

Australopithecus migration and subsistence habits research papers examples

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In the studying how the human species evolved, a lot of astonishing discoveries, great public interest as well as a great level of controversy have always been involved. Since the early twentieth century the discovery of new hominid fossils has altered the widespread perceptions held concerning how our species evolved. Piltdown Man and Ramapithecus are examples of these new discoveries (Szpak, 2014). The objective of this discussion is to address Australopithecus with regard to migration and subsistence habits.

With its first appearance being in Africa about 4. 2 million years ago and later diversifying into various forms, australopithecines is a broad group of hominids with the group's last member recorded being estimated to have gone into extinction about 1. 4 million years ago (Szpak, 2014). Since 1925, there has been rediscovery of a number of its species, which will be tackled here. These species include: Australopithecus afarensis, A. anamensis, A. garhi, A. africanus, Paranthropus robustus, P. boisei, and P. aethiopicus (Szpak, 2014). It would be important to note that although many have campaigned for three australopithecines that are 'robust' to be given a separate genus, still they will be tackled here under the category of 'robust' australopithecines (Szpak, 2014). There are still however many texts which do not accord the robust species a different genus (Szpak, 2014). In the process of trying to understand how Homo sapiens evolved, it is always important to discuss the australopithecines. Based on a critical study of fossil, paleoecological, and primatological evidence, the australopithecines' evolutionary history of their migration, subsistence, and behavior will be dealt with.

Defining australopithecines is usually a challenging task. The first description

in literature was made in 1925 by Raymond Dart after the discovery the Taung Child in South Africa in 1924 (Szpak, 2014). Taung Child was a young specimen and is considered to belong to the *Australopithecus africanus* species (Szpak, 2014). The term *Australopithecus* means “ southern ape’ (Szpak, 2014). It is clear that this nomenclature was adopted because the cranium of this organism has ape-like characteristics, and because of its site of discovery, which was in a limestone cave found in South Africa (Szpak, 2014). This may denote that the movements/migration of australopithecines was at one point where the present day South Africa is located (Szpak, 2014). However, the discovery of the fossils of the genus *Australopithecus* has also been made in the Eastern region of Africa, denoting that their movements and migration was also in this region of Africa too (Szpak, 2014).

There are various characteristics that define *Australopithecus* whereby in this discussion they apply to both the *Paranthropus* (‘ robust’) as well as the *Australopithecus* (‘ gracile’) varieties (Szpak, 2014). The first important characteristic is bipedal locomotion. *Australopithecines* have been found to have anatomical features of the spinal column, femur and the pelvis that enable bipedal locomotion (Szpak, 2014). To facilitate bipedal locomotion, there is a forward shift of the foramen magnum, beneath the skull (Szpak, 2014). This depicts the angle of the spinal chord’s entry into the skull. The ‘ s’ shape that has been found on their spine further indicates bipedal locomotion since it assists in balancing when an organism is walking on two legs. Bipedal hominids have a wide pelvis along with ilia that is relatively short forming a basin for support internal organs (Szpak, 2014). This

facilitates lateral positioning of hip muscles laterally in relative to the legs, increasing balance as the organism walks on two legs (Szpak, 2014). There is just but a small portion of the evidence that supports that Australopithecus had bipedal locomotion.

The nature of the locomotion of Australopithecus can also be determined from the high ratio of their forearm to the upper arm. Leaper primates generally possess long hind limbs; suspensory species possess high intermembral and brachial indices while species that are quadrupedal possess intermediate indices (Szpak, 2014). As aforementioned, current evidence shows that australopithecines were bipedal. Due to their possession of high brachial indices, it has been found they also made use of arboreal habitats for purposes that may have included escape from predators, foraging, or even sleeping (Szpak, 2014).

