

BRAIN AND COGNITION WEEK 11- problem solving

Problem solving research... AIM

- To study the basic processes involved in problem solving
- Without contamination from other cognitive processes
- Confounding factors: previous experience, knowledge

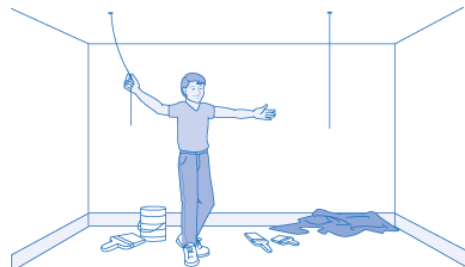
Behaviourism – behaviour can be explained by stimulus-response links. Problem solving seen as trial and error, reproduction of learned responses.

E.g. **THORNDIKE 1911** showed that animals learn the correct behaviour from trial and error

- hungry cats had to find a way out of their cage to get food
- they needed dozens of trials to form a close association between behaviour sequence and its consequences

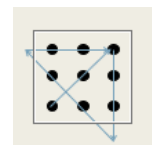
GESTALT PSYCH- theories first developed to account for perception, then applied to problem solving. But theoretical explanations are weak. Problem solving is both reproductive and productive and involves restructuring. Previous knowledge though can hinder problem solving e.g. it makes insight harder.

Restructuring and insight- **MAIER'S 1927** two-string problem- goal is to tie two strings together that seem to hang too far apart- hint (brushing one string helps restructuring). Also illustrates functional fixedness.



Functional fixedness- (follow up) **BIRCH AND RABINOWITZ 1951-** 2 groups complete electrical circuit by using either a switch or a relay. Ptps are given the 2-string problem with several objects at their disposal and after some hints they swung one of the strings. But the 2 groups chose different devices... relay group= set string using the switch and switch group= used the relay.

Or **DUNKERS 1926** nine-dot problem- people are fixated on the shape of dots and assume the lines must stay within the square – we can join all 9 dots using 4 lines like this:



Represented change theory **OHLSSON 1992**= uses Gestalt ideas and provides an elaborate mechanism explaining the processes involved in insight problems.

NEWELL AND SIMONS 1972 information-processing approach:

- Problem solving is seen as a search through a problem space
- Emphasis on strategies used by people
- Computational approach that has led to simulation programs e.g. GPS and Soar

Internal problem space- people construct an internal representation of the external problem space. It includes representation of start, goal, rules etc... capacity of human memory is limited, particularly LTM, hence why we use *selective search* to quickly weed out moves that are not reasonable

