

Materialist versus Non-Materialist Explanations of Mbuti Subsistence Behavior

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Several years ago, I published two articles in which I proposed an ecological explanation for the spatial and temporal variation that characterized Mbuti Pygmy subsistence behavior, social organization and world view in relation to their Ituri Forest environment in northeastern Congo (formerly Zaire) (see Abruzzi 1979, 1980). My analysis of the Pygmy material was sparked by Colin Turnbull's (1968) claim that there was no ecological reason for the variation he observed in Mbuti subsistence behavior. Turnbull argued that Mbuti subsistence activities could be better explained by social structural considerations than by ecological ones. The most important factor causing variation in Mbuti subsistence behavior, according to Turnbull, was the Mbuti need to maintain the "essential unity" of their local hunting bands. For Turnbull, the Ituri Forest was simply a "permissive environment" that allowed the Mbuti a wide latitude of subsistence related activities.

While my own attempt to explain the observed variation in Mbuti subsistence behavior was offered primarily as a critique of Turnbull's social structural analysis of Pygmy ecology, it was also undertaken to demonstrate the value of a materialist explanation of human social behavior generally. The following paper reviews my critique of Turnbull's social structural analysis of Mbuti Pygmy subsistence behavior and then examines developments in Mbuti Pygmy research since my original research. It shows that significant advances continue to be made in our understanding of Pygmy ecology specifically by those researchers who have adopted an explicit materialist research strategy and who have examined the cost/benefit implications of Pygmy behavior under different

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environmental conditions. This research has led to a greater understanding of local variation in Mbuti subsistence than could have been achieved by idealist, structural explanations that are inherently incapable of explaining such variation (cf. Bicchieri, 1969 ; Godelier, 1977 : 51-62 ; Mosko, 1987).

Colin Turnbull's Account of Pygmy Subsistence Behavior

The Mbuti Pygmies are divided into two distinct types of bands : larger *net hunting* bands, consisting of between 7 and 30 families, who practice communal or cooperative hunting with nets, and much smaller *archer* bands, consisting of only a few families, who hunt individually with bow and arrow. In 1968, Colin Turnbull published a short essay which became widely accepted in anthropology as a cautionary tale against too readily accepting ecological (i.e., materialist) explanations of human social behavior, even when that behavior was directly related to subsistence activities. In that article, Turnbull claimed that there was "no environmental reason" for the pervasive economic division which existed among the Mbuti Pygmies between net hunting and archer bands due to the fact that no significant variation existed within the Ituri Forest which could generate such discrete adaptive strategies. As Turnbull (1968 : 133) stated, "there is nothing that makes one part of the forest more or less desirable than any other part at any time of the year." He claimed instead that the Ituri Forest environment was simply "generous enough to allow alternate hunting techniques (*ibid.*)"

Turnbull's thesis regarding the inadequacy of an ecological explanation of Mbuti subsistence was confirmed for him by the fact that the net hunting and archer bands responded in diametrically opposed ways to the same ecological event, an increase in the availability of honey during the summer months of June and July. In precisely the same natural environment and in response to the same precipitating event, according to Turnbull, the larger net hunting bands divided into smaller sub-bands and temporarily abandoned hunting, claiming that the increased availability of honey made this possible, while the smaller archer bands aggregated into larger maximal bands and conducted cooperative game drives (without nets) in response to what they perceived as a period of scarcity created by a substantial decline in resources.

Having discounted any consideration of an ecological explanation for this perplexing behavior, Turnbull proposed instead that its cause was primarily social. For him, the seasonal shifting in both the size and composition of local Pygmy bands (which he termed "flux") facilitated a regular reorganization of those bands and, in the process, preserved their

“essential unity” and ultimately their survival as social units within Pygmy society. Turnbull argued that conflicts inevitably accumulated during ten months of cooperative net hunting which necessitated : (1) a temporary dispersal of individuals from local net hunting bands ; and (2) the subsequent reformation of new bands containing a new combination of individuals whose cooperation in hunting would not be compromised by previous conflicts. Conversely, he argued that the archers, who lived in small isolated bands most of the year, needed to come together for a brief portion of the year in order to preserve their unity as a social group. Thus, according to Turnbull, the net hunters created the illusion of the honey season as a time of plenty in order to facilitate their dispersal, while the archers deluded themselves that this same period was a time of scarcity in order to justify their coming together.