There has been great debate concerning the extent of sexual dimorphism among the australopithecines. The debate is on whether based on the skeletal samples, a great degree of dimorphism exists or there are two hominid species in the sample, a large one and a small one. Due to the fact that there is an inherent challenge of estimating body size by use of fossil specimens, accurate conclusions regarding the level of sexual dimorphism would be difficult to make. However, fossil evidence shows that Australopithecus may have had a considerably greater degree of sexual dimorphism compared to what is seen in the present day humans and chimpanzees (Szpak, 2014). The level of sexual dimorphism however seems to be less than that found in gorillas. There is significance in the extent of sexual dimorphism since it has implications for both social organization as

well as mating systems (Szpak, 2014). It has been found that great male to male competition and a social organization that is polygynous is exhibited in primate species that show high levels of sexual dimorphism (Szpak, 2014). It is unfortunate that it would be challenging to use existing primates for analogies to describe australopithecines since there are no species that portray a similar pattern dimorphism in canines and body size. It has however been suggested that the core of social organization comprised of cooperating kin groups made up of many males (Szpak, 2014).

. Another attribute of Australopithecines is that they possessed a cranial capacity between 350 to 600cc (Szpak, 2014). All australopithecines have relatively similar cranial capacities. It is vital to note that cranial volumes are considered relative to the overall body mass. There is little known on the cognitive abilities of australopithecines, but significant evidence shows that some species were already making and utilizing some crude tools about 2.6 million years ago (Szpak, 2014). The tools were most likely made of organic materials hence perishable and their preservation was impossible due to taphonomic processes. There is yet to be found any evidence that australopithecines had any kind of linguistic capabilities (Szpak, 2014).

Australopithecines' dentition of is great importance since teeth are the most common fossil isolated from them (Szpak, 2014). A closer examination of their teeth's morphology can be of great use in the determination of the diet as well as their social organization. The postcanine dentition of australopithecines and specifically Paranthropus has been found to be significantly large and possessing a thick enamel (Szpak, 2014). Existing species of primates possessing thick enamels often feed on hard objects like

nuts, seeds, and fibrous material (Szpak, 2014). Based on their dentition, Australopithecus has been suggested to have had a similar kind of diet (Szpak, 2014).

Paleoanthropological studies in earlier days mainly revolved around meat consumption in the diet of the early hominid (Szpak, 2014). There was little evidence on this hence this hypothesis was later abandoned. There has been a dramatic change in thought in the context in which meat was consumed (Szpak, 2014). There has a shift of considerations from the hunting capabilities of these early hominids to the likelihood of scavenging. The hypothesis of scavenging is backed through findings of cut marks on the remains of mammals along with paleoecological conditions reconstruction, for instance of a large carnivore guild. Bone accumulations at some sites have led to suggestions of early hominids 'home bases' (Lewin, 2005). The potential abilities of early hominids to hunt has also led to a change of opinion towards perceiving them as unable to compete with other carnivores which were larger, because of their relatively small size, limited cognition, and crude toolkits (Szpak, 2014). However, a lot of evidence that has been found in the last forty years regarding the hunting behavior in Pan disregards suggestions that early hominids could not hunt (Szpak, 2014). Additionally, contemporary analysis of scavenging and digestive tract of chimpanzees and baboons shows great carrion avoidance because of a high hazard of internal parasites (Szpak, 2014). Scavenging could only have been a suitable option if cooking of food was possible. However, there is no evidence that early hominids could cook with fire. From this information, it would be wise to suggest that early hominid species hunted and ate meat from birds, small

mammals, and reptiles like contemporary chimpanzees (Szpak, 2014).

However, more research is needed before precise conclusions can be made on early hominid meat consumption.

Analysis of stable isotopes has shown that australopithecines ate a diet that had a major proportion of C4 plants which include sedges and grasses, or animals that ate C4 plants (Szpak, 2014). On the basis of the aforementioned information on meat consumption by early hominids, there is a low likelihood that the diet was mainly meat-based, even though animals consuming C4 plants may have made a contribution to the stable isotopes consumed (Szpak, 2014). Compared with the frugivorous foods consumed by many modern species of apes, this diet was relatively poor nutritionally. Recent literature discusses the possibility of greatly consuming underground storage organs (Szpak, 2014). The nutritional quality of these storage organs is relatively high and may have contributed to the C4 portions in the diet of early hominids (Szpak, 2014).

