

"REPRESENTATION" IN THE CHIMPANZEE¹

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Summary.—Recent research said to demonstrate that chimpanzees have a "representational symbolic function" can be more parsimoniously interpreted in terms of fundamental processes of conditioning.

Savage-Rumbaugh, Rumbaugh, Smith, and Lawson (1980) recently presented data said to show that chimpanzees are capable of a "representational symbolic function." Having established with three chimpanzees discriminations between three foods and three tools, photographs of those foods and tools, and lexigrams that the chimpanzees had learned to pair with those foods and tools, the experimenters showed that two of the chimpanzees could successfully categorize novel foods and tools, photographs of novel foods and tools, and lexigrams that they had learned to pair with novel foods and tools. Their procedures suggest an explanation for the results which is far simpler and much less speculative than the one they proposed.

Over many months of training before the reported tests, food lexigrams had necessarily been paired with food more than tool lexigrams had been paired with food. Through classical conditioning, food lexigrams would come to elicit food-related responses, such as salivation. The discriminations subsequently trained between foods and tools, photographs of foods and tools, and lexigrams for foods and tools, could have been based, then, on rather simple contingencies: Early in training, a chimp earned reinforcement by placing into the "food" bin items in whose presence he salivated and by placing into the "tool" bin items in whose presence he did not salivate. In later stages of training, a chimp earned reinforcement by selecting the "food" lexigram given a food, photograph, or lexigram in whose presence he salivated and by selecting the "tool" lexigram given a food, photograph, or lexigram in whose presence he did not salivate.

The reinforcers, though not mentioned in the report, were critical to the so-called "concept" acquisition. Presumably, as in prior work (Savage-Rumbaugh, Rumbaugh, & Boysen, 1978), correct responses were reinforced with the experimenter's praise—which itself had been paired with many primary reinforcers. Incorrect responses were presumably followed by "No," "Wrong," and other signs of the experimenter's disapproval, in which case, two contingencies of punishment were also in effect.

This history of discrimination training and classical conditioning, though undoubtedly not the whole story, could easily account for successful performances in subsequent tests, as well as for some of the reported errors. Novel foods, photographs of novel foods, and lexigrams that had been paired with novel foods would all tend to elicit food-related responses. These, in turn, would set the occasion for placing an item in the "food" bin or selecting the "food" lexigram. Novel tools, photographs of novel tools, and lexigrams that had been paired with novel tools would normally not elicit food-related responses and thus would set the occasion for placing an item in the "tool" bin or selecting the "tool" lexigram. One would expect that tools that had been paired with food (such as a knife or cutting board) would tend to be misclassified as foods. The authors confirm this.

¹Supported by NSF Grant BNS-8007342. I thank B. F. Skinner for comments. Requests for reprints should be sent to the author at the Department of Psychology and Social Relations, Harvard University, Cambridge, MA 02138.

The authors have not shown that "concept formation," "symbolic encoding," or "representation" are necessary for their results. The possibility remains that chimpanzees can correctly classify symbols that they have learned to pair with different classes of objects which in turn have been paired equally with foods or other unconditional stimuli. But even that would not constitute evidence for "representation." It would only demand a more elaborate analysis of some combination of the physiological, genetic, and environmental factors that contributed to the chimps' success.²

REFERENCES

- EPSTEIN, R. On pigeons and people: a preliminary look at the Columban Simulation Project. *The Behavior Analyst*, 1981, 4, 43-55.
- EPSTEIN, R., LANZA, R. P., & SKINNER, B. F. Symbolic communication between two pigeons (*Columba livia domestica*). *Science*, 1980, 207, 543-545.
- EPSTEIN, R., LANZA, R. P., & SKINNER, B. F. "Self-awareness" in the pigeon. *Science*, 1981, 212, 695-696.
- SAVAGE-RUMBAUGH, E. S., RUMBAUGH, D. M., & BOYSEN, S. Symbolic communication between two chimpanzees (*Pan troglodytes*). *Science*, 1978, 201, 641-644.
- SAVAGE-RUMBAUGH, E. S., RUMBAUGH, D. M., SMITH, S. T., & LAWSON, J. Reference: the linguistic essential. *Science*, 1980, 210, 922-925.
- SEBEOK, T. A., & UMIKER-SEBEOK, J. (Eds.) *Speaking of apes*. New York: Plenum, 1980.
- TERRACE, H. S., PETITTO, L. A., SANDERS, R. J., & BEVER, T. G. Can an ape create a sentence? *Science*, 1979, 209, 891-902.

Accepted February 25, 1982.

²Commentaries on other instances of possible overinterpretation in research with chimpanzees are available (e.g., Terrace, Petitto, Sanders, & Bever, 1979; Sebeok & Umiker-Sebeok, 1980; Epstein, Lanza, & Skinner, 1980, 1981; Epstein, 1981).