Question: How does what an animal expect to happen affect its performance? How does expectancy interact with drive?

I ask this question because at one time I considered that perhaps the brain system works by looking ahead to see what would happen if I do such and such (actually doing the action mentally) and then evaluating the result in terms of drives and goals. While there is still clearly some relevence of this idea, it does not seem to be a basic, essential part of the nervous systems primary operation. It probably is used a great deal in advanced nervous systems such as our own at least. It is useful in that performing mentally conserves time and effort, and yet may still give information on what drives, action, etc will (may) be elicited in oneself [and all this without even having performed the action ever before]. While this principle is liable to be a very important part of abstract thought, it appears not to be very relevent at the level of stimulus-response, operant and classical conditioning). Expectations primary operation seems to be more because the event has occurred before - and to be a more automatic, conscionsless act. This is expectation as in conditioning - the dog salivates to the CS because it expects the food - expectation is really a misleading connotation ively - The CS was followed by the food in the past, so salivary neuron synaps aligned

on the CS, thus, the occurrence of CS directly causes the salivary response — this is expectation, but not a very mentalistic expectation.

An hours thought has mainly only pointed out the problem of how learning actually neurally (spatially) occurs in operant and classical conditioning (with this, the significance of singular, few output collecting fibers, and communicating levels of abstract action systems (such as the reticular formation). Before making some more of my brazen assumptions or hypothesis, I think I should check what Pribram had to say on how the learning is done (how the reinforcement is applied). Also, the importance of the frontal lobes in this is implicated.

4/15/76

Learning acts on stimuli that produce an orienting response. There must be some kind of an operating, learning memory, with active sustention of excitation through reverberation. The evidence for this is that the learning changes cannot occur totally peripherally (this would be too hard as where to apply what reinforcement). The mind reacts and orients ~~to only a~~ perhaps only to one stimulus at a time, and it is this which initiates learning. The central system must somehow find the proper connection and transfers the ~~info~~ learning in the form of synaptic changes to a peripheral, long term, automatic usage form. [Lots of implications, and suggestiveness]

4/17/76

Pribram suggests a neurochemical basis for reinforcement. He suggests that reinforcing impulses travel up through the medial forebrain bundle to the various parts of the brain (from the hypothalamus?) and that these impulses interact with cortical (and probably others) to strengthen synapses which have recently fired. Pribram's book was not able to make the workings to clear to me - perhaps he was not specific enough - too confusingly general for me. The does not express any definite rules of operation or say how specific the upcoming reinforcing impulses are (do all always fire? or is it selective?) or say which or all neurons are affected. Oh well....

Would it be feasible merely to support all responses in relation to their strength and how recent was their action? (Or perhaps add local measures of the significance of their response). It seems now that mainly only those synapses that directly affect the response should be most affected. (I am thinking of my model ( )). Perhaps some complex mechanism (heuristic) in the frontal lobes or limbic system can participate.

The reinforcement would apply only to those synapses which cause the response for reinforcement as in instrumental conditioning. Perhaps the two kinds of learning can be related to the following two ideas from my model: 1) Direct reinforcement of learning - a selective strengthening of the synapses (according to which best bring out the reinforcement, obviously) - Instrumental conditioning, 2) learning of what is to bring out reinforcement -

- Pavlovian or classical conditioning. (This is the unclear part of my model now) For me it is not clear if that which ~~can~~ brings out the reinforcement can or cannot be specific to certain responses (i.e. if the reinforcement can act only on certain synapses). Primarily it has not even been modeled how the learning of what is to bring out reinforcement occurs.

That the same functions are performed at varying levels of complexity and abstraction at ~~various~~ various levels in the brain (the cortex and lower structures: basal ganglia, thalamus, reticular formation) (perhaps even within the cortex) This would occur through development, otherwise known as learning. Basic schemas set down by one structure (level) then a higher level forming for more careful discrimination and slight accomodations (with accompanying assimilation

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I am presently struct by the fact that we normally pay attention to only a small part of our total input (and output). Most of it is automatically processed with little notice while reasoning (and learning) acts on only a subset which has heuristically been deamed relevent!? This is specified by biasing input of ~~attention~~ attention and arousal indicating relevency and whose application, like any part of my model is based on learning (heuristic - experience of what is effective = relevent). The preceding suggestion is that the relevency selection is a peripheral rather than a central phenomena.

I must conclude that the proper way to proceed from here is a consideration of the second learning system, that which causes the reinforcement application, as classical conditioning for the purpose of explicitly incorporating it in my model. The half model is nothing without the other half.

4/18/76

A note on the second (classical) learning system: This system is sort of a system for finding and applying where proper, the system's subgoals. In this light Sommerhoff's definition of subgoal may be illuminating (page 33 of this). If X is a goal and X implies Y (i.e. whenever X is true Y must be true), then Y should be a subgoal (with certain other specifications essentially related to Y's usefullness as a predicter of X — or, which is rather the same thing, a causes of X; — and slightly differently - a necessary condition for X.

The use of a changing "level of aspiration" can provide valuable subgoals.

Note the S shapedness of the classical conditioning learning curve - initialy learning is hard, but once it is started (tried), the continued reinforcement causes it to increase more rapidly.

A subgoal is simultaneously both a drive and a source of reinforcement. Furthermore, the same can be said of even of primary goals!

WHY???