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Critical Review of *Some Observations regarding the Experiences and Behavior of the BaMbuti*

Pygmies by Colin M. Turnbull (1961)

Colin M. Turnbull's 1961 article *Some Observations regarding the Experiences and Behavior of the BaMbuti Pygmies* examines several aspects of environmental psychological conditioning in the BaMbuti Pygmy tribe indigenous to the Congo region of central Africa. Before I begin analyzing the different observations that Turnbull makes on BaMbuti distance and number perception, art, and historical records, I have to make the claim that I am reading this work from a psychological perspective and not an anthropological one. There is no mention in Turnbull's article of corroboration from other scientists, and it is therefore hard to understand the possible biases that accompanied his observations. It is also worth to note that some of the first observations on size and distance perceptions reported in this paper are based on the responses of a single member of the BaMbuti tribe, and not a random member either; he was a boy named Kenge who was "about 22" and "always accompanied" Turnbull on his expeditions in this region. Despite these seemingly problematic scientific approaches, I still believe that this paper presents many important ideas from a psychological perspective that provoke critical thought, primarily in terms of the environment's role on one's perceptual conditioning. Turnbull's work steps outside the normal realm of Western civilization, and even what we might define as

modern day civilization¹, and therefore away from the bias of these environments to investigate basic perceptual differences. For the sake of this critique, I will take Turnbull's account to be valid, and proceed to analyze each of his observations solely as a critique of the psychological issues that they address.

The first aspect of BaMbuti perception upon which Turnbull remarks is that of size and distance perception. Turnbull ventures out with Kenge away from his homeland in the dense Ituri forest to the vast, snow-capped Ruwenzori Mountains. From a distance, Kenge cannot fathom the true nature of these mountains, having never seen "hills bigger than [those] in his forest" (304, and does not process them as such. As they drive closer and the visibility improves, Kenge is finally forced to account for the giant structures before him. He is reported as "unable to express any ideas" and "fascinated" by the snow, which "he thought...must be some kind of rock" (305). Kenge's attempts to categorize these unfamiliar and unbelievable stimuli with known labels are reasonable, and bring about an interesting point: although perception of the external world may be dependent on the environment in which one is raised, there is a case to be made that grouping new stimuli to exist within an already established environment is innately human. This is further exemplified by the next example that Turnbull gives, when he and Kenge observe buffalo grazing below from a high altitude. Never having observed the animals from such a distance, he is convinced that they are some sort of insect, and "tried to liken the buffalo to the various beetles and ants with which he was familiar" (305). When the pair drives progressively closer, "he was no longer afraid, but what puzzled him still was why they had been

¹ In terms of Morton Fried's and Elman Service's classification of human culture into four distinct categories, the BaMbuti align most accurately with nomadic hunter-gatherer bands, a largely egalitarian form of social organization. By all accounts, they seem to lack the complex social hierarchy and institutional government associated with this classification's definition of a civilization.

so small, and whether they really had been small and had suddenly grown larger, or whether it had been some kind of trickery” (305). Finally, after mistaking a canoe across a lake as a small pile of wood, Kenge begins to adapt. The rigid mold of what he believed was possible begins to give in a new environment, and the concept of “constancy” begins to take shape in his mind.

Size constancy is the particular form of constancy being discussed here, and is defined, according to Gillam, as the visual perception of an object or quality remaining constant even though our sensation of the object changes (89-93). Having personally been raised in a heterogeneous environment where distance between myself and my surroundings vary (an average-sized home within a suburban town), and even further having traveled outside of this environment (large cities, rural areas, bodies of water, mountains, etc.) numerous times, my perception of distance and size constancies is relatively well-adjusted to the actual distances and sizes of my external environment. I say “relatively,” because this perceptual ability seems to differ greatly among people like Kenge. Growing up only in a dense forest environment, one can postulate that Kenge and the rest of the BaMbuti tribe were never exposed to great distances, and therefore had no way to account for size constancy when viewing something from a distance; they merely perceived them as smaller objects.

Although lack of environmental exposure seems like a reasonable explanation for Kenge’s inability to initially account for distance, part of Turnbull’s analysis seems flawed. He notes,

“In the forest, vision is strictly limited to a matter of yards, the greatest distance one can see, when up a tree looking down onto a camp, being a hundred feet or more below. Kenge was, however, a sophisticated and well travelled Pygmy. He had been with me a long time, had travelled along roads where he could see for as much as a quarter of a mile, and had seen

aircraft and knew that they contained people...He had seldom seen any animal from further away than a few yards, he had never seen any boat bigger than a dug-out canoe, and that no further away than a few hundred feet" (305-6).

The BaMbuti may have been inexperienced in seeing animals and boats from far away, but depth perception is a gradient measure. If Kenge had any experience seeing objects from a quarter-mile away, and knew that these objects appeared smaller than they were up close, why was he unable to apply this reasoning to something farther away? Was this not the next logical conclusion?