Turnbull offered what was in effect a classic structural functional explanation of Mbuti subsistence behavior. The primary causal agent in his analysis was not the prevailing environmental conditions to which local Pygmy bands had to adapt, but rather non-material sociopolitical forces which functioned to maintain band unity. Turnbull also emphasized the symbolic implications of the flux, which according to him, de-emphasized the stability of interpersonal relations and placed people in closer recognition of the one constant in their lives, “the environment and its life-giving qualities (*ibid.* : 137).”

Critique of Turnbull's Analysis

In my critique of Turnbull's analysis of Mbuti subsistence behavior, I began by showing that his claim regarding the spatial and temporal uniformity of the Ituri Forest was fundamentally incorrect. I showed that the eastern and northeastern portion of the Ituri Forest differed significantly from the remainder of the forest not only in the composition of the forest, but also in the degree to which the agricultural and commercial activities of non-Mbuti populations had penetrated the region (Abruzzi, 1990 : 8-12). Moreover, I showed that, according to Turnbull's own data, net hunting and archer bands were not distributed randomly throughout the forest, but rather were largely associated with the degree of changes that had occurred in their forest ecosystem. More specifically, the archer bands were located in the most disrupted portion of the forest to the east and northeast, while the net hunting bands were concentrated primarily in the less disturbed sections of the forest to the west and southwest. I also demonstrated that there were distinct wet and dry seasons in the forest and that the puzzling behavior surrounding the honey season occurred during the height of the summer rains.

I further showed that Turnbull's argument contained serious methodological problems, many of which were inherent in his social structural explanation (see Abruzzi 1980 : 16-19). One of the more important methodological problems was the fact that Turnbull's claim that the Mbuti created imaginary seasons of plenty and scarcity in order to facilitate band reorganization was directly contradicted by his own data, which showed that local bands maintained less than 40 % continuity from one month to the next. The Mbuti, therefore, clearly did not need to delude themselves by creating imaginary seasons of scarcity and plenty at one time of the year in order to achieve what was in fact taking place on a daily basis. I also noted the contradiction between Turnbull's claim that the flux which he observed placed the Pygmies in a closer recognition of the one constant in their lives -the forest-with the central fact of his own argument, which was that the Pygmies did *not* see their forest environment as constant, but rather perceived it as changing drastically during the honey season.

Most importantly, I argued that Turnbull's structural functional explanation of the role of flux in maintaining band unity made no attempt to account for the observed behavior in terms of empirically definable antecedent conditions to which the Mbuti might be responding. Rather, the purported result of the demographic changes which took place during the honey season - the maintenance of band unity - was inappropriately (and rather illogically) presented as its cause. Lacking the empirical foundation and conditional form inherent to all scientific explanations, Turnbull's explanation of Mbuti subsistence behavior remained at best interpretive and speculative and at worst teleological and empirically unverifiable. It certainly did not advance our understanding of Mbuti subsistence behavior in any meaningful scientific way.

I offered in its place an explicitly ecological explanation of Mbuti subsistence behavior which was empirically grounded and which attempted to explain Turnbull's observations in terms of the specific material conditions associated with the behaviors in question. I suggested that cost/benefit considerations associated with different population/resource ratios underlay both the distribution of net hunting and archer bands throughout the forest, as well as the divergent behavioral response of these two groups to the changing conditions of resource availability accompanying the onset of the honey season.

Based on the available data, most of which had been collected by Turnbull, I showed that net hunter bands were both larger and more densely settled than archer bands, leading to greater pressure on food resources among these bands. In addition, I suggested that the penetration of the Ituri Forest by slash and burn cultivators placed increasing adaptive pressure on those indigenous hunters - i.e., the net hunters- who depended primarily on the forest for their livelihood. I suggested that these hunters were forced under increasing population

pressure to hunt longer hours and organize into larger cooperative groups in order to assure reliable hunting returns.

At the same time, I proposed that the presence of agricultural villages created a novel adaptive situation in which some Mbuti hunters, most notably those in the eastern and northeastern portion of the forest where the greatest penetration of cultivation had occurred, were able to gain access to foods produced in the village gardens and thus reduce their dependence on a shrinking forest resource base. Moreover, these Mbuti - the archers - were able to obtain the produce of village gardens for the relatively small cost of protecting those gardens from the herbivorous animals that might destroy them.

My thesis was supported by the empirical research of Harako (1976 : 125) and Tanno (1976 : 53) which showed that net hunting bands worked significantly longer hours than archer bands in procuring their food (see Abruzzi, 1979). According to their records, net hunters hunted an average of between 7 hours and 56 minutes and 8 hours and 21 minutes compared to an average of between 3 hours and 25 minutes and 4 hours and 18 minutes for archers. Furthermore, while archers hunted only 2-3 days per week, net hunting bands hunted between 5-7 days per week, depending on their size (see Tanno, 1976 : 114).

