors or relationships" (sauter, ibid)

detection

"While apparently at work, on another problem, the mind reveals verifiable facts, supplies answers to questions, or problems, or provides insights into the real nature of the problem… suddenly can draw relationships among facts or components previously appearing to have no relationship… can only happen after rational thought sets the groundwork and provides data and analysis as the basis for detection." (sauter ibid)

evaluation

"facilitates choice among alternatives… can help.. decide if analytical-based information is sufficient, or if inconsistent measures exist."

prediction

"hypothesis without first analyzing the data"

operative

"guides and provides a sense of direction. It suggests something that needs investigation."

creative

"resolves around alternatives, options, or possibilities"

judgment

Evaluation of one or more possibilities with respect to a specific set of evidence and goals. The distinction been judgment and reasoning is not clear. People seem to simultaneously (and in parallel) draw conclusions (an *intuitive* judgment done quickly), and rationalize that conclusion with a more *abstract* judgment.

see also *exemplar based judgment*

time

Some types of judgment are 'faster' than others, but many important judgments – esp. those related to social function – are made within a few seconds.

Table 10: *Speed of judgment*

	Task
0.25 seconds	Evaluate as good or bad
2 seconds	Rate performance of another person
6 seconds	Get a sense of a persons energy & warmth

just noticeable difference

The smallest difference in stimulation the sense can detect. The body scales the perceived differences so the increment is relative to the initial stimulus. (Webers

law) A Weber Fraction is used to describe the sensitivity of each sense

Table 11: *Weber fractions*

Sense	*Fraction*
vision	1/60
kinesthesis	1/30
pain	1/30
hearing	1/10
pressure	1/7
smell	1/4

khaki-wacki

A particular "upstanding" girl engaging in anonymous sexual favors with soldiers:

> The response of moral reformers points to the changes that had occurred since the previous generation. Whereas those of the First World War focused on the dangers of prostitution, by the 1940s it was the behavior of "amateur girls" – popularly known as khaki-wackies, victory girls, and good-time Charlottes – that concerned moralists.

John D'Emilio and Estelle B. Freedman, Intimate Matters: A History of Sexuality in America *1998. ISBN 0226142647 University of Chicago Press. p. 260-261*

And:

> Physicians and social workers frequently commented that the professional prostitute had given way to the so-called "patriotic prostitute" and "charity girl." As one CTCA social worker wrote: 'The peculiar charm and glamour which surrounds the man in uniform causes an unusual type of prostitute to spring up in time of war. Girls idealize the soldier and many really feel that nothing is wrong when done for him. One such girl said she had never sold herself to a civilian but felt she was doing her bit when she had been with eight soldiers in a night.' The "girl problem," as it became popularly known, seemed even more ominous to reformers than commercialized vice because it so often included youngsters from respectable, middle-class backgrounds. "Girls apparently of good families drive up in their cars and invite the soldiers who happen to be along the roadside near the camp to come to supper to a roadhouse or the nearest city," explained Dr. Jennie H. Harris. "The results are the usual ones."

2nd quote:
Allan M. Brandt, No Magic Bullet: A Social History of Venereal Disease in the United States since 1880 *1987. ISBN 0195042379 Oxford Paperbacks p. 81*

aka *goodtime charlotte, patriotic prostitute, victory girl*

compare with *booth babes, charity girl*, *companion girls*

knowledge
concrete

general knowledge

facts, related to system of interest

Kohlberg's stages of moral development

Level 1: Self-Interest
Stage 1: Punishment. "I won't do it because I don't want to get punished."
Stage 2: Reward. "I won't do it because I want the reward."

Level 2: Social Approval
Stage 3: Interpersonal Relations: "I won't do it because I want people to like me."
Stage 4: Social Order. "I won't do it because it would break the law."

Level 3: Abstract Ideals
Stage 5: Social Contract. "I won't do it because I'm obliged not to."
Stage 6: Universal Rights. "I won't do it because its not right, no matter what others say."

These predicate on morality in terms of rules and rights, ignoring other forms.

lateral antagonism

Cause of why the eye fills in some areas with false images (e.g. Hermann grid). Allows the eye to compare lightness of a local area with the general lighting.

See also *eye, vision*

learning

Resilient changes in the subjects knowledge about the task domain that are potential use in solving further problems.

Accretion, tuning, restructuring

Shaping and operant conditioning. Reinforcement of successively closer approximations to desired actions or responses – stimulus, response, reinforcement.

Programmed learning. Self-instruction. Information and self-assessment tests arranged in a sequence of small steps to permit active responses by learner.

Observational learning – models, attention, retention, reproduction, motivation.

Feedback, role of

Comprehensive, organized, easy-to-review note taking.

reinforcement learning theory

An explanation of how individuals acquire particular patterns of response to particular stimuli. Essentially individuals 'try out" a number of behaviours as responses to stimuli. If the consequence is positive or rewarding, the behaviour becomes part of their repertoire, to be repeated in similar circumstances. Should the consequence be punished, it is likely to be dropped and replaced with an alternative.

Rome

When learning is a primarily leisure pursuit (e.g. Rome) they borrow (and simplify the interesting bits from others.)

feedback

role of

reinforcement and reward

Continuous reinforcement – each proper response is rewarded
Scheduled reinforcement – specific pattern of presentation of rewards over time
Fixed-ratio reinforcement schedule – 1 reward for every n proper actions
Variable-ratio reinforcement schedule
Fixed-interval reinforcement schedule – timer-interval after first proper action until reward; proper actions in this time will be ignored.
Variable-interval reinforcement schedules

relations of reward to response and productivity

Ratio schedules tend to produce more rapid responses than interval scheduling;
Variable schedules tend to generate steadier response rates – greater resistance to extinction, may lead to obsession.

testing

Schools use tests that are designed to be passed.

Tests include:

- Show what has been learnt
- Who has done best: with grades that are precise and meaningful
- Should be rigorous & fair
- Standards should stay stead over time
- Curriculum should be up to date
- Course should be accessible and attractive, yet cover all the ground that universities & employers require.

leptin

used in the bodies regulation of weight (fat) ,hunger and calorie seeking.

lexical memory

There are five types of lexical memory, based on how the memory is accessed (esp. encoding):

ORTHOGRAPHIC – The word is recalled based on its spelling or shape

PHONOLOGICAL – The word is recalled based on its sound or pronunciation (phonemic coding)

SEMANTIC – The word is recalled based upon its meaning (semantic coding)

KWIC – The word is recalled based upon its context with other words.

There also appears to be a memory of topics, entities and concepts that is used to resolve anaphora – that is, to figure what is referred to by 'this', 'that', 'it', etc.

see also *discourse repair, Heap's law, object classification*

lie
leading

leading lie is done to lead the recipient to their own, erroneous, conclusions. They form the majority, if not all, of the lie within their own mind

outrageous lie	This is an obvious lie or fabrication. It is usually a form of the leading lie. It is commonly used to make the truth appear to be a lie. example a police officer coming out of a massage parlor looking horribly embarrassed to make it seem that he was there for more moral reasons.	
sincere lie	This is often practical – nothing outrageous. Its nature is such that it is something believable and that the listener would like to believe. It seldom contains actions, words, or phrases that are out of character. It is often short, simple, and told as part of the truth, with a straight face.	
logic	Distinguished valid form from correct (is true in the real world). See *inference*	
love mature	Both are individuals apart from the other Each accepts the fact that neither is perfect The relationship is strong in tough times as well as happy times The love gives each person energy to devote to all aspects of life The two people are close friends Each person continues to grow as an independent human being There is joy in giving as well as receiving There is honesty and truth between the two people Each feels a responsibility to the other's well being. See also *infatuation*	
mania	Talks a lot, fast-talking Dominates conversation Energetic, active Restless, jumps from idea to idea Distractible Quick thinking Impulsive, acts on ideas immediately Grandiose, feels destined Elated Attractive, charismatic, charming Irritable, explosive Suspicious Needs little sleep Dresses for attention Risk taker financially, physically, sexually Sex drive See also *personality*	
mapping$_1$	The relationship between elements of an object	
mapping$_2$	the relationship between controls and results.	
mapping$_3$	With analogies, a table translating person A in the original situation (or possible world) to their counterpart (B) in the current context. Mapping is "a way of thinking about aspects of the target domain and acting upon it. It is not directly a reflection of a pre-existing objective structure of that domain." Mapping "enables us to think directly [about the target domain] without consciously activating the source domain, and yet to use the relevant conceptual properties of that domain, because they are … projected inherently onto the target and linked to the generic, more abstract, induction schema that motivated the analogy in the first place." see also *analogical reasoning, blending, counterparts, SME*	*Fauconnier*
mass communication selective influences	An explanation of why only certain types of people attend to particular forms of media messages, based on assumptions about their individual differences, social category memberships, and social affiliations.	
matching	non-obvious name relationships	

maximum entropy method

A method of inference. Selects arrangement or outcome with the maximum entropy ("uncertainty").

$$H(p) = -\sum_i^n p_i \log(p_i)$$

Drawback of this approach is managing multiple separate independent hypotheses – a test for each possible outcome. (Note: the sum of probabilities equaling 1 is considered a constraint)

memetics

Belief in the concrete nature of ideas, fashion, and concepts – that is, memes – and studying the dispersal and effects in an epidemiological manner.

memory

Memory supports only a single cognitive task at a time, preferring similarity matching over deduction. It is not accurate with particular details, but emphasizes substance and meaning of events. Involves processes of encoding, storage, recall and recognition. (As much as 20% of the brain is dedicated to memory)

TEMPORAL MEMORY – items that occurred near each other (see *hippocampus)*

EPISODIC MEMORY – chronological memory

LEXICAL MEMORY – word meaning, spelling, pronunciation, and use

OPERATIONAL MEMORY – actions, skills, movements, operations and procedures.

EMOTIONAL MEMORY – There is a fast channel to memory, triggered by adrenaline in the a2b-adrenoceptor in the amygdale.

FACE MEMORY – a specialized type of memory used in recognizing the faces of friends, family and other people

CONCEPTUAL MEMORY – items by their concept

DECLARATIVE MEMORY – factual memory

SEMANTIC MEMORY – memory of meaning, groupings, schemas, etc.

SPATIAL MEMORY – movement, arrangement or placement, orientation, path or navigation

Related items are easier to remember as a group. This probably relates to our ability to track a large number of varied relationships and keep score.

Central to mental operations; special tasks. Seemingly, there are a large number of specialized memory – some for important tasks, other for kinds of relationships. Memory operations can be voluntary and involuntary. Recognition – similarity resonance, matching ways to match is involuntary. Encoding is largely involuntary, although many voluntary techniques are practiced. Recall is involuntary and voluntary. Holding is involuntary. Overall emotions fade; few emotional tones are recalled.

see also *encoding, episodic memory, faces, guided recall, identity, lexical memory, mirror neurons, operational memory, prosopagnosia, recall, selective recall, semantic memory, sleep*

associative symmetry

Under certain circumstances recall of associations can be accomplished backward just as easily as forward. Direct violation of encoding specificity.

auto-associative memory

based reasoning

see *exemplar based reasoning.*

storage hierarchy

Divided by *longevity* there are at least four types of memory:

SENSORY MEMORY – not a true sense of storage (it has fast delay), but the ability for a sense to hold ('buffer') a sensation or perception.

