Module:
Psychological Foundations of Mental Health

Week 1
Introduction to cognitive psychology

Topic 2
The heyday of behaviourism: operant learning – Part 1 of 3

Professor Richard Brown
Department of Psychology, King's College London

Lecture transcript

Slide 4
Let's look at another major influence on behaviourism, Edward Thorndike. Thorndike was another pioneer of behaviourism, and like Pavlov and Morgan, he studied animals. He did so to understand what might be seen as distinctly human attributes, such as intelligence, consciousness, and the mind. Like others, he viewed that much of this could be explained in terms of reflexes and connections. However, he also thought that in humans what we called our mental life, required the assumption of internal events that lay between them and mediated the relationship between the stimulus and the response. Something that Watson later rejected in his strict behaviourist stance. Mediation is a key concept in cognitive psychology. Indeed, cognitive processes are, by definition, mediational. They underlie an observed relationship between one observable event and another. The debate between behaviourism and cognitive traditions lies in the nature of those mediating events, and whether they are necessary for a comprehensive model of the mind.

Slide 6
One of Thorndike's practical contributions was the development of specific apparatus to measure aspects of animal intelligence. He used the ability to learn as a measure of intelligence, although that narrow definition is not used today, historically challenged by later behaviourists, who rejected the need to invoke such ideas for humans or for animals. Nevertheless, his experiments and apparatus subsequently became refined by later behaviourists. A good example is his puzzle box that he used to study learning in cats. In a typical study, a hungry cat is placed in a cage with a bowl of food out of reach. The cats' task is simply to escape the box to get the food. The experimenter is interested in how long it takes the cat to get out. Typically, the first time in the box the cat will show a wide range of behaviours, such as howling, reaching through the bars, turning in circles, and so on.

Eventually, by chance, the animal will press a lever that opens the cage door allowing it to reach the food. The next time in the cage, the same will happen but, with repeated trials, the time it takes the animal to get out of the cage will become less and less, as the animal learns that pressing the lever opens the door. Thorndike called this trial and error learning and his learning theory was called connectionism. Operant learning differed from classical conditioning in that it was based on the association, the stimulus and a response, and the subsequent outcome or reward, rather than the simple pairing of a US and a CS. For this reason, operant conditioning is sometimes seen as an example of contingency learning, or SR learning, when a specific response is made contingent upon

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a specific stimulus being present. In contrast, classical conditioning is sometimes called contiguity learning, based on the temporal contiguity or pairing of two stimuli. Various other experiments conducted by Thorndike showed how animals can learn more complex responses or sequences by linking together or training. This provided a means by which animals can learn more complex behaviours by using the same basic building blocks.

Slide 7

A crucial element of Thorndike's theory was the role of the positive or negative effects of the behaviour, and whether it left the animal, what he called, satisfied or dissatisfied. This is stated in his law of effect. Essentially, where a response led to satisfaction, escape from the box and getting the food, that is reward, the same behaviour was more likely to be repeated on the next occasion. While the behaviours that lead to dissatisfaction, that is remaining in the cage and hungry, were correspondingly less likely to be repeated. In this way, the animal, including humans, learned over time based on the consequences of their actions. The emphasis on effect represented a fundamental step in behaviourist thinking. Behaviourism was no longer just looking to explain associations between a stimulus and a response, but considered the critical role of the consequences of that response for the organism and its role in future behaviour. Thorndike's basic law of learning lies at the core of later learning theories and is commonly called operant or instrumental learning. Rather than simply being a simple two term stimulus response contingency, it is based on a three term, or SRS contingency, the situation, the response and the effect.

Slide 9

Now let's look at a quick example of a three term contingency in action. You are leaving your house and looking up as you leave and see that there are dark clouds gathering. You continue, it rains, and you get wet. The next day as you leave the house, you see that it is cloudy again. You go back and get your umbrella, just in case. Sure enough, it starts to rain but this time you have your umbrella and arrive at your destination nice and dry. The next day, it is sunny, so you don't bother to take your umbrella. Although seemingly trivial, this illustrates associative learning in action. The presence or absence of clouds in the sky serve as discriminative stimuli, sunny or cloudy. Each of which is associated by reinforcement with a particular consequence, dry or wet, depending on the contingent behaviour: taking your umbrella and using it or leaving it at home. The terms used by Thorndike of situation, response, and effect were later replaced by discriminative stimulus, response and reinforcing. Another terminology for the three term contingency that we will use later is antecedent, behaviour and consequence or ABC.