[Turnbull (1961) - some observations regarding the experiences and behavior of the BaMbuti Pygmies.

METHOD

As mentioned at the beginning of this chapter, Turnbull is not a psychologist, but rather an anthropologist. In the late 1950s and early 1960s, he was in the dense Ituri Forest in Zaire (now Congo) studying the life and culture of the BaMbuti Pygmies. Because he was an anthropologist, Turnbull's primary method of research was naturalistic observation, that is, observing behavior as it occurs in its natural setting. This is an important method of research for psychologists as well. For example, differences in aggressive behavior between young boys and girls during play could be studied through observational techniques. Examining the social behavior of nonhuman primates, such as chimpanzees, would also require a method involving naturalistic observation. Such research is often expensive and time consuming, yet some behavioral phenomena cannot be properly researched in any other way.

Turnbull, on one excursion, was traveling through the forest from one group of Pygmies to another. He was accompanied by a young man (about 22 years old) named Kenge, who was from one of the local Pygmy villages. Kenge always assisted Turnbull in his research as a guide and introduced Turnbull to groups of BaMbuti who did not know him. Turnbull's observations that constitute this published report began when he and Kenge reached the eastern edge of a hill that had been cleared of trees for a missionary station. Because of this clearing, there was a distant view over the forest to the high Ruwenzori Mountains. Since the Ituri Forest is extremely thick, it was highly unusual to see views such as this.

RESULTS

Kenge had never in his life seen a view over great distances. He pointed to the mountains and asked if they were hills or clouds. Turnbull told him that they were hills, but they were larger than any Kenge had seen before in his forest. Turnbull asked Kenge if he would like to take a drive over to the mountains and see them more closely. After some hesitation—Kenge had never left the forest before—he agreed. As they began driving, a violent thunderstorm began and did not clear until they had reached their destination. This reduced visibility to about 100 yards, which prevented Kenge from watching the approaching mountains. Finally, they reached the Ishango National Park, which is on the edge of Lake Edward at the foot of the mountains. Turnbull writes:

> As we drove through the park the rain stopped and the sky cleared, and that rare moment came when the Ruwenzori Mountains were completely free of cloud and stood up in the late afternoon sky, their snow-capped peaks shining in the afternoon sun. I stopped the car and Kenge very unwillingly got out. (p. 304)

Kenge glanced around and declared that this was bad country because there were no trees. Then he looked up at the mountains and was literally speechless. The life and culture of the BaMbuti were limited to the dense jungle and, therefore, their language did not contain words to describe such a sight. Kenge was fascinated by the distant snow caps and interpreted them to be a type of rock formation. As they prepared to leave, the plain stretching out in front of them also came clearly into view. The next observation makes up the central point of this article and this chapter.

Looking out across the plain, Kenge saw a herd of buffalo grazing several miles away. Remember that at such a distance, the image (the sensation) of the buffalo cast onto the retinas of Kenge's eyes was very small. Kenge turned to Turnbull and asked what kind of insect they were! Turnbull replied that they were buffalo even bigger than the forest buffalo Kenge had seen before. Kenge just laughed at what he considered to be a stupid story and asked again what those insects were. "Then he talked to himself, for want of more intelligent company, and tried to liken the distant buffalo to the various beetles and ants with which he was familiar" (p. 305).

Turnbull did precisely what you or I would do in the same situation. He got back into the car and drove with Kenge to the grazing buffalo. Kenge was a very courageous young man, but as he watched the animals steadily increase in size, he moved over next to Turnbull and whispered that this was witchcraft. Finally, as they approached the buffalo and he could see them for the size they truly were he was no longer afraid, but he was still unsure as to why they had been so small before, and wondered if they had grown larger or if there was some form of trickery going on.

A similar event occurred when the two men continued driving and came to the edge of Lake Edward. This is quite a large lake, and there was a fishing boat two or three miles out. Kenge refused to believe that the distant boat was something large enough to hold several people. He claimed that it was just a piece of wood, until Turnbull reminded him of the experience with the buffalo. At this, Kenge just nodded in amazement.

During the rest of the day spent outside the jungle, Kenge watched for animals in the distance and tried to guess what they were. It was apparent to Turnbull that Kenge was no longer afraid or skeptical, but was working on adapting his perceptions to these entirely new sensations. And he was learning fast. The next day, however, he asked to be returned to his home in the jungle and again remarked that this was bad country: no trees.

DISCUSSION

This brief research report dramatically illustrates how we acquire our *perceptual constancies*. Not only are they learned as a result of experience, but these experiences are influenced by the culture and environment in which we live. In the jungle where Kenge had spent his entire life, there were no long-range views. In fact, vision was usually limited to about a hundred feet. Therefore, there was no opportunity for the BaMbuti to develop size constancy, and, if you stop to think about it, there was no need for them to do so. Although it has not been directly tested, it is possible that these same groups of Pygmies may have a more highly developed ability for figure-ground relationships. The logic here is that it is extremely important for the BaMbuti to

distinguish those animals (especially the potentially dangerous ones) that are able to blend into the surrounding background vegetation. This perceptual skill would seem less necessary for people living in a modern industrialized culture.