VERY SHORT-TERM CONCEPTUAL MEMORY – Fast access to recent items, used to conceptual and 'think about' things. Supports understanding and thoughts

SHORT-TERM VERBAL MEMORY – fast access to words heard a moment ago. Similar to a loop-record, used to understand what is being said/read. Comprehension of verbal information. Hold items for about 2 seconds, then decays over the next 30.

LONG TERM MEMORY. These depend on the kind of memory

learning to categorize

Learning of defining features

Characteristic features (probabilistic)

Prototyping abstraction

Exemplars.

Don A Norman, DG Bobrow "Descriptions: An intermediate stage in memory retrieval" Cognitive Psychology **11** *(1979) p107-123*

linking

How are memories linked together?

- Special memories
- Linkages within each that cross stimulate?
- There are encodings for these but we have little other published info

Recall and similarity (esp. looking identical) aren't enough; an extra link of identity is needed. This small linkage between memories can be broken – or just the link for s a single "item". Link of areas in emotion and ability to form new memories.

failures of memory

1) Transient nature
2) Absent mindedness as interference of attention and memory
3) Blocking – improper encoding, or active block to prevent retrieval
4) Misattribution
5) Suggestibility
6) Bias
7) Persistence
8) Interference – retroactive interference and proactive interference.
9) Reconstructive nature of memory

elaboration

To increase a subject's memory, have them elaborate on the material to be remembered.

nutrition

Cutting calories improve memory, esp. in elderly: functioning, health, insulin levels improve.

method of loci

A visual place (or setting) with the key elements to be remembered located there. Conceptual blending is one attempt to describe this.

See *grid cells, spatial cells*

narrative

narrative and memory

duration and intensity are encoded differently. For most memory is more sensitive to encoding of intensity.

interference

It is possible to alter memories so that they are inaccurate or misleading. This can be retroactively – for memories that are already formed, as well as for new memories.

One method is thru recall, and during re-encoding intro a beta-blocker.

Summary: Memories of interactions are modified or altered to fit beliefs or stereotypes

McFarland, C.; M Ross, "The relation between current impressions and memories of self and dating partners." 1987 Personality and Social Psychology *Bulletin* **13***(2) p228-238*

performance characteristics

Chunk: "a maximal familiar substructure of stimulus"[8]

Capacity: Number of chunks given that the can be successfully recalled (e.g., may be done by reading the chunks, the asked to repeat them)

Memory Type	*Code Type*	*Capacity*	*Retention period (Decay*	*Concept attainment*[9] *rate*

[8] Simon, H.A. (1995) The Science of the Artificial.

[9] Gregg, L; Simon, H.A. (1967, June) "Process Models and Stochastic Theories of Simple Concept Formation". *Journal of Mathematical Psychology* 4:246-276. Reprinted in *Models of Thought,* vol 1, chapter 5.4
Newell, A; Simon, H.A. (1967) "Overview: Memory and Process in Concept Formation" *Concepts and the Structure of Memory.* B. Kleinmuntz (ed) (New York: Wiley), Chapter 11, p 241-262

		(Chunks)	*Rate)*	
Long Term	Semantic			
New type of chunk				8 [8 - 15] sec / chunk[10]
Chunk fits a learned pattern				1-2 secs / chunk
Working	Sensory		7 [5 - 226] Sec	
Uninterrupted		7 [5 - 9][11]		
Interrupted		3 [2.5 - 4.1][12]		
I			73 [73 - 236] Sec / 1 Chunk	
			7 [5 - 34] Sec / 3 Chunks	

spontaneous recovery	Memories that appear to be lost forever are not always lost.	
tasks	Acquisition: gets information Retention: maintain information in memory Retrieval: recall the information Cue specificity: taxonomic categories, thematic categories (it is believed that memory is often recoded as part of maintenance)	*DG Bobrow, Don A Norman, "Some principles of memory schemata" in* Representation and Understanding: Studies in Cognitive Science*. (Bobrow & Collins Eds) New York: Academic Press 1975*
transfer and interference	Negative: learning one item makes it harder to learn another item. Retroactive interference: new learning interferers with what is already known Proactive / positive: A beneficial effect of some learning on later learning.	
transactive memory	Shared memory with other people keys to trigger recall.	*Daniel Wegner University of Virginia*
mental abilities Guilford's model	Operations: Evaluation, convergent production, divergent production, memory, cognition Contents: visual, auditory, symbolic, semantic, behavioral Products: units, classes, relations, systems, transformation, implications	*Guilford, JP 1939* General Psychology. *Princeton, NJ. Van Nostrand Reinhold* *1959. "Three faces of intellect."* American Psychologist ***14****, p469-479* *1985. 'The structure-of-intellect model." In BB Wolman (ed)* Handbook of intelligence: Theories, measurements, and applications*. New York, Wiley.*
mental model	An interlocking network of concept that explain and unify known facts. Integrates sensory information. Structural correspondence to the situation it represents. Consists only of elements that correspond to perceptible entities. (No free variables?) See also *concept, schema*	
mental spaces	Gilles Fauconnier. Strengths: "reference, descriptions, and coreference" Frames. "Entities in the mental spaces are *the roles* defined by ICMs and frames and the values for those roles." "possible-world – a state description, a set of entities and the properties and relations that hold them in that state. " "situation – a partial state description"	

[10] Bugelski, B.R. (1962) "Presentation Time, Total Time, and Mediation in Paired Associate Learning", *Journal of Experimental Psychology 63:409-412*

[11] Miller, G. (1956) "The Magical Number Seven, Plus or Minus Two" *Psychological Review* 63:81-97

[12] Waugh, N.C., Norman, D.A. (1965) "Primary Memory" *Psychology Review* 72:89-104

methods

Careful parsing — *Scott Turow, One L*

"literal, linear, step-by-step process of thought"

"Highly structured problem solving method:

- "sorting thru details
- "moving outwards toward the broadest implications"

It is a:

- A process of analysis
- Set of rules
- Strategies of legal argument: reasoned, consistent, progressive in its logic

"The way each fact relates to the controlling principle"

"Reconcile the decisions –

- "To explain the ways that seemed to establish consistent principles of interpretation, and
- "To accord for differences through the varying circumstances and facts of each case."

mimicry

A part of a fast learning process, following a leader (who is said to know better or have better access)

motor mimicry

mirror neurons

Recognizes facials cues, body language. Trigger sympathetic involuntary responses that mimic other (e.g. yawning) as well as allowing us to repeat actions (mimicry). Fire when others perform actions. Perhaps structures in emotion area. Aid in recognition *noisy* or ambiguous speech by keying off of facial movements. Repeated imagining practice is almost as good as real practice.

See also *mimicry, spindle cells*

misattribution of arousal

Similar to post-hoc ergo hoc & halo effect. Good / bad experiences reflect on associated item, people, etc. even though it may not be logical.

See *attribution, happiness*

misdirection

One of the means to suspend disbelief, but requires some compliance.

- Psychology and understanding assumptions
- Challenging assumptions
- Understanding suggestions
- Being aware of signs, signals, and symbols
- Emotional affect of color, black and white, contrast

Building (laddering): successively establish more compliance and misdirection as the presentation goes on.

See also *color temperature, rhetorical structure*

models

"When people write computer programs to model human behaviour they do not construct all possible programs. They construct those programs that seem to them to be intuitively reasonable. This statement is by no means confined to theories stated as computer programs." — *Edward Buzz Hunt.*

Monty Hall problem

Added choices and information (seemingly content free) can change expected values differently than intuition would suggest.

See also *decoy effect*

morality

Attempts to explain morality thru experiments. Morality appears to not be built on reason nor emotion – there are times they differ from the moral choices an

functional — individual makes.

behaviour — Most people cheats a little bit – without consideration of the economics of "how much can I get away with?" This cheating is reduced if a person considers a moral code (even one that is not their own) a short time before – e.g. recall the 10 commandments, sign an honor code, etc.

structure

1) Harm and care for others
2) Fairness and reciprocity
3) In group and loyalty
4) Authority and respect
5) Purity & sanctity (include. Purity of food)

Liberalism places the first tow as more important, and the other 3 against freedom. Conservatism sees the other three as important, the first two as immoral. The items can combine in good and bad ways; Religion may be a combination of these. These affect the conception of rust. Outsourcing costs to others (choice: "I want to benefit, but I want others to suffer") Exaggerated difference

When seeing a person of the same group cheat, cheating will go up.

When seeing a person (of other group) cheat, cheat remains low.

motivation

- Simple internal drives: an internal state of tension that motivates engagement of activities.
- Incentives and external drivers
- Goal directed behaviour[13], decision making. Perception and structure of alternatives – actions, achievements, the personal value of getting things done.
- Complex socially-influenced motivations (which don't easily fit into the above)

see also *reward, sensation seeking*

Bolles, RC, 1975, Theory of Motivation*, Harper & Row (New York)*

McClelland, DC, 1975, Power: The inner experience*, Irvington (New York)*

Skinner, BF, 1953, Science and Human Behaviour, *(New York)*

Table 12: Complex socially-influenced motivations

▪ Abasement	▪ Defendance	▪ Order
▪ Achievement	▪ Deference	▪ Play
▪ Affiliation	▪ Dominance	▪ Rejection
▪ Aggression	▪ Exhibition	▪ Sentience
▪ Autonomy	▪ Harm avoidance	▪ Sex
▪ Blame avoidance	▪ Avoidance of humiliation	▪ Succorance
▪ Counter action	▪ Nurturance	▪ Understanding
		▪ Self-actualization

Murray, Henry A, 1938, Explorations in Personality*, Oxford University Press (New York)*

[13] Atkinson, John W; D Birch, 1978, *Introduction to motivation*, Van Nostrand (New York)

achievement motive	Need to master difficult challenges, to outperform others, to meet a higher standard of performance. The relative effects include: ▪ Work harder with persistence[14] ▪ Delay gratification[15] ▪ Competitive occupations[16] ▪ Career Success and Social Mobility[17] ▪ Relationship with society, organizations[18] – if the motivation is broad – the average need for achievement is 'high' across the society or organization – the society will be marked with progress and productivity. ▪ Situational influences[19] – the long-term strength of personal achievement motivation. Task-specific probability estimate of success. Task-specific rewards, tangible and intangible. ▪ Seeking to avoid failure[20] – can produce achievement, cause avoiding taking risks.[21] ▪ Seeking to avoid success – fear of social rejection, gender roles, equally distributed among men and women. See also *competition*	*McClelland, DC; John W Atkinson, RA Clark, EL Lowell, 1953,* The Achievement Motive*, Appleton-Century-Crofts (New York)* *McClelland, DC, 1985, "How Motives, Skills, and Values determine what people do,"* American Psychologist ***40*** *p812-825*
affiliation motive	The need to associate with others and maintain social bonds (join groups, make friends, love) See also *cooperation, relation, social networks*	
contingent motivation	Only have intended effects when subject has very little cognitive skill. The connection between reward is very simple if-then-else : If you do X you will get reward Y. More contingent motivation (reward) → worse result. Intrinsic reward vs extrinsic reward. Only some types of contingent reward are good motivators. Falls apart if two different things work together. (e.g. do it for both money and morals). Falls apart if complex circumstances requires conceptualization and creativity. Money at work has an effect only if you don't pay people enough; once that threshold has been reach other factors apply.	*Ariely Dan, 2005 July, Federal Reserve Bank of Boston No 05-11*