Rather than discredit Turnbull's findings, I propose that another component of size constancy more specific than simply lack of distance exposure could account for Kenge's observations. This is referred to as linear perspective, or the phenomenon that parallel lines receding into the distance converge. Surrounded by an environment in which parallel lines of this type are ubiquitous, such as roads, we in industrialized societies have a template to which we can compare the distance of many other objects within our visual field. This is further explained by the Müller-Lyer illusion, in which two parallel lines appear to be of different lengths due to their association with the angles protruding from their ends². In the dense forest, however, this linear perspective is lacking, and thus the confusion in an open environment, reportedly without trees, where objects can be perceived in the context of the horizon. It could be more specifically that Kenge's inexperience with linear perspective, rather than just distance perception could explain his previous observations.

Before turning to Turnbull's next observation, on BaMbuti number perception, I think it is helpful to turn back to one of the key theories of epistemology first developed by Jean Piaget,

² According to Richard Gregory, we assume in general that the "angles in" configuration of the illusion corresponds to an object which is closer, and the "angles out" configuration corresponds to an object which is farther away.

constructivism. Essentially, constructivism states that humans acquire knowledge by forming interpretations from direct experiences with their external environment, which are then processed by the mind. Because this interaction is indirect, there is a critical stage in knowledge processing which is the interpretation interacting with existing “schemata³,” or “schema” we hold as ideas. Often when approached with unfamiliar situations with new stimuli, we “assimilate” these stimuli into our existing constructions of what they may be. For example, Kenge, not having ever seen a mountain before assumed that they must be clouds from a distance, because a cloud was the closest representation he held that compared to what he perceived. However, there is also a more adaptive process that we as humans can undertake when gaining that of knowledge: accommodation. In this model, our established, internal “schema” must accommodate new stimuli that do not fit into existing molds. After Kenge observes the mountains in closer proximity and clear visibility, sees the buffalo grow larger as he approaches, and accepts the existence of the boat across the lake, he begins this process of accommodation, though very gradually.

I mention these elements of Piaget’s theory because I believe that Turnbull’s next observation, on the environment’s shaping of BaMbuti number perception, exemplifies another way in which accommodation is a difficult process to internalize. He reports that the tribe members are “unable to count above four,” but have “such an eye for patterns” (306) that they can quickly detect changes in a set of multiple arrows or multiples of beans used in a gambling game. It is unclear whether Turnbull is speaking about language deficits for quantities above four, because their adeptness at grouping by through multiples seems to suggest the ability to

³ In his paper *Culture and Cognition*, Paul DiMaggio defines schemata as “knowledge structures that represent objects or events and provide default assumptions about their characteristics, relationships, and entailments under conditions of incomplete information.”

count, as well as add and multiply. At the same time, however, this ostensible paradox may again reflect an inability to adapt to internalize new stimuli. Our western system of counting, on the one hand, requires at least an ability to count to ten, as our system is based on multiples of this number. It makes sense then, that BaMbuti are highly adept at their gambling game, in which they can “tell you if [the pieces] form a multiple of four, or how many - one, two, or three - have to be added to make it into such a multiple” (306). It appears that this lower base system of counting shifts the emphasis onto a form of pattern recognition, the ability to identify multiples, rather than assessing quantity solely by counting. Also worth noting is that basic forms of pattern recognition are known to be an innate skill in many different animal species, and not just humans. This points to the idea that, in this case, the BaMbuti are drawing on innate abilities and their environments are enhancing them.

While this low-base counting system does not seem in many regards to be theoretically inferior to our base ten system, and for the BaMbuti’s purpose may actually be more effective (addition and subtraction vs. multiplication and division), it also reflects the absence of an economy among the their population, as compared with the Bantu people, with whom they occasionally interact. Instead it is a product of their economically egalitarian society, where trade is rare and ways of distributing goods and services are obsolete, thus a way to assess large quantities is not useful.

The BaMbuti are adept visual pattern recognition, but strangely, according to Turnbull’s next observations, this seems not to translate to the realm of visual art. This could be due to a lack of variation within their jungle environment, prompting them to operate visually more on a functional level than an artistic one. Turnbull muses that “perhaps the world of the BaMbuti is

too close around him, too confined and colorless...” (306), colorless, perhaps, in the sense that they are numb to colors and textures that they have been surrounded by their whole lives.

According to the paper, they “refer to white, black and red, by color names,” but “for other colors they make comparisons-- ‘like leaves,’ ‘like leopard,’ instead of ‘green’ or ‘yellow’” (306). Things that exist within their environment need not another identifier if the objects they are describing are the sole possessor of that color. In terms of art, they paint their bodies with crude and simple designs, and leave their wooden tools unpolished. As I researched more about the BaMbuti, I also wondered whether this could be more due to their religious beliefs rather than purely perceptual preferences. They regard the forest as a sacred protector and deity, often referring to it as “Mother” or “Father,” and participate in various rituals in its honor. In this sense, it is possible that they refrain from interfering too much with nature other than for items of utility.

