R. Allen and Beatrix T. Gardner

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| 1971 | Gardner, R. A., & Gardner, B. T. (1971). Communication with a young chimpanzee: Washoe's vocabulary.(No abstract) |
| 1974 | Gardner, R. A., & Gardner, B. T. (1974). *Teaching sign language to the chimpanzee, washoe*. Unpublished manuscript, University of Nevada.Abstract: Project Washoe, in which two-way communication was established with a chimpanzee by means of the sign language of the American deaf, Ameslan, is best illustrated in motion picture films. During the course of the project, more than 20 hours of 16mm films were made. “Teaching Sign Language” is the first of a series of 3 films on the project. It consists of a selection from the film record illustrating: the range of Washoe’s vocabulary, including signs for objects, proper names, modifiers, actions, and negatives; the development of sentence-like sequences of signs; the context in which she signed, including requests, answers to questions, spontaneous comments and questions, and blind-testing conditions; and the research methodology which emphasized (1) the integration of two-way communication into all aspects of the daily life of the chimpanzee, and (2) rigorous testing procedures. This is the test of the soundtrack of the film. Some descriptive notes indicating the action have been added in parentheses. All of the text that is not contained in these parentheses is a direct transcription from the soundtrack. Often, the soundtrack consists of the direct translations into English of Ameslan signs, as they appear in the film. All direct translations from Ameslan into English are written in capitals. Translations of Washoe’s signs are underlined and translations of signs made by her human companions are not. The remainder of the soundtrack is written in italics. |
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| 1975 | Gardner, R. A., & Gardner, B. T. (1975, February 28). Early signs of language in child and chimpanzee. *Science*, *187*, 752-753.Abstract: In a sequel to Project Washoe, chimpanzees are being aught American Sign Language from birth by humans who are fluent in the language, including persons who are themselves deaf or whose parents were deaf. The first two subjects began to use signs when they were 3 months old, and these early results indicate that the new conditions are significantly superior to the conditions of Project Washoe. More valid comparisons can now be made between the acquisition of language by children and by chimpanzees. |
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| 1982 | Gardner, B. T. (1982). Comparative psychology and language acquisition. *Contemporary Psychology: A Journal of Reviews,* *27*(1), 68.(No abstract) |
| 1982 | Van Cantfort, T. F., & Rimpau, J. B. (1982, Spring). Sign language studies with children and chimpanzees.Abstract: With the beginning of the project Washoe in 1966 a new field of scientific inquiry opened. Sign language studies with chimpanzees provide a new tool for understanding the continuity between human and non-human intelligence. In this article we have answered many of the criticisms of sign language studies with chimpanzees by taking a close look at the procedures and results of this new field of scientific inquiry. We have tried to shed more light than heat on the subject and hope that we have shown how the work of comparative psychologists has contributed to the understanding of the nature of language and intelligence. |
| 1984 | Gardner, R. A., & Gardner, B. T. (1984). A vocabulary test for chimpanzees. *A Journal of Comparative Psychology,* *98*(4), 381-404.Abstract: Chimpanzees can communicate in American Sign Language (ASL) to independent human observers whose only source of information is the ASL signs of the chimpanzees. A vocabulary test was presented to 4 cross-fostered chimpanzees (4-6 years old). Thirty-five-millimeter color slides were projected on a screen that could be seen by the chimpanzee subject but not by the human observers. There were two observers: O1 was the questioner in the testing room with the subject; O2 was in a different room. Neither observer could see the other, or the responses of the other observer. O1 and O2 agreed in their readings of both correct and incorrect signs, and most of the signs were the correct ASL names of the slides. In order to show the chimpanzees were naming natural language categories-the sign DOG could refer to any dog, FLOWER to any flower, SHOE to any shoe- each test trial was a first trial in that test slides were presented only once. Analysis of errors showed that two aspects of the signs, gestural form and conceptual category, governed the distribution of errors. |
| 1985 | Gardner, B. T., & Gardner, R. A. (1985). Signs of intelligence in cross-fostered chimpanzees. *Philosophical Transactions of the Royal Society*, *B 308*, 159-176.Abstract: In cross-fostering, the young of one species are reared by adults of another, and in the classical ethological studies of imprinting and song-learning. In our laboratory, infant chimpanzees were reared under human conditions that included two-way communication in American Sign Language, the gestural language of the deaf in North America. A large body of evidence from five chimpanzees demonstrated stage by stage replication of basic aspects of the acquisition of speech and signs by hearing and deaf children. Here we review evidence that, under double-blind conditions: (i) the chimpanzees communicated information in A.S.L. to human observers; (ii) independent human observers agreed in their identification of the chimpanzee signs, (iii) the chimpanzees could use the sign to refer to natural language categories: DOG for any dog, FLOWER for any flower, SHOE for any shoe |
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| 1988 | Gardner, R. A., & Gardner, B. T. (1988). The role of cross-fostering in sign language studies of chimpanzees. *Human Evolution,* *3*(1-2), 65-79.Abstract: In cross fostering, the young of one species are reared by adults of another. In our cross-fostering laboratory, two-way communication by means of American Sign Language (ASL) brought the rearing conditions for chimpanzees much closer to those of human children than was possible in earlier studies. At the same time, ASL provided a means by which chimpanzees could express their intelligence in ways that permit closer comparisons with human children. Cross-fostered chimpanzees can communicate with human observers whose only source of information is the American Sign Language (ASL) signs of the chimpanzees. In order to show that the chimpanzees could name natural language categories-that the sign DOG could refer to any dog, FLOWER to any flower, SHOE to any shoe- each trial was a first trial in that test slides were presented only once. Analysis of errors showed that two aspects of the signs, gestural form and conceptual category, governed the distribution of errors. Like human adults and human children who sign, the chimpanzees modulated their signs in meaningful ways. Observations in field noted, video tape records, and systematic experiments illustrate how these modulations were related to the verbal and nonverbal context and how they made signs more visible, more versatile, and more informative.  |