[14] French, EG; FH Thomas, 1958, "The relation of achievement motivation to problem-solving effectiveness," *Journal of Abnormal and Social Psychology* **56** p46-48

[15] Mischel, W, 1961, "Delay gratification, need for achievement, and acquiescence in another culture," *Journal of Abnormal and Social Psychology* **62** p543-552

[16] McClelland, W, 1965, "Achievement and Entrepreneurship: A longitudinal study," *Journal of Personality and Social Psychology* **1** p389-392

[17] Crockett, H, 1962, "The achievement motive and differential occupational mobility in the United States," *American Sociological Review* **27** p191-204

Veroff, J; John W Atkinson, S Feld, G Gurn, 1960, "The use of thematic apperception to assess motivation in a nationwide interview study," *Psychological Monographs* **74** (12 Whole No 499)

[18] McClelland, DC, 1961, *The achieving society,* Van Nostrand (Princeton, NJ)

deCharms, R; GH Moeller, 1982, "Values expressed in American childrens' readers: 1800-1950," *Journal of Abnormal and Social Psychology* **64** p136-142

[19] Atkinson, John W, 1974, "The mainsprings of achievement-oriented activity," In John W Atkinson, JO Raynar (Eds), *Motivation and Achievement,* Wiley (New York)

Atkinson, John w, 1981, "Studying personality in the context of an advanced motivational psychology," *American Psychologist* **36** p117-128

[20] Atkinson, John W; D Birch, 1978, *Introduction to motivation*, Van Nostrand (New York)

[21] Atkinson, John W,; GH Litwin, 1960, "Achievement motive and test anxiety conceived as motive to approach success and to avoid failure," *Journal of Abnormal and Social Psychology* **60** p52-63

Weiner, B, 1978, "Achievement Strivings," In H London, JE Exmer (Eds) *Dimensions of Personality,* Wiley (New York)

creativity motive — Creativity motivation

intimacy motive — The need to have warm, close exchanges with others, marked by open communication. An important component of affiliation.

See also *cooperation, intimacy*

McAdams, Don P, 1980, "A thematic coding system for the intimacy motive," Journal of Research in Personality **14** *p413-432*

1982, "Intimacy Motivation," In AJ Stewart (Ed) Motivation and Society*, Jossey-Bass (San Francisco)*

at work — self satisfaction an purpose: autonomy (self-direction), mastery, purpose.

Money at work

motor centers — The motor planning and control portions of the brain fire mimicking actions a person *sees* or *visualizes* (imagines, or dreams). There is some sub-threshold motor signals at the muscles. There is no evidence if this is sympathetic activation or serves a critical role.

multi-attribute utility theory — tradeoffs with different goals

see also *decision making*

multiple sclerosis — Disease of nerve destruction of myelin sheath, lesions. May be immune response to viral infection.

music — Listening and infer what notes are being played and how

name — Fanciful appellation, nom de plume, nom de guerre, stage name, identity

narcolepsy — Emotionally laden events trigger sudden cataplexy.

narrative
importance of — The importance or utility of narrative & myth – stories we want to believe. These are more compelling than "messy" data (one would come to differing conclusions). How is the expository developed?

- Use of significant action
- Direct analysis of the character
- Dialogue, speeches, interviews
- Physical details and images
- How are these blended? (Is individual in relief against society?)
- Depth and flux – major changes, attitude changes, etc.

See also *dialogue, message flow, story telling*

naturalness principle — Matching the properties of the representation with the properties of the thing being represented aids experimental cognition

See also *physical design*

nature
values one — Categories of values on nature:

1. Utilitarian
2. Naturalistic
3. Ecologistic-scientific
4. Aesthetic
5. Symbolic
6. Doministic (challenge, e.g. Teddy Roosevelt)
7. Humanistic
8. Moralistic
9. Negative
10. Theistic

Kellert, Stephen 1980. "Knowledge, affection, and basic attitudes toward animals in American society" Superintendent of Documents, US Government Printing Office, Washington DC, 162pp

navigation — Some ants appear to be guided by the Sun & have step counter; this allows them to return home. Walk N steps then hunt for home. Issues include: orientation, relative position, path traveled,

See also *bees, grid cells, planning, spatial cells*

necromimesis A delusion that you are dead – no evidence (eg listening ones heartbeat) will convince the person otherwise

See also *identity*

nervous system
central response system

Responsible for cognition – thinking, feeling, fantasies. Consisting of the brain, spinal cord and neural structures therein, it interfaces with body – enhancing, inhibiting, interpreting information. It works thru the somatic system.

see also *brain, emotion, hormones*

definition

After nerve damage or infection (eg post-infectious brain disease), there can be further damage to the nervous system by immune system response. (eg multiple sclerosis)

peripheral response

Provides the senses to the central response system. This consists of everything outside the CNS; it includes the somatic and automatic nervous systems.

somatic system

Body surface information – touch, temperature, pain, pressure. It controls voluntary muscles and movement.

sympathetic system

Meets physical and emotional emergencies or stresses. This is autonomic, including fight or flight arousals. The endocrine system is influenced by this.

para-sympathetic system

Primarily controls the internal reflex system. It works when the body is calm – ie not overridden by the sympathetic system – for the standard operating procedures.

neural cliques

Groupings of neurons that respond to different aspects of an event, range from the selective & specific, to the general and abstract. These cliques are likely used as part of the encoding of memories. Free running (e.g. during sleep), the cliques fire in the same sequence as an event during the day, but with decaying intensity.

See also *encoding*

neural networks Two neural networks: one for the easy to spot spam; a second for all the ones that the first misses.

neurogenesis

Exercise and some hormones (e.g. prolactin in women) leads to some nerve cell creation in the dentate gyrus (in the hippocampus). Stress (and hence depression) kills nerve cells – especially the newly forming ones. This region is associated with learning and memory in later life; nerve cell growth is associated with learning.

See also *hippocampus*

Columbia University and the Salk Institute for biological Studies.

Daniel Peterson, Rosalind Franklin University of Medicine and Science.

neuron doctrine network structure, glia is most of the cells in the brain. Glia controls sleep, critical periods of learning.

neuron

The elementary unit of processing in the nervous system. Specialized. The integration of synaptic potentials can be additive or multiplicative, depending on synaptic geometry and ionic conductance. Most connections are between, not within, neuron classes (cliques). The integration of synaptic potentials can be additive or multiplicative depending on the synaptic geometry and ionic conductions.

$\sim 10^{12}$ neurons, 10^{15} synapses
Activation potential lasts ~1ms
Synaptic transmission ~5ms
Transmission velocity in myelinated axons: 10-100m/s
In unmyelinated axons < 1m/s
Synaptic potential lasts 1ms to 1min

signal type

leading edge: the time it takes for element to fill with electrons

signal decay: due to migration of electrons: always present; momentum, photoelectrical involvement, other

trailing edge: the time it takes for elections to be removed from the element.

Each has a characteristic frequency range from 0-200hz ie max 200 bits/sec per neuron. Signals could not possibly be sent serially unencoded?

normative

Can be an overly strong, idealized process; more than a few such techniques do not work in theory (let alone practice). The archetypical normative description employs formal logic, math or graphs; is regimented, and prefers pedantically narrow definitions and 'strong' compliance checks or specifications, such as ordering, invariance, and so forth.

Fewer still – *if any* – normative techniques work over a broad range of problems, with varieties of available information, veracity and accuracy.

See also *rationality (bounded)*

note taking

Comprehensive, organized, easy to review not taking helps improve cognitive of subject, and learning

M P Ryan "Conceptual Models of Lecture Learning Guide Metaphors and Model-Appropriate Notetaking Practices", Reading Psychology, *Oct 2001 p 289-312*

N Purdie, J Hattie, "The Relationship between Study Skills and Learning Outcomes: A Meta-Analysis" Australian J. Education, *Apr 1999 p72-86*

F J DiFesta, G S Gray, "Listening and Note Taking J Educational Psychology, *Feb 1972, p8-14*

Keiichi Kobayashi, "Combined Effects of Note-Taking/Reviewing on Learning and the Enhancement through Interventions: A Meta-Analytical Review," Educational Psychology, *June 2006 p 459-477*

nouns

Nouns and how brain thinks

number scramble

A pile of digits 1 thru 9; can only pick a number each turn. First with 3 numbers that sum to 15.

4 9 2
3 5 7
8 1 6

object classification
noun

The mind represents objects as human and non-human. Non-human objects are classified with three dimensions, based on what they related to: eating, shelter, and the way the object is employed. Each dimension induces activity in a specific brain region.

http://thetartan.org/2010/2/8/scitech/brainnoun

see also *communication classes*

oculesics

The study of eye contact and pupil dilation indicating their degree of interest, openness and arousal. See also *vision*

ontology

The more detailed, expressive are applicable to fewer than a spare one would be; hard to find people to properly review it.

operational memory

aka *procedural memory, motor memory*. Memory that stores actions, skills, movements, operations, schema (organized cluster of knowledge about a sequence of events), and scripts (organized knowledge about a common activity) taken. Schema organized cluster of knowledge about a sequence of events. Script: organized knowledge about a common activity. What happened: structural code. Schema memory: how to

See also *hippocampus, process learning*

opinion

See also *sentiment analysis*

opsin

The family of proteins related to light sensitivity in the eye

optimism

The role of optimism includes:

Allows us to take risks, sometimes with less hesitation

Allows us to get past skepticism, fears, conservatism, and other risk aversions

Reduces deleterious stress and other chronic issues

Allows faster response than those needing more evidence; a well-functioning optimist, upon receiving contradictory evidence that clearly implies something different, backtracks and quickly recovers.

Can be very socially pleasing.

There appears to be a gene tat helps promote optimism.

oxytocin peptide

Receptors in very old parts of brain.

See *breast feeding, hormones (oxytocin)*

pain

An intentional act hurts more than an accident. An accident's pain goes away with time, and hurts less with recurrence. Pain intentionally inflicted on another does not – or is very slow to do so.

To reduce pain, progress from more sensitive areas (e.g. the face) to less sensitive ones (e.g. legs), giving a sensation of progress. Take breaks: long periods of low intensity pain is better than short bursts of high intensity. End on very low pain intensity.

see also *stress*

pain memory

Encoding of pain experiences have a weak link with time and duration memory. Memory encodes intensity differently than duration – it is better to have a long time of low intensity pain than short bursts of high intensity pain. (The most painful moments are recalled as most typical). Sensitive to serial position effect, specifically the pain intensity at the end of the event.

Pain memory can be altered (see *memory)*

paradigm

cliché term that means a school of thinking, an approach, system or methodology. Some observations about paradigms include:

- "Paradigms are difficult to explain, and difficult for individuals outside the paradigm to understand.
- "Paradigms can not be proved or disproved by a single crucial experiment, but must be judge by accumulated evidence.
- "Paradigms tend to be championed by a small group in the face of opposition from the larger community; they gain ground very slowly until the entire community adopts the new paradigm in a scientific revolution."

Fox, Christopher; William Fox. "The Quality Approach: Is it delivering?" Communications of the ACM. *June 1997, V40N6 p25*

paradoxical vection

Conflicting sensations of self-motion and immobility. This is one of the reasons that subjects in simulators get sick.

paralysis

See *multiple sclerosis, nerve damage*

Parkinson's

defect in alpha-7 nicotinic acetylcholine receptor, nicotine is a nicotinic agonist, and helps reduce symptoms.

partially decomposable

Break it down into a smaller problem, solve that, use that solution/those solutions to solve the bigger one.

passion

Motivation, challenge, flow, random reward, self-visualization

pattern recognition

Grammars, decisions trees ('trie's), adaptive resonance theory.