I then applied the same cost/benefit considerations to account for the apparently paradoxical behaviors associated with the honey season. I suggested that the net hunter's behavior at that time was to be expected given the increased abundance of plant food throughout the forest, including honey, which was made available by the onset of the rainy season. The decreased ratio of population to resources which occurred at this time enabled the net hunters to disperse into smaller groups, reduce their workload and temporarily curtail their involvement in hunting. This was for them indeed a time of relative plenty. Conversely, the population/resource ratio of the archers increased at this time due to the seasonal decline in the availability of food in the village gardens. This was the time when village planting took place, but when cultivated plants had not yet borne fruit. As a result, the archers were thrown into complete dependence on the local forest during this time of the year. Indeed, according to Turnbull, this was the *only* time of the year that the archers depended exclusively on the forest for their food. Moreover, because the archers lived in that portion of the Ituri Forest that had been the most disrupted by outside forces, they had to work harder and cooperate more in their hunting than at any other time of the year in order to assure reliable returns. It was for them a time of relative scarcity.

Thus, in the place of Turnbull's structural functional explanation of Mbuti subsistence behavior which could not explain *any* of the variation associated with that behavior, I offered a systematic ecological model of Mbuti subsistence activities which accounted for *all* of the variation that

he observed but could not explain. More importantly, through the systematic analysis of cost/benefit considerations, I provided a theoretically coherent explanation of Mbuti subsistence behavior that parsimoniously explained *both* the spatial distinction between net hunters and archers and temporal variation in subsistence activities that took place during the honey season. Moreover, I did so by making explicit, empirically verifiable predictions which were ultimately substantiated by Turnbull's own data, as well as by data collected independently by other researchers.

Subsequent Research

Several researchers have examined Mbuti subsistence behavior in the years following my initial critique of Turnbull's research. Most have undertaken quantitatively oriented field research and have adopted the logic of a cost/benefit analysis to explain the data they have collected. Our present understanding of Mbuti adaptation to their Ituri Forest environment has been substantially enhanced through the continued application by these researchers of an empirically grounded materialist research strategy to explain Mbuti subsistence behavior. While an exhaustive review of the recent literature is not possible, a brief summary of some of the more important findings is useful.

In an effort to link the net hunter/archer distribution directly to the environment, Milton (1985) proposed that the spatial distribution of these two adaptive strategies was largely a function of the geographical distribution of two types of forest communities. She suggested that the net hunters are primarily located in the less diverse *Gilbutoid* forest in the southwest Ituri, while the archers are concentrated mainly in the more diverse *Cynometra* forest in the northeast Ituri. She hypothesized that net hunting may be a more successful adaptive strategy in the less diverse *Gilbutoid* forest where the Mbuti must concentrate on the hunting of a single species of small antelope (diukers). Conversely, she suggested that bow and arrow hunting may be the more adaptive hunting technique in the *Cynometra* forest with its greater variety of prey species, including larger animals such as elephants which could not be effectively hunted with nets.

Bailey and Aunger (1989) criticize Milton's thesis by showing that net hunting is not restricted to the *Gilbutoid* forest in the southwest Ituri, but rather is more widely distributed throughout the central, southern and western portions of the forest. Moreover, after carefully sampling four sections of the Ituri Forest, they show that the diversity of the two forest communities do not differ significantly from one another, at least as

measured by the Simpson Diversity Index. They suggest, instead, that the distribution of net vs. bow and arrow hunting is determined largely by the cost/benefit implications of female labor being invested in hunting vs. village gardens.

The success of net hunting depends fundamentally upon female labor. Women participate as beaters, driving game into the nets manned by the men. All researchers consistently note the central role of women in the net hunt (Tanno, 1976 ; Harako, 1976 ; Peacock, 1985 ; Hart, 1978 ; etc.). Indeed, Noss (1997) indicates that, among the BaAka net hunters in the Central African Republic, women are the most enthusiastic hunters. According to him, BaAka women participated in 158 hunts per year, compared to only 118 hunts per year for men.

Bailey and Auger (1989 : 285-86) show that net hunting Pygmies received 3-4 times as much agricultural food in exchange for meat as do archers (between 5.7 and 8.2 calories of agricultural food in return for each calorie of meat, compared to about 2 calories of village food for each calorie of meat). As a result of the higher economic value of meat in net hunting areas, Bailey and Auger (1989 : 286-287) calculated that net hunting women earn twice as many calories per hour net hunting than they can working in exchange for food in village gardens. Conversely, women in the northeastern Ituri earn twice as many calories per hour by working in village gardens than they can by assisting the men in hunting.

