

IS GIVING CHIMPANZEES CONTROL OVER ENVIRONMENTAL ENRICHMENT A GOOD IDEA?

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One of the cornerstone issues in defining or promoting psychological well-being of apes seems to be allowing animals some control over their own environments. Many individuals writing about psychological well-being or improving animal welfare have mentioned the importance of control. For example, Markowitz (1982, p.197-198) wrote that we should “leave as many decisions as possible to the animals while providing them increased behavioral opportunities.” A number of others have echoed this thought (Coe, 1995; Novak and Drewsen, 1989; Snowdon and Savage, 1989; Rumbaugh, Washburn and Savage-Rumbaugh, 1989), and have suggested, for example, that, “Animals cannot passively receive environmental events; they must be able to act on the environment and consequences must result from their actions. This is a key aspect to most good environmental enrichment” (Snowdon and Savage, 1989, p.81). We know that a lack of control, particularly over aversive events, can lead to what is called “learned helplessness” (Overmier and Seligman, 1967). Learned helplessness can result when an animal experiences repeated exposure to uncontrollable negative events (such as electric shock, loud noise, or cold water). This can lead to major behavioral and physiological problems in a wide range of species, such as a retardation of later learning, especially if the learning is to avoid further negative events (Mineka and Hendersen, 1985). Overall, the notion that enhancing animals’ control over their environments should be critical in promoting well-being, is widely agreed to.

Many published studies claim that one important aspect of enrichment is giving the animals control. But these studies do not specifically set up conditions to examine subjects with and without control over some feature of their environment. Such a comparison would allow you to conclude that differences in behavior between the two groups of subjects are due to having or lacking control. So, while many of us bring up the issue of control, very few published studies have carefully or experimentally examined this issue in non-human primates. We will briefly describe three studies that did.

In one study two groups of rhesus monkeys were exposed to a loud noise. Those without control over the noise had elevated levels of cortisol (a “stress-related” hormone) and social aggression compared to monkeys who could terminate the noise (Hanson et al, 1976). Also, when the lever that had controlled the loud noise was removed from the monkeys, they showed greater elevations in cortisol than monkeys who never had control over the noise. This indicates that the loss of control may be very important to examine, as well. In another study, peer-reared rhesus monkeys lived in one of three conditions: (1) with control over access to food, water and treats; (2) in an identical environment with inoperative equipment where they received yoked, noncontingent access to the reinforcers; and (3) in a standard laboratory environment with no access to the reinforcers (Mineka, et al, 1986). The monkeys with control were bolder when presented with a fear-provoking toy monster, more readily entered a novel playroom, explored more in the playroom situation, and adapted somewhat better when separated from peers.

More recently, Washburn and colleagues (1991) gave rhesus monkeys the opportunity to select which of many computer tasks they would work on, or they were assigned a series of tasks. These two conditions were “yoked” or set up so that the animal chose the tasks during one session, and then later was assigned those same tasks in the same order. The monkeys performed better when they could choose the task than when they were assigned the task. Each of these studies experimentally manipulated control over the environment for the nonhuman primates studied, but none were evaluated as enrichment, and none involved apes.

To help fill this void, we have conducted two studies to assess the effects of giving chimpanzees control over two different forms of enrichment—videotapes of conspecifics, and a computer-joystick task. The use of these types of technology as forms of enrichment have been suggested and studied previously (Bloomsmith, et al, 1990; Bloomsmith and Lambeth 2000; Markowitz, 1982; Rumbaugh, et al, 1989; Washburn, et al, 1991). In both studies, we used a “yoked control” design. Half of the subjects could control the task (i.e., chose the videotape or control the joystick to “play” the computer game), and half were given inoperable equipment and therefore could not control the enrichment. Since the videotape player or computer was linked between two groups of subjects, both were exposed to the same visual stimuli and were given the same foods, at exactly the same time. One group of subjects controlled the device, and the other group, the “yoked control” subjects, could not exercise any control over the enrichment. There were 12 subjects in the computer task study and 62 subjects in the video study. The computer study took place at the Yerkes Regional Primate Research Center of Emory University, in Atlanta, Georgia, and the video study took place at the M.D. Anderson Cancer Center, Science Park, Department of Veterinary Sciences in Bastrop, Texas. Three hundred hours of data were analyzed between the two studies. We hypothesized that chimpanzees with control over either enrichment system would use the system more, and would show more evidence of behavioral benefit than would those without such control.

In both studies, most subjects made good use of the enrichment, although in the computer study elderly females did not. Statistical analysis of data from the study of the computer task as a form of enrichment showed no change in behavior related to whether chimpanzees had control over the enrichment. Data analysis of the study of videotapes as a form of enrichment revealed that solitary play was higher in those subjects with control over the enrichment. Scratching, which is sometimes used as a measure of anxiety, was higher in those subjects who lacked control.

Comparing findings with these two different types of enhancements will help to determine whether control may differentially influence behavior depending upon the type of enhancement that is controlled. The video enrichment is relatively passive and requires that the animals choose to turn on one of several videotape segments, while the computerized enrichment is more interactive,

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requiring the chimpanzee to learn a task. Giving chimpanzees control over two forms of visual/interactive enrichment led to few changes in behavior. There were no differences between the behavior of chimpanzees with control over the computer task versus those without. This is surprising since most of the subjects appeared interested in the task, voluntarily participated, and learned the task. These findings should not be interpreted to mean that control is unimportant to captive apes. These studies were of very specific events in a defined context, and there may be different findings if other environmental features or stimuli were brought under animals' control. It may be that controlling certain environmental features is more important than controlling others. For example, Rumbaugh, et al. (1989) suggest that control over social companions may be important. Controlling the delivery of large portions of ones' diet or controlling noxious stimuli may also be more important. In any case, the surprising findings of these two studies underscore the importance of conducting objective assessments to measure the possible benefits of giving apes control over various features of their environments.

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