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| 1994 | Gardner, R. A., & Gardner, B. T. (1994). Ethological roots of culture. In R. A. Gardner, B. T. Gardner, B. Chiarelli and F. X. Plooij (Eds.) *The ethological roots of culture* (pp. 199-222). Boston, MA: Kluwer Academic Press.Abstract: Sign language studies of cross-fostered chimpanzees measure the amount of human culture transmitted to very young chimpanzees under special conditions. Cross-fostered chimpanzees, like human children, only acquire culture and language gradually, in a process that takes many years. Here we discuss details of the procedure, the overlap between human and chimpanzee infants in the contents of the first 50-item vocabularies, and the ways in which the signs of chimpanzees exhibit the fuzziness of natural language categories. We also compare the cross-fostering approach with more traditional modular approaches to the study of language like behavior in nonhuman animals. |
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| 2000 | Jensvold, M.L.A., & Gardner, R.A. (2000). Interactive use of sign language by cross-fostered chimpanzees. *Journal of Comparative Psychology, 114,* 335-346.Abstract: Cross-fostered as infants in Reno, Nevada, chimpanzees (*Pan troglodytes*) Washoe, Moja, Tatu, and Dar freely converse in signs of American Sign Language with each other as well as with humans in Ellensburg, Washington. In this experiment, a human interlocutor waited for a chimpanzee to initiate conversations with her and then responded with 1 of 4 types of probes: general requests for more information, on-topic questions, off-topic questions, or negative statements. The responses of the chimpanzees to the probes depended on the type of probe and the particular signs in the probes. They reiterated, adjusted, and shifted the signs in their utterances in conversationally appropriate rejoinders. Their reactions to and interactions with a conversational partner resembled patterns of conversation found in similar studies of human children. |
| 2001 | Haasch, J. S., Gardner, B. T., & Gardner, R. A. (2001). *Development of indexical pointing in four cross-fostered chimpanzees*.(No abstract) |
| 2002 | Bodamar, M. D., & Gardner, R. A. (2002). How cross-fostered chimpanzees (Pan troglodytes) initiate and maintain conversations. *Journal of Comparative Psychology*, *116*(1), 12.Abstract: This study systematically sampled typical attention-getting sounds and sign language conversations between each of 4 originally cross-fostered chimpanzees (*Pan troglodytes*), still living freely, but now in a laboratory setting, and a familiar human interlocutor. Videotape records showed that when they encountered a human interlocutor sitting alone at his desk with his back turned to them, the crossfosterlings either left the scene or made attention-getting sounds. The only signs they made to the interlocutor's back were noisy signs. When the human turned and faced them, the chimpanzees promptly signed to him (98% of the time) and rarely made any sounds during the ensuing signed conversations. Under systematic experimental conditions, the signed responses of the chimpanzees were appropriate to the conversational styles of the human interlocutor, confirming daily field observations.  |
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| 2005 | Gardner, R. A. (2005). Animal cognition meets evo-devo. *Behavior and Brain Sciences,* *28*(5), 699-700.Abstract: Sound comparative psychology and modern evolutionary and developmental biology (often called evo-devo) emphasize powerful effects of developmental conditions on the expression of genetic endowment. Both demand that evolutionary theorists recognize these effects. Instead, Tomasello et al. compares studies of normal human children with studies of chimpanzees reared and maintained in cognitively deprived conditions, while ignoring studies of chimpanzees in cognitively appropriate environments. Karl Marbe, distinguished German experimental cognitive psychologist, studied Basso, a chimpanzee in the Frankfurt zoo that solved arithmetic problems (Marbe 1917). Asked in German “How much is six plus four?” Basso selected a card bearing the number “10” as in Figure 1. Verifying that Basso was usually correct, Marbe interviewed the zookeeper and trainer who drilled Basso on simple problems as one might drill a small schoolchild, but without believing that Basso could do arithmetic. He believed, instead, that Basso read his mind. Marbe tested this hypothesis by asking the trainer to give Basso a series of arithmetic problems and think wrong answers. The result was decisive. Basso repeatedly gave the answer that his trainer was thinking, regardless of the correct answer in arithmetic. He succeeded at mind reading where he failed at arithmetic. |
| 2005 | Chalcraft, V. J., & Gardner, R. A. (2005). Cross-fostered chimpanzees modulate signs of American sign language. In K. Liebal, C. Muller, & S. Pika (Eds.), *Gestural Communication in Nonhuman and Human Primates*. Benjamin’s Current Topics (No abstract) |
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| 2015 | Newquist, G. & R. A. Gardner (2015). Reconsidering food reward, brain stimulation, and dopamine: Incentives act forward. American Journal of Psychology, 128(4), 431-4344. DOI: 10.5406/amerjpsyc.128.4.0431In operant conditioning, rats pressing levers and pigeons pecking keys depend on contingent food reinforcement. Food reward agrees with Skinner’s behaviorism, undergraduate textbooks, and folk psychology. However, nearly a century of experimental evidence shows, instead, that food in an operant conditioning chamber acts forward to evoke species-specific feeding behavior rather than backward to reinforce experimenter-defined responses. Furthermore, recent findings in neuroscience show consistently that intracranial stimulation to reward centers and dopamine release, the proposed reward molecule, also act forward to evoke inborn species-specific behavior. These results challenge longstanding views of hedonic learning and must be incorporated into contemporary learning theory. |
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