In regard to size constancy, Turnbull's observational study may offer us an explanation for why this ability is learned rather than innate. Certain perceptual skills may be necessary for our survival, but we do not all develop and grow in the same situation. Therefore, to maximize our survival potential, some of our skills are allowed to unfold over time in ways that are best suited to our physical environment.

SIGNIFICANCE OF FINDINGS AND RECENT APPLICATIONS

Turnbull's work fueled the fire of behavioral scientists who address the question of the relative influence of biology versus environment (learning) on our behavior: the "nature-nurture" controversy. Turnbull's observations of Kenge's perceptions points strongly to the nurture or environmental side of the issue. In a fascinating series of studies by Blakemore and Cooper (1970), kittens were raised in darkness except for exposure to either vertical or horizontal stripes. Later, when the cats were taken out of the dark environment, the ones who had been exposed to vertical lines responded to the vertical lines on objects in the environment, but ignored horizontal lines. Conversely, the cats exposed to horizontal lines during development later appeared to recognize only the presence of horizontal figures. The cats' ability to see was not damaged, but some specific perceptual abilities had not developed. These particular deficits appeared to be permanent.

Other research, however, has suggested that some of our perceptual abilities may be present at birth, that is, given to us by nature without any learning needed. For example, one study (Adams, 1987) exposed newborn infants (only three days old) to squares of various colors of light (red, blue, green) and to squares of gray light at the exact same brightness. All these very young infants spent significantly more time looking at the colorful squares than at the gray ones. It is unlikely that infants had the opportunity to learn that preference in three days, so these findings provide evidence that some of our perceptual abilities are innate.

The overall conclusion from research in this area is that there is not a single definitive answer regarding the source of our perceptual abilities. Turnbull and Kenge clearly demonstrated that some are learned, but others may be innate or part of our "factory-installed standard equipment." The one sure point here is that this area of research is bound to be pursued far into the future.

It should be noted that this article by Turnbull, even though it appeared in a psychology journal, has made lasting contributions to Turnbull's own field of anthropology and has helped to illustrate important crossovers between the two fields. Psychologists have continually been informed about the underlying causes of human behavior by studying it across cultural borders and ethnic boundaries. Conversely, anthropologists have broadened their scope of study through an awareness of the psychological underpinnings of human behavior in societal and cultural settings (e.g., see Fisher & Strickland, 1989; GalaniMoutafi, 2000).

Finally, what is perhaps most indicative of Turnbull's ongoing influence in the field of psychology is the observation that his 1961 article and his related book (Turnbull, 1962), continue to be cited and quoted in most general psychology texts as demonstrations of environmental influences on human perceptual development (e.g., Morris, 2003; Kalat, 2002). Colin Turnbull died in 1994 at the age of 70. He was one of the most famous and most unconventional anthropologists in the history of the field. If you are interested in learning more about the details of his life, an excellent, well-reviewed biography has been published recently, titled *In the Arms of Africa: The Life of Colin M. Turnbull* (Grinker, 2000), or a briefer summary of his life by Bower (2000).

Adams, R. J. (1987). An evaluation of color preference in early infancy. *Infant Behavior and Development, 10,* 143–150.

Bower, B. (2000). The forager king. *Science News, 158,* 170–171

Blakemore, C., & Cooper, G. F. (1970). Development of the brain depends on physical environment. *Nature, 228,* 227–229.

Fisher, J., & Strickland, H. (1989). Ethnoarchaeology among the Efe Pygmies, Zaire: Spacial organization of campsites. *American Journal of Physical Anthropology, 78,* 473–484.

GalaniMoutafi, V. (2000). The self and the other: Traveler, ethnographer, tourist. *Annals of Tourism Research, 27*(1), 203–224.

Grinker, R. (2000). *In the arms of Africa: The life of Colin M. Turnbull.* New York: St. Martins Press.

Kalat, J. (2002). *Introduction to Psychology.* Pacific Grove, CA: Wadsworth.

Morris, C. *Understanding psychology* (2nd ed.). Englewood Cliffs, NJ: Prentice Hall.

Turnbull, C. (1962). *The forest people.* New York: Simon & Schuster.

TO SLEEP, NO DOUBT TO DREAM . . .

Aserinsky, E., & Kleitman, N. (1953). Regularly occurring periods of eye mobility and concomitant phenomena during sleep. *Science, 118,* 273–274.

Dement, W. (1960). The effect of dream deprivation. *Science, 131,* 1705–1707.

As you can see, this section is somewhat different from the others in that there are two articles being discussed. The first study discovered a basic phenomenon about sleeping and dreaming that made the second study possible. The primary focus is William Dement's work on dream deprivation, but to prepare you for that, Aserinsky's findings must be addressed first.

In 1952, Eugene Aserinsky, while a graduate student, was studying sleep. Part of his research involved observing sleeping infants. He noticed that as these infants slept, there were periodic occurrences of active eye movements. During the remainder of the night, there were only occasional slow, rolling eye movements. He theorized that these periods of active eye movements might be associated with dreaming. However, infants could not tell him