

### **3. Animal Behaviour: Skinnerian and ex-Skinnerian**

Cognitive Processes in Animal Behavior Edited by STEWART H. HULSE, HARRY FOWLER and WERNER K. HONIG (1978) Hillsdale, N.J.: LEA. Distributed by John Wiley. Pp. xii + 465. Hard: £21 .00.

Whether it is the animals or the people who are cogitating more, these conference proceedings are something of a landmark in the neo-Tolmanian revolution. Some of the contributors – Honig, Hearst and Premack – were once Skinnerians of a sort, while others, such as Wagner, might at one time have been called Hullians. But they are all Tolmanian now. By and large, in this collection of papers, it is a matter of discussing ordinary data in new terms, rather than reporting novel manifestations of animal intelligence. Rescorla for example presents data from Pavlovian conditioning experiments, with a “cognitive perspective”. The conclusion is that animals learn relationships between events, instead of acquiring responses or reflexes, and this can be taken as the new consensus. Bolles, who was an early advocate of the cognitive perspective (10 years ago) has a short and lucid chapter about what rats do when subjected to electric shocks. They don't learn responses, he says, as much as try and get as far away from the shock as possible. The interest is in how they decide where the shock is and where it isn't. They “freeze” if they can't get away, but even this response isn't learned.

There are several chapters about pigeons pecking at visual displays because of food rewards. Some aspects of the visual information processing which appears to take place – selective attention, visual search, interference – have cognitive overtones. Hearst discusses 'latent learning' techniques for; the pigeon, and comes down for stimulus relations and perceptual factors, and against Skinner, in his chapter. Honig rather ambitiously attributes variation in latency of pecking by pigeons in his experiments to their “working memories”.

Although there are grounds for thinking that the pigeon's short-term memory in a Skinner box isn't up to much, if let out of their cages pigeons do show spatial abilities, and so should have reasonable cognitive maps. No data is given for pigeons, but Olton reviews his experiments with the eight-arm radial elevated maze, on which rats tend not to return to an arm they have recently visited, thus demonstrating “spatial working memory” as well as cognitive maps.

Mackintosh discusses selective attention in rats with his usual rigour, and drags his feet when it comes to the “selective working memory” I was expecting. He knows that animals do not just register co-incident events, but rather conservatively wants to assume a simple, basic, underlying associative process, on to which supplementary principles to take care of memory and attention can be added if needed.

Eyeblink conditioning in the rabbit certainly looks like a simple associative process. But Wagner, unlike Mackintosh, wants a fully cognitive theory all at one go. Typical data in this chapter show slow changes in eyeblinking conditioned from shocks to flashing lights, or in vasomotor responses in the ear during repeated sounds, observed in physically immobilised rabbits. From these unpromising findings, Wagner derives a model which has sensory registers, long-term and short-term memory, and a rehearsal loop. Within this theory, if a rabbit retrieves the representation of an event from LTM into STM, it has an expectancy. Wagner is engagingly frank about where his model comes from – he got it from people writing about human information processing, not from the rabbits.

There is something to be said for the old-fashioned principle of inducing a theory from data, and looking for experiments which test it. Tolman himself tried to get rats to do insightful things, which disproved S-R theories. The rats, pigeons and rabbits featured here are not solving problems, or doing anything as insightful as Tolman's rats did – it is only Tolman's perspective or framework of discussion which is being writ large. A consideration missing from this perspective is that cognitive processes in animals can be defined as something that pigeons, rats and rabbits have very little of, but chimpanzees have lots of. So far it is only with chimpanzees that cognitive processes and

experimental observations make very much contact. Menzel provides a review of his studies of knowledge of where food is in chimpanzees, and gives an account of tool-using which supports Kohler's less systematic reports in *The Mentality of Apes*.

Unfortunately the conference did not include anything on the “language” experiments with chimpanzees – a curious omission, or repression. But there an excellent final chapter by Premack on why it would be rash to embark on similar experiments with pigeons. Due weight is given to the question of what sort of data implies what sort of cognitive process, and his conclusion is that not all species under discussion have equal powers of abstraction.

*Cognitive Processes in Animal Behaviour* is essential reading for anyone .teaching animal learning at any level not because it settles anything, but because everyone should know how opinions have been shifting. Postgraduates will need to read whatever bits impinge on their own field, and would be well advised to read more. The best chapters for undergraduates to read would be those by Bolles, Menzel and Premack.

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