WHAT YOU SEE IS WHAT YOU'VE LEARNED


This study is a somewhat unusual one to appear in this book. Turnbull did not have any specific theoretical propositions, there was no clear scientific method used, and the author is not a psychologist. Nevertheless, this short article has been frequently and widely cited to demonstrate some important psychological concepts relating to your ability to perceive the world around you. Before reaching the point where Turnbull’s observations can be placed in the proper context, a considerable amount of conceptual explanation is necessary. Keep in mind that we will get to the study itself, even though we may seem to be taking the long way around. Let’s begin by filling in the theory behind Turnbull’s discoveries, which the brevity of his article did not allow him to do.
THEORETICAL PROPOSITIONS

Two large and important fields of study within psychology are those of sensation and perception. These are fundamentally separate areas, but they are highly related. Sensation refers to the information you are constantly receiving from your environment through your senses. You are bombarded with a huge amount of sensory data every minute of every day. If you just stop and think about it for a minute, frequencies of light are reflecting off all the objects around you wherever you look, near or far. There are probably a multitude of sounds entering your ears at any moment, parts of your body are in contact with various objects, and several tastes and smells are often present. If you take your attention off this book for a moment (I know this is difficult!) and focus on each sense, one at a time, you'll begin to get some idea of the amount of "sensory input" that was beneath your level of awareness. In fact, if I do this right now I become aware of the hum from my computer, a car going by outside, a door slamming somewhere, a painting on the wall, a partly cloudy sky, the light from my desk lamp, the feel of my elbows resting on the arms of the chair, the taste of the apple I just finished eating, and so on. However, just a few seconds ago, I was not aware of any of these sensations. We are continuously filtering all this available input and using only a small percentage of it. If your sensory filtering mechanisms were suddenly to fail, the world would become so intensely confusing that you would be overwhelmed, and probably you would not be able to survive it.

The fact that the sensory world (what you see, hear, touch, taste, and smell) usually appears to you in an organized way is due to your abilities of perception. Sensations are the raw materials for perception. Your brain's perceptual processes are involved in three general activities: (1) selecting the sensations to pay attention to as discussed in the previous paragraph; (2) organizing these into recognizable patterns and shapes; and (3) interpreting this organization to explain and make judgments about the world. In other words, perception refers to how we take this jumble of sensations and create meaning. Your visual sensations of the page you are reading are nothing more than random black shapes on a white background. This is what is projected onto the retinas of your eyes and sent to the visual fields of your brain. However, you pay attention to them, organize them, and interpret them so that they become words and sentences that contain meaning.

Your brain has many tricks or strategies available to assist in organizing sensations in meaningful and understandable ways. To put Turnbull's study in proper perspective, let's take a look at several of these. The perceptual strategy you probably use the most is called figure-ground. A well-known example of the figure-ground relationship is pictured in Figure 1. When you look at the drawing, what do you see immediately? Some of you will see a white vase, while others will see two profiles facing one another. As you study this drawing, you will be able to see either one and you will be able to switch back and forth between seeing the vase and seeing the profiles. You'll notice
that if you look at the vase (figure), the profiles (ground) seem to fade into
the background. But focus on the profiles (figure) and the vase (ground) be-
comes the background. We appear to have a natural tendency to divide sen-
sations into figure and ground relationships. If you think about it, this makes
the world a much more organized place. Imagine trying to spot someone in a
crowd of people. Without your figure-ground abilities, this task would be im-
possible. When soldiers wear camouflaged clothing, the distinction between
figure and ground is blurred so that it becomes difficult to distinguish the
figure (the soldier) from the ground (the vegetation).

Other organizational strategies we use routinely to create order and
meaning out of those chaotic sensations are called "perceptual constan-
tcies." These refer to our ability to know that the characteristics of objects
stay the same even though our sensations of them may change drastically.
One of these, for example, is shape constancy. If you stand up and walk
around a chair, the image of that chair projecting onto your retina (the sen-
sation) changes with every step you take. However, you perceive the shape
of the chair to be unchanged. Imagine how impossibly confusing your world
would be if all objects were perceived differently each time your angle of vi-
sion changed.

Another one of these techniques is size constancy. This is the percep-
tual facility that is most related to Turnbull’s article. Size constancy enables
you to perceive a familiar object as being the same size, regardless of its dis-
tance from you. If you see a school bus two blocks away, the image projected
onto your retina is the same as that of a small toy bus seen close up. Never-
theless, you perceive the distant bus to be its large, normal size. Likewise, if
you are looking at two people standing in a field, one 10 feet from you and
the other 100 feet in the distance, your sensation of the more distant per-
son is of someone 3 feet tall. The reason you perceive that person to be of
normal size is due to your ability of size constancy.

Your perceptions using any of these strategies can be tricked. This is
how visual (optical) illusions work. A film director can shoot a scene in
which a ship is being tossed about in a terrible storm. Even though the cam-
era is filming a 2-foot-long model ship in a special effects tank, we perceive
the ship as full size because of size constancy and the lack of any compari-
son objects to offer cues as to its true size. In the film spoof Airplane, we see
a room shot from a low angle directly behind a telephone on a desk (therefore, we know this phone is about to ring with important information). The phone is so close to the camera lens that it appears huge on the screen, but we see it as a normal-size phone due to our ability of size constancy. The perceptual surprise comes when the phone rings and the actor crosses the room to answer. The phone he picks up turns out to really be as huge as it looked: about 3 feet across!

The last important point that must be made before turning to this chapter’s study concerns whether these perceptual abilities are learned or inborn. Research with individuals who were blind at birth and who later gain their sight has suggested that our ability to perceive figure-ground relationships is, at least in part, innate; that is, present from birth. Perceptual constancies, on the other hand, are a product of experience. When young children (age 5 and under) see cars or trains in the distance, they perceive them as toys and sometimes will ask quite adamantly to have one. By the time children reach age 7 or 8, size constancy has developed and they are able to judge sizes correctly over varying distances.

Psychologists have asked the question: What kinds of experiences allow us to acquire these abilities? And could a situation exist in which a person might grow to adulthood and not possess some of these perceptual talents? Well, Turnbull’s brief report published 30 years ago shed a great deal of light on these questions.

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 the Congo (now Zaire) 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 figureground 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 vs. 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 3 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 3 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 cross-overs 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. This is exemplified by two anthropological studies that made reference to Turnbull’s 1961 article. One study examined the inferred meaning of the organization of campsites in early African Pygmy settlements (Fisher & Strickland, 1989) and another explored the interplay between the forest environment and the social organization of Kenge’s native culture (Mosko, 1987).

Finally, what is perhaps most indicative of Turnbull’s on-going influence in 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, 1996; Plotnik, 1996).
