COGNITION IN CALIFORNIA SEA LIONS: THE ROLE OF DIFFERENT FISH REINFORCERS

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Relating different unconnected information in a novel manner defines a cognitive act. Thus, cognition includes the ability to form relationships between stimuli that become functionally equivalent even when lacking perceptual similarities. If one set of many dissimilar stimuli is arbitrarily divided into two subsets, an animal can be trained, through a process of repeated discriminations and reversals, to respond to each subset as a separate category. Members within each subset can be shown to have become equivalent. We recently tested two California sea lions in a discrimination/reversal task using ten-member classes arbitrarily designated "numbers" and "letters". In Experiment 1, correct responses

were reinforced with two different fish (capelin or herring) that were uncorrelated with class type (numbers or letters). In this mixed reinforcer condition, both animals showed evidence of categorization soon after a reversal was instated. In Experiment 2, a differential outcome effect (DOE) design was used in which capelin was correlated with one class (letters) and herring correlated with another class (numbers). For both animals, performance on the first trial following a reversal was predictably zero, but subsequent performance was nearly perfect. Thus, the sea lions showed much stronger evidence of equivalence when the outcome of a choice was represented by the same biological event (type of fish). In Experiment 3, we continued to use a DOE design and the sea lions were transferred to a match-to-sample (MTS) procedure. On all novel stimulus pairings, their performance was almost perfect. In Experiment 4, new stimuli were mapped onto a single familiar letter or number by MTS and transfer to all other letters and numbers emerged full blown. Additionally, near perfect transfer was shown when the newly mapped stimuli were tested in the reversal procedure. Thus, equivalence relations can be readily formed when stimuli are represented by the same biological reinforcer.