

Concept Learning and Memory in a California Sea Lion

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Many animals can solve problems by trial-and-error, a process by which specific relationships are learned through repeated interactions with environmental stimuli. Some marine mammals are also able to learn more general or abstract strategies. These strategies, or concepts, are learned through experience with many problems of a given type. After learning to solve similar problems by trial-and-error, an individual may acquire a general problem-solving rule that can be applied to novel problems from the same category. In a long-term study of the cognitive abilities of California sea lions, we documented the formation of several conceptual rules by a hand-reared female sea lion named Rio. These included the formation of several categories of visual stimuli that shared a common meaning or function and the development of an identity (sameness) rule. Although these concepts were eventually used by Rio to successfully solve novel problems, they first required a protracted period of training and practice. We revisited several of Rio's concepts following periods of time ranging from two weeks to almost ten years in order to evaluate how well she remembered these problem solving strategies. We found that Rio showed good to excellent long-term memory for complex relational rules and concepts. These experimental findings are consistent with a variety of observations of pinnipeds in natural settings, which indicate that natal sites, feeding areas, and individuals may be remembered over long periods of time.