Little algebra glossary

Audjaciez grammar.

Tries: if X==B → do Y, advance to next item in sequence, goto rule N; else goto Y

see also *adaptive resonance theory, Chomsky Hierarchy*

peptide Crh

The release of peptide Crh in the brain associated with stress and anxiety. The number of active receptors is proportionally related to the anxiety level. There are some drugs that block the receptors, reducing anxiety.

perceived value

Affected by price. See also *compliance, condition*

perception

A response time of:

10^{-1} seconds: perceived as instantaneous
10^{0} seconds: the limit to keeping the user uninterrupted; loses the feel of working directly with data
10^{1} seconds: limit of keeping attention on the task; focus wanders to other tasks.

Smooth instantaneous response may produce what some have called a drug-like response. The person is relaxed and unaware of the passage of time.

See also *flow, judgment*

perceptual principle

When the mapping between the thing and its representation is natural – analogous to the real perceptual and spatial environment – are preferred over other representations.

performance

Performance of task/event X combines

- Ones preferences about X,
- Beliefs about how one should do (and does) X, and
- The ability & opportunity to do X.

personality

There may be a basis for broad personality traits rooted in dominate neurotransmitter systems.

categorized

1. forceful, direct, competitive, results oriented
2. optimistic, fun, warm, enthusiastic, talkative
3. steady, patient, relaxed, slow to change, not risk-takers
4. Precise, accurate, cautious, conventional, diplomatic, detail-oriented

People will first look for someone with a similar style before buying. People will open up about their true wants once there is a reasonable degree of trust built.

major traits

Openness to new experience. See *moral structure*

Conscientiousness, extroversion, agreeableness, neuroticism

Risk tolerance, sensation avoiding, sensation-seeking

hormone model

4 hormones seems to be related, and one may drive personality more than others: *Helen Fischer, Lucy Brown*

- dopamine: creative, curious, spontaneous, energetic, novelty seeking, risk taking, mentally flexible
- serotonin: builders, conventional, traditional, cautious, frugal, follow rules, respect authority, detail oriented, loyal, modest
- testosterone: analytical, decisive, tough minded, skeptical, math, engineering, mechanics
- estrogen: compassionate, verbally skilled, social skilled, emotionally expressive, intuitive, imaginative, sees big picture

Dopamine driven prefer relationships with dopamine people. Serotonin prefer relationships with serotonin people.

Testosterone match well with estrogen people; vice versa

personalization

Used to store extended user information. 1. Dynamically building profile about user. 2. storing profile, in any data store. How to use later to learn about population.

persuasion

Keys to significantly changing the thinking or opinion of an audience, that work together individually or together: *Howard Gardner,* Changing Minds, *2004 Harvard Business School Press*

- Appeal to reason,
- Research: presenting relevant data,
- The view or idea has some *resonance:* it seems right
- The ability to described and represented in a number of forms, each reinforcing the others
- Inviting reciprocity by giving rewards, resources or gifts
- Real world events
- Resistances

See also *dialogue*

factors	A presenter is encouraged to make himself presentable, and 'size up' his audience: ▪ Credibility – signaling by expertise, experience;[22] Credibility is improved when mentioning an issue has several sides[23] (even if they are not elaborated) ▪ Likeability ▪ Physical Attractiveness[24] ▪ Matching[25] – how similar is the other part to us? ▪ How flexible is the audience on its attitudes? ▪ Is the audience educated on the issue? ▪ What is the audience pre-disposed to? See also *creative personality, relationship*	
one-sided messages	One sided messages work only if the audience is uneducated about the issue, or they're pre-disposed to your point of view.	*Loumsdaine, A; I Janis, 1953, "Resistance to counter-propaganda presentation,"* Public Opinion Quarterly, ***17*** *p311-318*
fear arousal in persuasion	Fear-arousal is successful when structured as: ▪ Consequences are exceeding unpleasant ▪ If warning is ignored the outcome is very likely ▪ It is avoidable if the advice is followed See *ideology*	*Leventhal, H, 1970, "Findings and theory in the study of fear communications." In L. Berkowitz (ed)* Advances in experimental social psychology, *Vol **5** Academic Press (New York)* *Rogers, RW, 1975, "A protection motivation theory of fear appeals and attitude charge,"* Journal of Psychology ***91*** *p93-114*
rhetorical questions	Rhetorical questions are useful only when the audience is neutral and the argument is very strong. Otherwise, draw conclusions for the audience.	*Petty, Richard E; John T Cacioppo, 1986, "The elaborate likelihood model of persuasion," In L. Berkowitz (Ed)* Advances in experimental Social Psychology, *Vol **19** Academic Press (New York)*
latitude of attitude[26]	Latitude of acceptance is the range of potentially acceptable positions on an issue; it is centered on an initial position. Persuasion is more effective if the arguments and desired conclusions fit within the audience's latitude of acceptance (see also *complexity horizon)*. Arguments outside the latitude area are unpersuasive no matter how good they are. See also *anchoring effect, Bayesian, character*	
social judgment	People are willing to consider alternative views, if they are not to dissimilar to their own.	*Sherif et al 1961,* ibid *Upshaw 1969,* ibid
phantom limb pain	Almost always linked to missing lower limbs	

[22] Hass, RG, 1981, "Effects of source characteristics on cognitive responses and persuasion." In RE Petty, TM Ostrom, TL Brock (eds) *Cognitive responses in persuasion,* Erlbaum (Hillsdale, NJ)

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Atkins, A; K Deaux, J Bieri, 1967, "Latitude of acceptance and attitude change: Empirical evidence for a reformulation," *Journal of Personality* **6** p47-54

plan

A sequence of states and actions

[S0, a1, S1, a2, … Sn-1, an]

All of the preconditions of an are satisfied in Sn-1

If a strict sequential plan, All of the effects are An are true in Sn

Otherwise, Each of the effects of An are true are some point m >= n in Sm.

planning notebook

"A thick loose-leaf notebook with tabs for every conceivable issue. It [is typically] full of advance planning, anticipation of possible contingencies, specification of goals and objectives, identification of means of achieving the goals, estimation of resources required, timelines, and assignment of responsibilities."

Summary: The direction and bureaucratic organization under various presidents made the US, in the past, better defenders of the nation despite the limits and weaknesses of the system and the people involved.
Clarke, Richard Against All Enemies *2004 p197*

posture

particular attitude; way of behaving to convey (perhaps falsely) an attitude or disposition

practice effect

Skill improves with the number of trials, following a power-law relationship. With many kinds of tasks there appears to be plateaus of performance, possibly reflecting a change in the dominant underlying system (i.e. in different regimes). Implies different types of memory. Control loop tuning.

See also *learning*

10,000 hours

There is an old folk belief that 10,000 of deliberate practice leads to mastery. This is not likely true:

"proposed that individual differences in performance in such domains as music, sports, and games largely reflect individual differences in amount of deliberate practice, which was defined as engagement in structured activities created specifically to improve performance in a domain. This view is a frequent topic of popular-science writing—but is it supported by empirical evidence?.. We conclude that deliberate practice is important, but not as important as has been argued."

Deliberate Practice and Performance in Music, Games, Sports, Education, and Professions
A Meta-Analysis
Brooke N. Macnamara, David Z. Hambrick2 Frederick L. Oswald
http://pss.sagepub.com/content/early/2014/06/30/0956797614535810.abstract

prediction

Poor at predicting future satisfaction with choices. In these cases use other experiences. Stylized rules for mathematical prediction.

see *prognosis*

preference

not an absolute requirement

press book

A type of advertising which tells reviewers, columnists, etc what to say.

price

"Economic theory says that when an individual's choice damages others' interests, that damage should be reflected in the price he faces."

"What price carbon?" The Economist, March 17, 2007

People really do enjoy products more when told they are more expensive. Price may serve as a proxy for quality or how good a thing is. (e.g. via market forces or display behaviour marketing)

See also *Bayesian, choice function, cost, perceived value, two-sided business*

priming effect

A stimulus affects interpretations of later stimulus. Giving a warm object spurs interpersonal warmth. Cold items spur interpersonal coldness.

prior

Prior knowledge or prior state of probabilistic inference.

probability

Some factors in a problem, context or environment encourage Bayesian Reasoning. People are *not* Bayesian: they have difficulty combining a sequence of events to judge or estimate its probability. People make a distinction between internal and external uncertainty.

Tom Griffiths (Brown University), Joshua Tenenbaum (MIT) in Psychological Science (2006), asked how Bayesian people are

problem solving and puzzles

Types of puzzles and problems. Inducing structure – the relationship among elements – arrangement, and transformation.

classes of problem

Well-defined: set of criteria, proposed solutions must meet criteria to solve problem.

Open-ended: belief that improvement is possible. Discovering criteria is often a part

	of the problem.	
defining a problem	Requirements: criteria that must be met Domain Effects to product What to configure	
types of problem solving	already knowing the solution; already knowing the solution to another problem.	
steps to solve a problem	Steps to solving a problem: 1. State the problem broadly: where you are and what your goal is 2. Get the facts. Investigate implied facts as well 3. Focus on the important facts: facts that must constraint the research. In pedagogy, these are often the given information and the goal. 4. Generate ideas and hypothesis. These early ideas and hypothesis guide further fact gathering (e.g. via tests and experiments) 5. Choose the best idea. Include criteria to evaluate idea.	*Anderson, BF, 1980* The Complete Thinker, *Prentice-Hall (Englewood Cliffs, NJ)*
well-understood problems	Solutions to well-understood problems tend to be procedure oriented	
hard problems	Solutions tend to be search based	
problem decomposition	pulling apart a problem into a recipe or formula we know how to solve. see also *AI*	
procedural memory	See *operational memory*	
proceduralization	Translating verbal knowledge into procedures	
process learning		
procrastination	People procrastinate (more) when they think abstractly (or view task in an abstract terms) than when given a concrete task. Why procrastinate? ▪ Low confidence of success in task (e.g. perfectionists or depressed) ▪ Impulsive or lack self control ▪ Deferring the unappealing, difficult, or expensive ▪ Presentation of concreteness	*Dr Sean McCrea et al, University of Konstanz, Germany, in Psychological Science 2008*
product design behavioral	The four components include function, understandability, usability, and physical feel. see also *design, usability*	*Don Norman*
production model of reasoning	A long list of if X is true, then you can do Y. A person winnows down the list to a few options and selects from those. Production rules are very similar to decision trees – the productions are simply a flat table – and can be converted into a decision tree. The Rete algorithm is the most common such procedure. Some relational Horn (CNF) clauses can be translated into productions. And some, but not all, productions can be treated as Relations and/or Horn clauses.	
projection	ability to imagine location, circumstances, blend, mappings	
prosopagnosia face blindness	The inability to form memories about facial details, or to recall details about a face (or only blurred features). This does not extend to other features about objects or bodies, indicating that the brain localizes special facial memories and recognition, allowing the area to become damage, disease, or ill-formed. There has been some	

confirmation with functional MRI to map the "fusiform face area."

see also *face, identity, memory, vision*

prospect theory

People evaluate and compare outcomes in terms of *potential use (utility)* of each outcome, rather than money. Parameters:

- v(x): the subjective value for outcome x; x can be an event, something like receiving $100.
- r: reference level that acts as neither a gain nor loss; a gain is when x > r, and a loss is when x < r. This might be a ranking or an ordering of possible outcomes.
- a function that assigns probability weights to objectively stated probabilities

see also *behavioural economics, endowment effect, protein.*

Kahneman, Daniel; and Amos Tversky, Prospect Theory: An Analysis of Decision under Risk Econometrica*, XVLII (1979), 263-291*

physiological basis

This has some neurological support:

- The ventromedial prefrontal cortex code for decision making & learning in gain/loss contexts
- The ventral striatum handles learning, motivation and reward.
- Dopamine neurotransmitter associated with motivation and reward.