At the same time, Turnbull also notes the BaMbuti’s surprising advancement and complex developments in music. They “can improvise a 15 part liturgy or canon, with melodies frequently running in parallel seconds...” or “divide the melodic line up, note by note, among the performers...” (306-7). During religious ceremonies, they also play a ritualistic trumpet called the “molimo,” which they store in the forest and only retrieve when necessary. What the forest may lack in varying visual stimuli, it seems to more than make up in auditory stimuli, with the cacophony of animal calls, wind, and rain refining the auditory palette of any human living amongst it. From religious perspective, auditory art seems not to take from anything the forest might provide, but rather drawn on its influences and add to it. On the whole, BaMbuti art seems to be a shaped largely by their environment, in particular the emphasis on music rather than

visual art. It is interesting that Turnbull also mentions that “music permeates their whole life,” in that the BaMbuti often uses auditory cues rather than visual ones when hunting: “vision is used by the hunters in the examination of tracks, but the firing of the arrow is often done by sound.” This claim also points to existing evidence in nature, in that many forest dwelling animals have sophisticated hearing abilities, and make up with this sense for what they lack visually.

The last observation that Turnbull makes is on BaMbuti historical records. Essentially, Turnbull uses this observation to make the point that the BaMbuti people have undergone little to no change in their almost four thousand year history. He notes “the earliest historical records of the BaMbuti, found places this tribe where it is today, refers to it as forest dwellers, and indicates that song and dance played a great part in the life of its people then just as it does today, over four thousand years later” (307). As Turnbull goes on to say, there are few promoters of change in their isolated forest environments, and thus the BaMbuti culture and people have remained relatively constant throughout their history. Evolutionarily, they are functioning well enough, and thus require little to no adaptation in order to continue living in this way. Turnbull mentions that the Bantu migration a few hundred years ago did threaten to intervene with the BaMbuti way of life, but this ultimately had very little effect, as the tribe outwardly rejects life outside of their current forest environment. Today, however, there are significant issues that put the BaMbuti population at risk, including but not limited to deforestation, restrictions on big game hunting, gold mining, and civil unrest within their country. Despite these pressing issues, it is fortunate that they have been able to remain so unchanged for much of their history, both for the sake of them as a people, but also for the sake of studies such as these. They present a clear example of a human population cognitively and perceptually shaped by the environment in which they live.

I want to end this review with a discussion of the perceptual theories mentioned in class of Jerome Bruner and James Gibson, and how they relate to the perceptual observations of the BaMbuti made here by Turnbull. Gibson argued for a system of perception based on what he called direct perception or direct realism, the idea that sensation equates to perception and there is no need to for a middle step of interpretation to take place. There are facets of this theory that are plausible and make sense, one being his idea of invariance relationships, and that our constantly changing visual angle determines size and distance constancy. Yet my fundamental qualm with Gibson's theory is his argument that interpretation as a necessary step in perception is not evolutionarily adaptive, and thus not does factor into varying perceptions of the same objective stimuli. For one, it is clear from studies like these that interpretation and environmental status play heavily into our perception of the world. Although Gibson's theory may hold true for the many quick and accurate perceptions that we make on a daily basis, but it falls short when initial perceptions are wrong, such as in the case of illusions. Furthermore, we can extend the importance of interpretation to situations in which we must actually learn about the function of objects in order to perceive them accurately. When Kenge first saw Turnbull's automobile, he probably had a far different perception of it until he rode in it to the mountains. After that trip, his perception of the automobile was inextricably linked to its function and his own experience with it. In this sense, interpretation is critical for perception of our world, and the main reason in which Bruner's theory provides a more accurate model.

The last part of Bruner's theory about perception, in addition to the aforementioned step of interpretation, is the way in which this interpretation extends to become a function of the environment in which we are raised. He speaks about expectation factors influencing perception,

such as motivation, personal values, rewards and punishments, among others. It is clear that these all change based on cultural and environmental situations. The BaMbuti place less value on visual art than we do in Western societies because they are exposed to less visual variation in their environments. As a result, they literally perceive colors with less nuance than we do, but hear with a more critical ear, given the range of sounds within which they are immersed. It is these stark differences within our forms of perception that make theories stressing interpretation and environmental influence the more convincing ones.

Turnbull's case study of BaMbuti perceptual tendencies provides some classic examples in favor of the environment shaping human perception. They live in a confined forest environment, and thus are not conditioned to understand size constancy. Their lack of counting ability but adeptness at identifying multiples in a set suggests an advanced form of pattern recognition that compensates for their limited vocabulary for numbers. Visually, such as evidenced by their inexperience with depth perception, they lack exposure to variance and thus do not produce highly complex visual art. In contrast, however, their musical virtuosity suggests the rich auditory nature of their environment, and the ways this has conditioned them aurally. Furthermore, the BaMbuti as a population represent great experimental subjects given their static nature over the last few thousand years. Each of their perceptual abilities can be explained by starkly different environmental conditioning rather than innate ability, and thus an example of Bruner's theory. In this sense, it is critical to accept interpretation, and by extension environmental and cultural influence, as a necessary middle step in the model for human perception.

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