The greater demand for meat in the southwestern portion of the forest, according to Bailey and Auger (1989), derives from the greater regional (though not local) population density characteristic of this area. While there has been an increased demand for bushmeat in the local agricultural villages, there has been an even greater increased demand for meat by commercial traders paying cash. Hart (1978) noted the same development in his study of net hunting in the southern Ituri. Noss (1997), even notes an increase in "tourist hunts", net hunts conducted for tourists paying cash. According to Noss, "tourist hunts" represent a new form of hunting which the Mbuti prefer over both the traditional subsistence hunt and the commercial hunt, because the return on a tourist hunt is guaranteed : the Mbuti get paid cash whether the hunt is successful or not.

It is not clear how recently the increased commercial demand for meat has influenced the development of net hunting. Turnbull did not discuss it. However, Hart (1978) indicated that it began to have a major impact during the mid-to-late 1970's. Recent research suggests that the current increase in net hunting throughout the central and western portions of the forest has occurred primarily in response to the commercial demand for meat. In any case, my original thesis that net hunting may have evolved among the Mbuti in response to increasing population pressure caused by the penetration of the forest by non-Mbuti populations may, indeed, remain valid. Although the *proximate* cause for greater net hunting

among the Mbuti at this time may be the greater opportunity for them to earn cash through the commercial hunting of meat, the *ultimate* cause still appears to be the greater pressure on game resources brought about by an increase in the size of the regional (largely non-Mbuti) population relative to available forest resources.

In summation, then, our understanding of Mbuti adaptation to their forest environment has been, and continues to be, substantially enhanced by rejecting highly subjective and unverifiable structural and structural functional explanations of that behavior in favor of materialist explanations based on a consideration of the cost/benefit implications of different adaptive strategies. This necessitates the collection of the detailed, quantitative data needed to test the specific predictions generated by competing hypotheses. Our present understanding of the causes underlying variations in Mbuti subsistence behavior are certainly greater as a result of the research done by myself (Abruzzi, 1979, 1980) and by Bailey and Auger (1987), Noss (1997), Hart (1987) and others employing an explicitly materialist research strategy in which testable hypotheses are proposed and either accepted or rejected than by the structural analyses of Godelier (1977 : 51-62), Turnbull (1968) and Bicchieri (1969), or more recently of Mosko (1987) who attempts to discuss Mbuti adaptation in the Ituri Forest through metaphorical conceptualizations of the forest in terms symbolizing conception, the womb and the family. While the former approaches offer the possibility of explaining spatial and temporal differences in Mbuti subsistence related behavior, the latter approaches are incapable of even considering such issues.

The way that anthropologists attempt to understand and explain Pygmy ecology has important implications beyond our understanding of Pygmy subsistence in the Ituri Forest. It speaks to the relevance of anthropology as a discipline making a meaningful contribution to the current discussion of global ecological issues. To the extent that anthropology refuses to embrace a materialist, scientific approach to the study of human social behavior, it threatens to become increasingly irrelevant to our understanding of human ecology.

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Résumé

Hypothèses matérialiste et non matérialiste des stratégies de subsistance des Mbuti

J'ai publié il y a quelques années deux articles dans lesquels je proposais une explication écologique de la variation spatiale et temporelle qui caractérise le comportement de subsistance des Pygmées Mbuti dans la forêt de Ituri. Mon analyse des données pygmées avait été provoquée par l'opinion de Colin Turnbull selon laquelle il n'y avait pas de raison écologique pour la variation qu'il avait observée dans le comportement de subsistance mbuti. Turnbull arguait du fait que les activités de subsistance mbuti pouvaient mieux s'expliquer par des considérations socio-structurelles.

L'article qui suit examine d'abord ma critique de l'analyse socio-structurelle de Turnbull du comportement de subsistance des Pygmées, puis les développements de la recherche sur les Pygmées Mbuti depuis ma recherche initiale. Il montre que des progrès significatifs continuent de se faire dans notre compréhension de l'écologie pygmée, en particulier par les chercheurs qui ont adopté une stratégie de recherche explicitement matérialiste et qui ont examiné les implications de coût et bénéfice du comportement pygmée dans différentes conditions environnementales. Une telle recherche a conduit à une plus grande compréhension de la variation locale dans la subsistance mbuti que n'ont pu le faire les explications socio-structurelles idéalistes, ce qui a d'importantes implications pour la pertinence de l'anthropologie dans la discussion des questions écologiques globales.

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