The key is the differences in neurotransmitters

- An increase of potential gain increases activity in the mesolimbic and mesocortical dopamine systems.
- An increase of potential loss decreases the activity.

People differ in how much a gain corresponds with a increases in dopamine, and how much of a loss corresponds with a decrease. This implies context-sensitivity: the same set of losses and gains may be viewed (in most people) differently based on their sequence; in some people, this cycle of dopamine may not meet the criteria of a "reversible process." Dopamine production is sensitive to protein intake as well.

Summary: fMRI analysis of loss-gain gambles correlated with dopamine activity

Poldrack, Fox, Sabrina M. tom, Chrisopher Trepel, "The Neural Basis of Loss Aversion in Decision-Making under Risk" Science *January 6, 2007),*

prosperity effect

Prosperity makes the time spent on a walk in the park more expensive (taxing), and sometimes people try to do too much

protein

Increasing protein in a diet reduces the desire to eat – and it speeds up and prolongs the feeling of being sated. Peptide YY is important.

Pygmalion effect

This term seems to be used confusing several things.

- The Greek Pygmalion sees his creation as the most wonderful in the world, and "loves" it to the exclusion of all else. (This is akin to *narcissism* where someone loves himself to the exclusion of all else – a common phenomenon).
- The George Bernard Shaw play, *The Pygmalian*, (and the slightly different musicals and movies *My Fair Lady*) is about a narcissistic linguist who 'creates' an upper class lady, falling in love with his creation. But the play's emphasis was the British class system, how it quickly pegs a person – in this case, as a tramp, an academic, or a princess –seeing that person completely differently from their capacity or potential ('judging a book by its cover').

see also *experimenter bias, QA system*

Summary: bias by telling teachers that one group is smarter than the other; 'testing' of the group wound up showing this.

Robert Rosenthal, Lenore Jacobsen, Pygmalion in the Classroom *Irvington, Reissue in 1996 work done in the 1960s*

race identification

Can be rebranded by making other badges of allegiances prominent. Perception of self and others shift in response to unemployment, impoverishment, and imprisonment

Andrew Penner Univ CA Irvine Alija Saperstein, University of Oregon

random dot motion

Dots randomly appearing briefly within a circle (with a slight bias in relative position) give rise to the distinct impression that they are moving. The predominate theory is that there are many neural groupings, some that dedicated to deciding there is motion to the right, and others that there is motion to the left. They do not look at the motion of the scene and come to a moment-by-moment judgment. Instead, they accumulate (or integrate) events that support the movement in their preferred

direction, once this "sum" exceeds a threshold; a conclusion of the movement is reached (suppressing the others). The higher the threshold, the more accurate, but the longer it takes to reach a conclusion – the amount of minute motion or the time before a subject reaches a conclusion can be used to calibrate an approximation.

rationality

See also *choice*

substantive rationality – the right course of action; adjustment to outer environment

Simon, Herbert The Sciences of the Artificial *1994*

procedural rationality – finding a good way of calculating where a good course of action lies; discover appropriate adaptive behaviour

bounded rationality

Emphasizes that people have limited mental capacity, training, memory and information gathering abilities, and that they stop seeking options when they find a satisfactory choice. This concept intends to replace the idealized economic actor seeking the optimal outcome in every decision, who possesses all information, all the skills needed, and unbounded mental capacity.

> "The meaning of rationality in situations where the complexity of the environment is immensely greater than the computational powers of the adaptive system."

Ibid

> "Rationality is effectively undefinable when competitive actors have unlimited computational capabilities for outguessing each other."

Evaluate against limited or very restricted objectives. Useful in "situations where the complexity of the environment is immensely greater than the computational powers of the adaptive systems."

Adaptive expectations "actors gradually learn about their environment from the unfolding events around them"

Docile individuals have advantage over those "who reject social influence." They "greatly enhance their limited knowledge and skill by accepting information and advice from social groups to which they belong." "Provides information and advice about the world that is generally valid, or much more informative and valid than the information could generate independently."

see also *behavioural economics, behaviour shaping constraints, coin systems, homo economicus*

real world problems

Lack a complete enumeration of relevant details and elements. There is a great deal of imprecision – information is vague, inaccurate, inappropriate or not useful. The facts change, so we often employ out-of-date information. The relevant information can take exponential amounts of memory, as our desire for detail, completeness, and extra amounts (just) in case are without bounds. Heavy processing for some problems.

Experts develop self-control to limit getting distracted by such problems.

see also *ACME, AMR, analogical reasoning, frame-based reasoning, small world assumption*

reasoning

see also *ART, case based reasoning, Exemplar based, Inference, recall & reconstruction, analogy, logic and math, intellect and association, judgment, intuition*

dampening reasoning errors with Bayesian

Subjectivism: Desire for it to be truth; prior probability bias

Relevance of premise

Appeal to authority: P(Authority), P(Authority|Topic)

Appeal to Majority: Prior probability bias

False alternative: very common.

recall

Recall of ordered sequence, clusters (related items in a group). Recall is more of an iterative reconstruction process. Recalled stories "were shorter, the phraseology more modern, and the entire tale more coherent and consequential than the original."

Norman, Donald Memory & Attention: an introduction to human information processing 1969, Wiley & Sons, p137

Much of memory involves a back and forth, building up a set of key features (cues) – by recognizing key elements, and discarding wrong ones – until the memory can be 'addressed.'

MD Williams, JD Hollan "The process of retrieval from very long term memory." Cognitive Science **5** *1991, p87-119*

Sensitive to how cues correspond to memory code (the encoding specificity)

see also *guided recall, memory*

RECALL – write down the items that were in the previous list

Roger Brown, David McNeill, The 'tip of tongue' phenomenon. Journal of Verbal Learning and Verbal Behaviour *1, 1966 (**5**) p325-327 1966 Academic Press*

FREE RECALL – write down the items that were in the previous list in any order you like

SERIAL RECALL – write down the items that were in the previous list in the same order as the original

ORDERED RECALL – write down the items that were in the previous list; the items can be reported in any order, but you must state the original order

PROBED RECALL – write down the items that were in the previous list, in response to cues

cues

Recall is dependent on how well the cues correspond to the memory *encoding*, or how specific the cues are. The cues include *Retrieval cues, content cues, context cues*. Affects availability of construction.

retrieval of lists

Retrieval of lists and sequences is effected by a serial position effect (better recall for items at the beginning and end of a list, than the middle), primacy effect (when items at the beginning are recalled better than those at the end), Recency effect (when items at the end are recalled better), clustering (recall of related items in groups). Links with intelligence.

reciprocity

Ask for a big favor and then ask for a smaller favor.

See also *compliance, priming effect, sharing, trust*

recognition

Recognition – 'which items in this list were in the previous list?'

Recognition is seldom a recall process, more of a resonance process.

Recognize sequences: memory, parsing grammar.

Finding a response to an external event: event processing techniques

see also *guided recall, identity, memory*

recommendation system

Similarity and construction

See also *ART*

reflexive response

regression

To an approximation form

regret
and choices

A persons regret over a choice appears to be linked to:

- How much personal responsibility did they have with the choice?
- How easy can they imagine a better alternative?

relational memory

A non-declarative, non-consciousness memory use. For example, remembering what goes where in the kitchen, without being able to consciously recall and paraphrase it.

Can be seen in eye movement. When removing an item from desk and asking subject what is different, they will be unable to recognize or explain, but their eyes will go to where the missing item was.

Requires time and sleep.

relationships

People can identify a large number of individuals, track relationship with each (including making moral judgments), even act despite a cost to oneself. This may be the origin of virtue (see *altruism)*. Competition and ranking against each other. Some things we track include family lineage, social networks, sexual, calling & networking trees. We make tools to help with this. This may also have a relationship with sensing otherness, display behaviour, and racism.

We seem to keep our circle of familiars or family to less than about 150. Once we've formed such a circle, we vet much more before allowing someone in. Web of relationships that foster trust, and help disseminate ideas.

see also *coalitions, identification, keiretsu, memory, social capital, systems of competition, systems of cooperation, trust.*

factors

There are four major factors:

- Proximity – How easy it is to visit one another; how easy it is to talk, communicate
- Matching – People become friends, married to those that are similar to themselves.[27] But, whose choice is the pairing?[28]
- Attitude similarity[29] – Similar attitudes are a good fit – they don't provide a cause to split or may even attract. Dissimilar attitudes are a barrier to overcome, and may repel.
- Reciprocity[30]

representativeness heuristic

"[Evaluate] the probability of an uncertain event, or a sample, by a degree to which is:

1. "similar to in essential properties to its parent population; and
2. "reflects the salient feature of the process by which it was generated."

Kahneman, Daniel; and Amos Tversky, 1972, p431

Tversky, Amos; and Daniel Kahnemann 1983 p295

This similarity is "the degree of correspondence between a sample and a population, an instance and a category, an act and an actor, or, more generally, between an outcome and a model."

see also *decision making (intuitive), heuristic, pattern matching*

reputational risk

"The more squeaky clean someone's image is, the more that can go wrong"

Robin Walsh, Lloyd's of London insurer Hiscox

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Rosenbaum, ME, 1986. "The repulsion hypothesis: On the nondevelopment of relationships." *Journal of Personality and Social Psychology,* 51(6) 1156-1166

[30] Byrne, D; SK Murnen, 1986, "Maintaining loving relations," In RJ Steinberg and ML Barnes (Eds), *The psychology of love.* Yale University Press(New Haven, CT.)

resilience	The capability to make realistic plans & take steps to carry them out. A positive view of yourself and confidence in your strengths & abilities. Skills in communicating & problem solving Capacity to manage strong feelings & impulses How-to : • See problems as surmountable • Move toward goals, regular steps, avoid the unachievable • Accept changes • Take decisive actions (rather than detach) • Look for opportunities of self-discovery • Positive view of self • Perspective • Hopeful outlook	
response set	Systematic tendency to respond in a particular way unrelated to the questions' content. see also *bias*	*John Alllen Paulos (1995)*
response time	The average delay between a transaction and the response	
perceived response time	The perceived response time is the 90th percentile (the duration that is more than 90% of all response times). Response times typically follow an exponential distribution, and the 90th percentile is 2.3 the average response time.	*Arnold Allen,* Introduction to Computer Performance Analysis with Mathematica, *Academic Press*
retinal signals	The eye appears to send the following signals to visual cortex: What areas have low or high contrast; what areas have an increase or decrease in contrast. The last two are used to detect movement.	
rewards	see *motivation (contingent)*	
risk	Estimating from variability	
sampling bias	Methodological flaw	
satiation	one of two satisfaction signals; an immediate reaction to eating food, a part of estimating potential satiety via sensory stimuli. This signal is from the brain by integrating many signals, including physical textures. This is relative to satiety. see also *hunger*	*"Effect of bite size and oral processing time of a semisolid food on satiation"* *Nicolien Zijlstra, René de Wijk, Monica Mars, Annette Stafleu, and Cees de Graaf,* Am J Clin Nutr *August 2009 vol. 90 no. 2 269-275*
satiety	one of two satisfaction signals; the body's response to nutrition availability of food already digested. This is many hormone signals, integrated by the brain. Without satiety we are hungry no matter other compensations. Ventromedial nucleus	
alimentary alliesthesia	Central satiety. The sensation of tastes/flavors affecting satiety, but is not satiation;	
conditioned satiety	"food with a given flavor is eaten on a partly full stomach and followed promptly by a mildly adversive digestive event"	
sensory specific satiety	Taste, olfactory receptors generate this signal, for the specific taste being consumed. Nominally consumption reduces drive to eat by declining satisfaction. It couples taste, and physical stimuli to hunger. Bodies sense for energy density, nutrition, and other palatability figures don't influence sensory specific satiety.	
satisfaction	Limited choice, more satisfied with outcome; can't revisit the choice Predicting if circumstances will be satisfactory is not good. Look at someone who	

made similar choice and see if they were happy or not.

satisfaction criteria properties

"Not limited to positive values:"

- Above zero, various degrees of satisfaction are experience.
- At "a zero point minimal contentment"
- "Below zero, various degrees of dissatisfaction"

"If periodic readings are taken of people in relatively stable life circumstances, we only occasionally find [values] very far from zero in either direction, and the divergent measurements tend to regress overtime back toward the zero mark."

