Journal of Comparative Psychology
2001, Vol. 115, No. 2, 152–158

0735-7036/01/$5.00 DOI: 10.1037//0735-7036.115.2.152

Memory of Movies by Chimpanzees (*Pan troglodytes*)

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How do animals remember what they see in daily life? The processes involved in remembering such visual information may be similar to those used in interpreting moving images on a monitor. In Experiment 1, 4 adult chimpanzees (*Pan troglodytes*) were required to discriminate between movies using a movie-to-movie matching-to-sample task. All chimpanzees demonstrated the ability to discriminate movies from the very 1st session onward. In Experiment 2, the ability to retain a movie was investigated through a matching-to-sample task using movie stills. To test which characteristics of movies are relevant to memory, the authors compared 2 conditions. In the continuous condition, the scenes comprising the movie progressed gradually, whereas in the discrete condition, the authors introduced a sudden change from one scene to another. Chimpanzees showed a recency effect only in the discrete condition, suggesting that composition and temporal order of scenes were used to remember the movies.

How do animals perceive and retain what they see in daily life? Significant efforts have been made concerning the issue of memory in animals. One method used to investigate memory in animals is the serial probe recognition task (Sands & Wright, 1980). In this task, a list consisting of several items is presented to a subject. At the end of the list, the animal is required to answer whether a probe stimulus was contained in the list or not. In the recognition of continuous lists of items, the performances following a retention interval in retrieving each item are different depending on the position of the item in the list. This is referred to as the *serial-position effect* (Sands & Wright, 1980; Straub, Seidenberg, Bever, & Terrace, 1979; Wright, Santiago, Sands, Kendrick, & Cook, 1985). Wright et al. demonstrated that pigeons, monkeys, and humans all showed the serial position effect in tests of list memory. The list-item memory is thus thought to involve similar underlying processes in a variety of species.

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This study was financed by Grants 07102010 and 12002009 from the Ministry of Education, Science, Sports, and Culture of Japan. We wish to thank Sumiharu Nagumo for developing computer programs, Chisato Douke for her cooperation in collecting the data, Dora Biro for her helpful comments and for revision of our English, and also Masaki Tomonaga and other staff members of the section of Language and Intelligence of the Primate Research Institute. Thanks are also due to Kiyonori Kumazaki, Norihiko Maeda, and other staff members at the Center for Human Evolution Modeling Research for taking care of the chimpanzees. Naruki Morimura is grateful to Gen'ichi Idani, Kouki Fuwa, and Sumirena Sekine for their continuous encouragement regarding the study.

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Lists consist of several discrete items. Similarly, it may be suggested that a "sight" in daily life consists of a series of scenes. The processes involved in perceiving, retaining, and retrieving sights in daily life could be expected to be similar to the processes of perceiving, retaining, and retrieving moving images on a monitor. Consider, for example, a digital video recording that consists of 30 still frames per second; the memory of this movie may approximate the memory of a list consisting of a vast number of still frame pictures. However, there are qualitative differences between the memory processes of a list and a movie. Movies have no distinct boundaries between consecutive still frames. We perceive each of the several distinct parts to a movie on the basis of our subjective feeling. Moreover, the spatial and temporal changes in the composition of a movie occur continuously over a series of scenes. Therefore, we perceive a movie as possessing predictable directions and patterns. These characteristics could lead to different processes in the memory of movies and lists. The study of movie memory provides an opportunity to investigate how animals perceive and retain a sight in their daily lives from the viewpoint of comparative cognitive science.

There have only been a few cognitive studies using movie images as stimuli. Itakura and Matsuzawa (1993) demonstrated that a chimpanzee could use visual symbols to describe a scene in a movie in which one person approached another. Lea and Dittrich (1999) showed that birds could discriminate between moving shapes and between categories of movement. For animals to accomplish these tasks, they first must have the capability to perceive, retain, and retrieve movies. However, these memory processes in regard to movies have not been examined experimentally.

The purpose of this study was to investigate chimpanzees' memory processes regarding movies. First, using a movie-to-movie matching-to-sample task, we tested the ability of chimpanzees to discriminate movies in Experiment 1. Second, using a movie-to-still matching-to-sample task, we tested the movie recognition task in Experiment 2. In this task, a movie was shown to a chimpanzee, followed by the presentation of two still frame