"Hence the system's net satisfactions are history-dependent, and it is difficult for people to balance compensatory offsets."

People are poor at such predictions.

Herbert Simon, The Science of the Artificial,p29-30

satisfactory conclusion bias

People tend to make decisions based primarily upon which conclusion (or possible outcome) they think will make them most satisfied or happy; this is in contrast to the view that a decision (or acceptance of an argument) should be based upon its merits, consideration and quality of its evidence. Example: *"I believe in God because I'd hate to live without purpose in an empty universe, devoid of meaning,"*

Without this behaviour, a person is unable to make many daily choices, especially when he is unable to perceive any meaningful difference between choices. (For example, the inability to choose between a dentist appointment on Monday or Tuesday.) It would seem to be a catch-22 – embracing this bias leads underperforming due to rationalization, versus a Rainman-life, crippled from making any choices at all. Positivist decision theorists believe that such decisions can be solved thru a combination practice (e.g. skill building and experience), and employing a Markov decision process (e.g. flipping a coin or rolling dice) instead of a reliance on Aristotelian logic.

In a real sense, this is little more than scenario fulfillment.

satisficing

Satisfaction criteria properties. "Not limited to positive values" "Above zero, various degrees of satisfaction are experienced." At "a zero point minimal contentment" "Below zero, various degrees of dissatisfaction"

"If periodic readings are taken of people in relatively stable life circumstances, we only occasionally find [values] very far from zero in either direction, and the divergent measurements tend to regress overtime back toward the zero mark."

Satisfaction level; satisficing behaviour: strives for cooperation.

"Hence the system's net satisfactions are history-dependent, and it is difficult for people to balance compensatory offsets"

Satisfaction level: how high standards are set. Density of satisfactory answers n a problem domain; governs length of search time. Does it satisfy criteria?

Herbert Simon, ibid

scenario planning

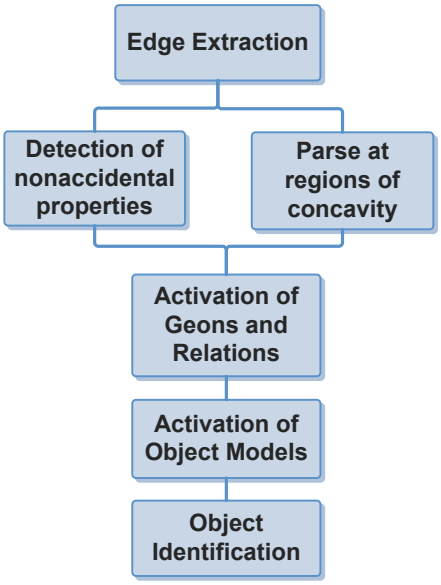
A method used in developing flexible, long-term plans.

- Some elements are hard to formalize
- Helps elicit the relationship between elements, identify key elements, and identify inflexibilities and weaknesses
- Helps dampen the optimistic, idealized future projections

scene understanding

recognize model

Figure 2: *Recognition by components stages "Recognition by components: A theory of human image understanding"* Pyschological Review 94 (1987) *p118*



seductive experience

- Entices by diverting attention; distinct by nature, shape, form, material
- Deliver surprising novelty
- Goes beyond obvious needs and expectations
- Creates an instinctive response
- Promise to fulfill these goals
- Leads the casual viewer to discover something deeper about experience
- Fulfills these promises
- The level of difficulty has to be at the edge of capability

See also *glamour, passion, persuasion*

*Khaslavsky & Shedroff, "Understanding the seductive experience," Communications of the ACM 1999, **42** (5) p45-49*

selection bias

Tendency for everyone involved to publish only positive or confirmatory results.

see also *experimenter bias*

selective dissemination of information

Retrieves information exactly tailored to meet the specific needs of each user, while supplying the output directly on a periodic and dependable basis. HP Luhn's studies indicate that this is a counterproductive tool for creating better organizations, or decisions. Similarly takes newspaper, magazine, and journal clippings and distributes them. Also seen as an information security mechanism, preventing most people from seeing the 'whole picture.'

See also *decision making*

selective recall

Memories are stylized generalities, with the availability effect altering what is considered 'typical.' Recall *recreates* memory not precision.

Summary: Selective recall of facts to fit stereotype or schema.

self-control

Methods of self control

- Extra-psychic devices ("other")
- Control of attention
- Control of emotion
- Personal rules

Cohen, CE, 1981. "Person categories, and social perception: Testing some boundaries of the processing effects of prior knowledge." Journal of Personality and Social Psychology. **40**, *p441-452*

self-disclosure

Gradual self-disclosure yields greater disclosure

self-justification

Can increase prejudice, distort memory, perpetuate injustice, warp relationships.

selfish

Merely don't care about others feelings. (A narcissist doesn't have an awareness

of others feelings)

semantic memory Words, concepts and other memories are recalled by their meaning. They are accessed first through general meaning or category. Then narrows to a more specific meaning, salient elements (in a compressed form) allow fast estimation of the rest of word or sentence, prepare for that. Fall back (with some degree of surprise) and revise their expectations.

Clustering: remembering related items in groups

Conceptual hierarchy: multilevel classification system based on common properties among items (see definition genus & species)

Schema, organized as a cluster of knowledge about a particular subject.

See also *encoding, memory*

sensation-avoidance

sensation-seeking Scale from low to high. High sensation seeking includes seeking out novel and stimulating experiences – the risk is part of the fun.

See also *personality*

sense Touch, heat, vision, hearing, kinestics, integration of senses, memory, difficulties and sickness

See also *just noticeable difference*

sensory adaptation Speed of adaptation.

see also *dynamic range, just noticeable difference.*

sensory memory

Sensory Images	*Capacity (Letters)*	*Decay Rate (msec)*
Visual	17 [7 - 17]	200 [70 - 1000]
Auditory	5 [4.4 - 6.2]	1500 [900 - 3500]
Tactile		
Olfactory		

sequence errors Degree of correlation depends critically on the range of variables considered.

Given even a modest time window, in any field (mutual funds, airline safety, etc) an item rated 'top' in one time period will be rated 'worst' in a later one.

Gamblers fallacy & gamblers ruin. Any given particular sequence is unlikely to occur, bit it is likely that some remarkable sequence will.

serial position effect See also *recall*

George Sperling, "The information available in brief visual presentations," Psychological Monographs *1960, **74** (498) p1-2*

"Successive approximations to a model for short-term memory." In Attention and Performance *1967, p286-288, 290-292*

example Aoccdrnig to a rscheearch at Cmabrigde Uinervtisy, it deosn't mttaer in waht oredr the ltteers in a wrod are, the olny iprmoetnt tihng is taht the frist and lsat ltteer be at the rghit pclae. The rset can be a toatl mses and you can sitll raed it wouthit porbelm. Tihs is bcuseae the huamn mnid deos not raed ervey lteter by istlef, but the wrod as a wlohe.

Keith Rayner et al, University of Massachusetts, Amherst

Vladimir Levenshtein's distance (1965) is the measure of how similar misspellings are

	The letters *are* permuted, but not randomly. In timed reading tests, people read about 12% slower with this kind of shift – the same with different typefaces or kerning. Reading speed falls with increased in shift – try the following phrase: Anidroccg to rcraeseh at Cgdirbmae untisreviny	
shame	"The signs of victory are obvious for all to see: the chest inflates, the head is thrown back, and the victor displays a strutting and confident air. Shame.. is equally recognizable: the head bows, and sometimes the shoulders slump and the chest narrows."	*Economist "Victory is Mine" Aug 16 2008*
shopping	Layout of store, decompression zone… Check out lines and queue theory. Much of the modern design comes from Charles Saunders	*Millier, ibid*
short term memory	Size is not constant in terms of *information bits*, but in chunks.	
side tones	Feedback mechanism in telephony so that people know how much to modulate their voice. Without it people speak louder when talking (they have to expend more to hear others and the result is talking louder). (see also white noise to know that the other end is still present)	
signals fundamental signals	Environmental signal Idiostatic (body signals, include. Skin and muscles) See just noticeable difference (for Weber fraction or sensitivity of these signals), signal sensitivity, illusory perception, signal discrimination.	
signal detection theory	A variety of factors are used to detect a signal: expectations, probability of detection under specific circumstances.	
similarity	Close enough along a sufficient number of dimensions of relevance.	
singular value decomposition	Can be used to loosely infer: ▪ elements in a hierarchy (physicist is a scientist) but not structure ▪ "facts" involved in an answer to a question ▪ an elements type (Baltimore is a city when listed with other cities, Canada is a country when listed with other countries) Very dense, very small window. The rows are the term or subelement, the columns are the document or major type.	
situational awareness	Each member in the group is fully aware of the situation, of what has gone on, and what is planned. see also *change blindness, peripheral awareness, shape coding*	
sleep	Sleep is thought to consolidate memory, preventing cognitive impairment or dementia. Portions of the brain may sleep although the person is otherwise awake. In some rare cases people can never sleep, yet not suffer cognitive problems (although they suffer from multiple system atrophy). Sleep helps prepare the brain for learning. The ideal nap is 90-100 minutes: 30 minutes of light sleep (improving motor performance), 30 minutes stage 2 sleep (refreshing the hippocampus), then 60-90 REM sleep (dreaming) during which connections between existing memories and new experiences from the hippocampus are formed.	*Summary: People who had a nap did better in episodic memory formation and recall tasks. Matthew Walker, University of California, Berkeley*
inertia	Groggy feeling after a nap: the brain is woken with its neurons still in slow rhythm, low temperature, and decreased blood flow. This may happen less frequently with regular nappers.	*Sara Mednick, University of California, San Diego*

SME
structured mapping engine

Employs a predicate logic with three types of statements:

- Attributes of an object, e.g. a mass of a planet
- Relations on attributes, e.g. greater (mass planet) (mass sun)
- Relations on relations, e.g. opposite successor predecessor

In forming the analogy, objects in the first situation are mapped to objects in the second, and relations in the first situation are mapped to relations in the second. Attributes are not mapped. Given two representations, the process attempts to find as many correspondences as possible.

Criteria: prefers to map relations between objects rather than their attributes.

see also ACME, *analogical reasoning*, ART, *mapping*

Forbus, Ken; Falkenhaimer, Dedre Gentner 1990.

Gentner, Dedre. Structure Mapping Theory *1983*

Table 13: *Situation 1*

#	*rule*			*notes*
a1	causes	a2	a7	
a2	and	a3	a4	
a3	attracts	sun	planet	
a4	greater	a5	a6	
a5	mass	sun		attribute
a6	mass	planet		attribute
a7	revolve	planet	sun	
a8	cause	a9	a3	
a9	gravity	a5	a6	

Table 14: *Situation 2*

#	*rule*			*notes*
b1	revolve	electron	nucleus	
b2	cause	b3	b6	
b3	opposite-sign	b4	b5	
b4	charge	nucleus		attribute
b5	charge	electron		attribute
b6	attracts	nucleus	electron	
b7	greater	b8	b9	
b8	mass	nucleus		
b9	mass	electron		

social comparison theory

social desirability bias

Self-reporting often has a number of distortions so that the person appears to be more socially acceptable.

see also *bias*

Summary: despite evidence or a determination to the contrary, subjects claim that they voted in an election or gave to a charity.

social interaction

Our social interaction requires atleast simplistic models of others. Cooperation, nice deceptions etc. The feedback – receptivity, facial expressions, body language, etc. – simplify the modeling while getting good efficiency. Some selfish people can exploit this for their own benefit. Empathy with others, beliefs, descriptions. Gossip.

A critical stage of cognitive development is the ability to adopt other peoples viewpoints.

see also *belief revision*

Katz, D. 1951. 'Social psychology and group process.' In CD Stone (Ed) Annual Review of Psychology

sociopath

Inability to form long term relationships

Think of others as things to be used, little empathy

impulsive

solipsistic life A life where one assumes everyone is mindless.

somatosensory somatosensory map (in parietal cortex) Body's image of self. Maps the movements done by the muscles; area of body vs detail in image varies. There are several: ones for touch, proprioception (where the limbs are to aid in balancing), and so on.

homunculus As a topographic map of skin. ; maps point on body to sensation; area for fingers is near face, and can cross talk; some regions of body have more detail

space building
discourse building

Gilles Fauconnier Mental Spaces

"The unfolding of discourse brings into play complex cognitive constructions. They include the setting up of internally structured domains linked to each other by connectors. This is effected on the basis of linguistic, contextual and situational clues."

"An expression can be said to *generate* meaning:

1. "When the grammatical information it contains is applied to an existing cognitive configuration, several new configurations will be possible in principle (i.e. compatible with the grammatical clues)
2. "the unfolding of discourse is a succession of cognitive configurations: each gives rise to the next.. A language expression entering the discourse at stage n constrains the construction of a new configuration, together with the previous configuration of stage n-1 and various pragmatic factors."

partition of information. Configurations and pragmatic info "relative [the configurations] to different domains." "The domains constructed in this fashion are partially ordered by a subordination relation: a new space M' is always set up relative to an existing space M that is in focus. Miscalled the parent space of M'." These are "organized into a partially ordered lattice" there are two: base space, and a focus space. "Construction at the next stage [is] relative to either the Base Space or the Focus Space."

indications from "various grammatical devices" (p39) "information regarding what new spaces are being set up, typically expressed by

grammatical devices for cognitive construction

Space builders

Names and descriptions

Tenses & moods

Presupptional constructions

Trans-spatial operators

Identification of elements

motivated polysemy "The tow domains in correspondence may stay apart, and even become increasingly distinguished but without losing their analogical or linguistic links."

A word may "mean two different things" on for each domain.

divergence and extraction "Real divergence between domains occurs when the vocabulary remains but the conceptual links disappear, or when a source domain changes its vocabulary white the target keeps the original vocabulary. so that the mapping is no longer linguistically transparent."

spatial cells A variety of different neuron structures in the brain that represent or respond to orientation, position, or space.

See also *navigation*

Table 15: *Various types of spatial cells*

	Location	*Notes*
grid cells	Entorhial cortex	Multiple grids, anchored to landmarks; location determined by self-motion
place cells	hippocampus	Fire when the subject is in a particular location,

	Location	*Notes*
		(not localized in space or on a grid)
head direction cells	many	Track orientation of head and body
spatial view cells	Hippocampus	Fire when part of the environment is in view (not localized in space or on a grid)

spatial memory See *memory (method of loci)*

speech

gender patters — Males: speak louder, lower pitch, less tonal variation
Female: employ intensifiers in verbal communication (qualifiers and tag questions)

types of — Affirmation, interrogation, commandment, narration, syllogism, sermon, oration

spes phthisica Euphoria from tuberculosis (some writers were more prolific), and may have made some patients very sexual active.

See also *immune system (and bacteria)*

spices No other animal appears to enjoy spicy food.

spindle cells Role in intuition

Stevens law How loud/bright/etc. we judge a scalar is proportional to the cube root of its intensity.

$$Loudness \propto Intensity^{0.3}$$

This works only in additive domains – where adding more light (for instance) makes things brighter. (Some domains cancel out).

stress Factors include familiarity (the less familiar, the more stressful), controllability, predictability (less predictable, the more stressful), and belief system. The belief system has a role in transforming events, expectations, and objectives into perceived stress. Stress tends to kill nerve cells, especially new ones, affecting the ability to form memories and learn during esp. stressful periods; some stress may increase nerve cell regeneration in fertile women. Stress interferes with hormone production (and receptors), harming the bodies ability to maintain itself, its relationship with others, and its feedback control.

McGrath, JE 1977. "Settings, measures and themes: An integrative review of some research on social-psychological factors in stress." In A Monet & RS Lazarus (Eds) Stress and coping: An anthology. New York: Columbia University Press
Weinberg, J; S. Levine. 1980. "Psychobiology of coping in animals: The effects of predictability." In S. Levin, H. Ursin (Eds) Coping and Health. New York: Plenum Press.

When people are stressed they are more focused and picky. People like relaxed gatherings to be creative, but put deadlines and challenges on themselves to help get things done. Overtraining to compensate for the effects of high stress situations. This training must be done frequently and performance measured.

See *anxiety, creativity, hormones, neurogenesis*

coping mechanisms & strategies — Show empathy for people more powerful than you. The more an infant smiles and interacts, the more active in his caregiver becomes.

Lazarus, RS; S. Folkman (1984) Stress, appraisal and coping. New York: Springer

Get thru stress by imaging a future for yourself – develop the ability to successfully anticipate a life (once again) with joy and meaning.

types of — Frustration (thwarted goals), conflict, change, and pressure.

cognitive functioning in stress — A modest amount of stress is needed for cognitive functioning:
no stress: a person is bored and inattentive
little stress: a person is performing routine tasks, with little reflection
more stress: engages in the perfectly vigilant mode of an expert thinker; considers many alternatives before choosing
high stress: a person (for some reason) denies even the most threatening thing to their existence
top level: full-on panic, fight or flight.

Irving Lester Janis and Leon Mann 1970s

student, stages of The stages of maturation a student goes thru in understanding *truth*; a framework patterned on Kohlberg's stages of moral development.

Jonathan Baron, Thinking and Deciding, Cambridge University Press. 1988.

W.G. Perry, Jr; Forms of Intellectual and Ethical Development in College Years: A Scheme. New York: Holt, Rinehart & Winston, 1971. Ch15 p93

K.S. Kitchener, P. M. King. "Reflective judgment: concepts of justification and their relationship to age and education." Journal of Applied Developmental Psychology, 1981 (2), p89-117

absolutism

1. There is no doubt about what is true – we know it directly or thru authority. A teacher's job is to convey this truth. When he presents more than one point of view, he is testing you: the student is to find the correct view.
2. There is an objective, knowable reality, but not everyone knows it – only legitimate authorities. Religion, morals, career plans are largely defined by others (e.g. parents). Any rejection of rejection of these is simply rebellion.

relativism

3. Objective reality may not be known, even by authorities. While waiting for the truth, you can believe anything you wish – none is better than another.
4. There is not truth; you can argue for any view of anything. Teachers show this when they present multiple points of view. Religion, morals, and career are arbitrary – there is no bases for choosing any

commitment

5. Within specific domains, people hold similar views and methods of justification. One must choose and defend this point of view – although you could argue for any. Although beliefs are justified within a particular framework, they are not comparable with others
6. Truth is ultimately subjective; although some justifications are better. Certain principles hold across all frameworks.
7. There is an objective reality, known imperfectly thru perception and interpretation. It is possible to refine which judgments are better or more correct than others. Beliefs and knowledge require a process of inquiry and challenge. Domains – e.g. theology, physics, and math – have specific criteria of such evaluation.

survivorship bias The tendency to exclude failures – failed projects, investments, companies, etc. – from performance studies due to the fact that they no longer exist. The results of studies are skews higher as it primarily includes successful-enough companies and not those that ceased to exist prior to the end of the period.

symbol structure Patterns of symbol tokens or organized structure of tokens with the special property that they provide access to, designate or point to structures outside of themselves. These designated structures may be other symbol structures in memory or may be productions.

symbol systems Often a system whose central function is capable of supporting universal computation. Includes Turing machines, Markov algorithms, register machines, Recursive functions, Pitts-McCulloch Neural Nets, Post productions, Tag systems.

synaesthesia Seeing numbers & letters in color, or experiencing a taste upon hearing a word. Women are more likely to experience this. See *vision*

Grapheme-colour synaethesia The tendency to see letters and numbers in color; this is the most common form of synaesthesia. Likely caused by strong linkages of the fusiform gyrus (which identifies word shape) and V4 (which identifies colour).

synapses The primary gateways through which neurons communicate. Consists of specialized pre-synaptic structures for the release of neuro-chemicals. Post-synaptic structures for receiving and responding to these neuro-chemcials.

Signaling between neurons at synapses is selectively altered by experience. The topology and shape of dendrites may be changed through experience. The spatial distribution of membrane channels may be changed through experience. The computational properties of neurons cannot be approximated by static response functions. The membrane is 1nm thick, 2dimensional fluid medians.

synaptic bouton A surface area of a few square microns and forms a highly stereotyped

	apposition with the post synaptic membrane	
synchronization	Coupling with others nearby and trimming	
	Boids, sense of others as a means of coupling, mirror neurons	
	See also *circadian*	
syncretic form	'A grammatical form which has absorbed the meaning and function of another, now obsolete, form and is used not only in its proper, original function also in constructions where formerly that other form was required.'	*pei*
tail risk		
taste bad taste in mouth	There are physiological basis for moral offence and leaving a bad taste in the mouth.	
umani	receptor for L-glutamate, amplified by guanosine monophosphate, inosine monopohosphate. Considered pleasant only within a narrow concentration range, dependent on the salt concentration. Coated tongue feeling	
temperature	Perception, regulation, calories consumed do so, presumed so that cell and tissue process efficiently (e.g. proteins are catalysts, temperature as energy to drive reactions)	
sensor	primary afferent nerve; TRP channel	
	6 kinds, including those that detect extreme range. Body's limits is the ability to mechanically move, the ability for ion movement, chemical reaction rates	
	TRPM8 menthol receptor sensation with one	
	cold sensitive fibers	
theory of mind	Inability to accurately estimate what others believe, think, or disposition. Much less accurate if we can't see them.	
	When a chimp seals & hides food, the other chimps solicit help only from helpers (guys at zoo) who they think likely to know where the food is hidden.	
	See also *amygdalia*	
throughput	The amount of work performed over some period of time	
time	Hippocampus nerve cells link memory	
	Perception of time. Sequence of events with intervals encoded separately	
time orientation past	Rely heavily on tradition, respecting the advice and wisdom advanced by the elderly	
future	belief that the future will provide considerably better conditions – especially if we do hard work in the present.	
tone	Essential aspect of meaning	
	Attitude toward subject	
	Role of persona; close identity vs distance	
	Tension in tone	
touch	Physical contact, touch increases touch between parties	*Summary: participants in a trust game that were given a massage where far more reciprocating and signaling trust.* *Vera Morhenn in Evolution of Human Behaviour (2008)*
	See also *hormone (oxytocin)*.	
sense	mechano recepters	
	free nerve endings – pain and temperature sensation; extreme / painful joint position	
	proprioception – sense of limb position	

kinesthesis: infor about limb movement

golbi tendon organs – feedback about muscle contraction

joint receptors: position

mechanorecepors

merkel disks – pressure, between dermis and epidermis

Meissner's corpuscles: respond to pressure over small area, respond to faster changes in pressure than merkel

Ruffini endings – detect forces likely to tear the skin

Pacinian – fast responding, tactile texture

Toulmin argument graph

DAG cycles are flaws).

Root: clam (a belief support by information)

Clam and grounds (evidence, supporting info) are linked via warrants on edge (rules or principles)

Leafs will be grounds

Nodes and arcs can have certainty weights

Disputable grounds are treated as sub-claims

Claim:

Evidence/data:

Warrant: intensional rules, tendency

Backing: credentials (rules) intended to support a warrant, not evidence. Eg more elaborate citations for the warrant.

Rebuttable: statement recognizing constraints and restriction on how the claim can be applied

Qualifier.

tracking

Classification:

Optical – if it uses a camera

Marker – doesn't use whole image (i.e. a few key spots / elements)

See also *visual features*

training
above real time

training simulators at a higher rate than normal. Performance, retention, effectiveness, stress. Allows connection of events, and causes-and-responses.

trust

The success of social groups depends, in part, on trust:

1. Trust between independent agents lowers transaction costs; a lack of trust raises the costs, in terms of lost opportunities, risk coupons (e.g. background checks, insurance, personal safety devices), and higher prices.
2. Successful companies, social groups, and societies depend on trust to encourage stability and a productive focus on the primary operational goals.
3. It is hard to develop and increase trust
4. It is always easier to undermine trust than to build it. This can happen directly, as thru poor character and actions. Trust can also be inhibited or indirectly undermined by social structures, or rules (which are easier to create than to fix)

Trust affects how to interact with strangers.

See also *hormone(oxytocin), social network (attacking), touch*

When someone visible to you does something visibly positive (trust building), or they sacrifice to make you better off oxytocin is release in the brain;

Summary: argues that trust is an economic necessity for successful social groups.
Francis Fukuyama "Trust: The Social Virtues and The Creation of Prosperity," http://www.amazon.com/exec/obidos/tg/detail/-/0684825252

Oxytocin promotes trusting others. This is part of a cycle of reciprocity. The more you believe in someone else, the more you get in return. (However, small slights undermine trust, which have to be ignored or forgotten – see *deception)*

Initially men are more trusting than women.

Response to positive interaction – reward more then men

Response to distrust (cheated) interaction – women forgive more quickly than men, boosts dihydrotesterone in men

trust violation

Done to avoid / stop intimacy

Those who enjoy violating trust may have problem with receptors.

truth

Truth may be affective, may depend on the type of group we want to belong to.

type A
1959

Characterized by a "harrying sense of time urgency". These type of people tend to perform tasks quickly, and are frustrated when encountering delays.

Meyer Friedman, Ray Rosenman

typical
estimating

Can be influence by the easy to remember – often the most vivid or recent occurrence. This often is disproportionately includes items at the margins.

Amos Tversky

See also *availability of construction*

ultimate game

Players are responsible for agreeing how to divide money between them; if there is no agreement, then everyone loses the pot.

rationality

While *rationalist* economists claim that any offering is rationally acceptable, they misunderstand human reasoning. *Money* is not the goal for players – it is a means. Most have a goal of social prosperity (to do better than 30% of their neighbors prosperity), or *utility,* what it can achieve: social just, harmony and consensus. They are willing to take less (or none) to punish injustice or inequality. It is costly for (most) players to determine and compare absolute prosperity.

The more competitive would rather accept less than see a rival prosper in *one-off* (or small number of) negotiations/trades; this isn't true with a large number of trades.

ultimatum game

Variation on the *ultimate game* where one player proposes how to divide the pot, and the other accepts or rejects the offer; there are no further rounds.

usability
essential characteristics

Part of human factors, usability has several essential characteristics:

LEARNABILITY – important to speed a persons ability to use it

EFFICIENCY – rewards a person who has learned the system to maintain a high level of productivity.

MEMORABILITY – Can a person who has left the tool for a period use it without starting over?

LOW ERROR RATE – Are the number of mistakes low? Are they easily fixed?

SATISFACTION – Does the system do what is expected of it? Is using it a pleasant experience?

usufruct
principle of

Allows resources to be used by any individual provided he leaves them in at least as good a state as they were given. Can be found in ancient Roman law. Used by school bicycle and boat clubs

see also *non-rival goods, sharing*

utility function

Require a choice that is consistent and transitive; humans are not like this. Usually very similar to optimizing strategies.

Herbert Simon, Science of the Artificial, p116-118

A function of the command variables, and environmental parameters, supplemental constraints. E.g inequalities between functions of the command variable and environmental parameters.

Goal: "to find an admissible set of values of the command variables, compatible with the constraints that maximizes the utility function for the given values of the environmental parameters."

Possible worlds. Consider all the possible worlds that meet the constraints of the outer environment." "find the particular world in the set that meets the remaining constraints of the goals." "Maximize the utility function."

value judgment condemnation or approval

victory girl see *charity girl, khaki-whacki*

virtue Can makes markets healthy from an economic perspective, and can make the participates healthier as well. See also sharing, trade, charity, altruism.

visceral part of brain Fast. Rapid polar judgments of good/bad, safe/dangerous. Starts affective processing, prepares the motor system, muscles and brain for action.

vision Coordinated by spatial cells and linked to the vestibular sense. Vision processing is decomposed into a parallel set of sub-processes, and reintegrated. Context, such as head position, and orientation, affect this process.

See also *binocular cues, color perception, eye, face, lateral antagonism, spatial cells*

focus points The eye focuses quickly on eyes, infinity points, horizon, facial features (esp. eyes), key color and light, detailed places or with edges or weight energy

processing paths Separate paths to identify

- what is seen, Object identification
- who is seen, Object identification (but for person)
- where it is, Object location
- orientation
- contrast
- color
- motion
- depth, cues (eg overlap), motion,. Ventral pathway pattern based clues; dorsal pathway motion-based cues
- optical flow: expanding the motion pattern generated by forward movement (e.g. motion parallax)
- structure
- Why things are happening, visual tension

Attention is used to integrate the pathways. How is it integrated. In typical case:

1. Build a map of visually interesting areas based on feature. This starts with a default mapping of feature to interestingness.
2. The most interesting areas are used to draw attention.
3. For the most interesting regions, create a list of items with those features
4. Repeat for the specific kinds of objects, focused on the regions (expanded appropriated)

When looking for specific kinds of things (expectation), the is modified. The mapping of feature interestingness is modified to downgrade interestingness of features not found in the objects, increased for features in the objects.

finding interesting region Every location on screen is mapped to a level of interest in the following way:

- Create a set of features for each location. Can be bivalent or weighted.

Can be different planes for each feature.

- Using a mapping of feature to a weight of interest, create a scalar interestingness for each point. This by sum feature present * interest weight.
- Perform blurring, dilation, erosion to produce a smoothed map.

Note: the feature to weight mapping may be generic, or context specific (when looking for specific item)

structure from motion — motion detecting neurons in dorsal pathway; sends to object-analyzing neurons in ventral pathway

visual cortex damage

Table 16: *Various types of damage to vision processing*

area	*name*	*Notes*
color processing	achromatopsia	
left sided vision	hemineglect	
motion detection	akinetopsia	

visual features — Texture, sense of depth, surface and light, horizon, infinite point, face elements, lines & edges, edge quality

visual memory — Given a large sequence of images, with an average of 6 seconds per image, people are highly reliable at later identifying which of them they have seen.

Shepard, R.N. (1957) "Recognition Memory for Words, Sentences, and Pictures" Journal of Verbal Learning and Verbal Behaviour ***6****:156-163*

vocational themes

Holland, JL Making vocational: A theory of careers. *1985, Prentice-Hall (Englewood Cliffs, NJ)*

1. Investigative
   - Intellectual, scientific, mathematical problems
   - Analytical, critical, curious, introspective, methodological
2. Realistic
   - Concrete & operational
   - Mechanical skills, lacking social skills
3. Artistic
   - Unsystematic, tasks and artistic projects
   - Painting, writing, drama
   - Imaginative, expressive, independent
4. Social
   - Education, helping, religious
   - Social activities, cooperative, friendly, helpful, insightful, persuasive, responsible
5. Enterprising
   - Political & economic achievement, supervision, leadership
   - Leadership, control, verbal expression, recognition, power
   - Extroverted, sociable, happy, assertive, popular, self-confident
6. Conventional
   - Orderly, systematic, concrete tasks
   - Verbal & mathematical skills
   - Conformist, clerical & numerical skills

Weber's law — The body scales perceived differences in stimulation so the increment is relative to the initial stimulus.

see also *just noticeable difference*

will

Predicting the wishes of an incapacitated person using Bayesian analysis (current method is biased toward treatment). Inputs:

- Prognosis of patient, based on some form of clinical criteria
- Documented treatment preference in various hypothetical circumstances (e.g. living wills)
- Age, gender
- Invasiveness of treatment
- Profession and social status

work
environment for optimal experience

- Interaction should include direct, immediate feedback
- "Have specific goals and established procedures
- "Motivate
- Challenges that require skill, but "neither so difficult as to create a sense of hopelessness and frustration, nor so easy as to provide boredom"
- Merging of action and awareness
- A sense of control and "Provide a sense of direct engagement, producing the feeling of directly experiencing the environment, directly working on the task.
- "Provide appropriate tools that fit the user and task so well that they aid and do not distract
- Concentration on the task at hand: "Avoid distractions and disruptions that intervene and destroy the subjective experience."
- A loss of self consciousness and an altered sense of time

Norman, Don, Things that make us smart, *Addison-Wesley Publishing Company, 1993 p35*

See also *burnout, flow, motivation, seductive experience*

Yerkes-Dodson law See *arousal*

Zermelo's algorithm

Used to obtain a pay-off vector.

See also *game theory*

epiphany

"Psychology: Themes and Variations." Wayne Weiten, 1989 Brooks/Cole Publishing company, Pacific Grove CA