Even though it is inconclusive, early australopithecines could be suggested to have had mixed subsistence with a high consumption of underground storage organs, which were supplemented with other plant products (like nuts, fruits, and seeds) and small portion of hunted meat such as of birds, small mammals, and reptiles (Szpak, 2014). However, it is highly probable that paranthropus ate plant materials that were more fibrous based on their dental characteristics of thickened enamels and very large cheek teeth (Szpak, 2014).

Lithic technology is the only form that has been preserved from the Pleistocene as well as from the Pliocene due to the impact of taphonomic

processes (Lewin, 2005). This however does not mean that australopithecine technology only comprised of simple tools made of stone. It is however probable that australopithecines also made use of various tools that were made from perishable materials (for instance, probes and digging sticks) and have been termed as instruments by some scholars (Szpak, 2014). The tools are common in the tool kits of contemporary hunter-gatherer communities. Suggestions have been drawn that Australopithecus probably used wooden instruments to a great extent for purposes which possibly include immobilization of small prey animals and digging up of underground storage organs (Szpak, 2014).

It has proved challenging to precisely determine the uses of the earliest tools (Lewin, 2005). Some potential uses of the tools that have been suggested include: butchery, hide slitting, grass cutting, and woodworking. Of all these possible uses, it is only butchery that holds visible evidence in the records of archeology. The tools are suggested to have been portable as well as versatile. In short, few tools were available and could be used in many contexts (Lewin, 2005). It would therefore be sensible to suggest that australopithecines used the simple flake tools for more purposes other than only those mentioned earlier. It is important to note that it would highly challenging to attribute a technology of stone tools to any specific hominid species (Lewin, 2005). In spite of this and considering Oldowan tools' temporal depth, it is apparent that some australopithecine species made these tools because Homo's appearance was only after a several hundred thousand years (Lewin, 2005). Australopithecus is suggested to have made these Oldowan tools about 2.6 million years ago and were first discovered in

the Olduvai Gorge in Ethiopia whereby the lithic assemblages have been named as the Oldawan industry (Lewin, 2005).

The movements of Australopithecus were always within Africa, mainly the southern and the Eastern regions. Australopithecus did not at any moment leave Africa. It was not until the genus Homo evolved that early hominids left Africa (Mhhe. com, 2014). Based on fossil evidences, possible locations and movements of Australopithecus were found within Africa in regions which include: Taung, East and West Turkana, Olduvai Gorge, Sterkfontein, Hadar, and Laetoli. Australopithecus anamensis was the first to exist and is one of the least known members of the Australopithecus genus (Mhhe. com, 2014). Its existence is approximated to have been around 4. 17-3. 9 million years ago. Its migration and location based on fossil specimens found was within where the present Kenya and Ethiopia are located. In fact, Anem, which is part of the nomenclature is derived from Turkana and means lake.

The movement of Australopithecus afarensis was also within the East African region, specifically within Kenya, Chad, Ethiopia, and Tanzania where its fossils have been discovered (Lewin, 2005). It is estimated that this species existed about 3. 6-2. 9 million years ago. The term afarensis is captioned from the Afar community, who are pastoralists in Ethiopia (Lewin, 2005). A. afarensis is probably the most renowned member of the Australopithecus genus and was discovered in the 1970s and given the informal name ' Lucy' (Lewin, 2005). This species depicts habitual bipedalism, has an ape-like cranium, has a cranium that is 380cc-485cc, demonstrated great sexual dimorphism, and has a post-cranial skeletal structure that is similar to a combination of both humans and apes (Szpak, 2014).

The location and movements of *Australopithecus africanus* were discovered to be within Southern part of Africa, specifically South Africa (Lewin, 2005). It is estimated to have existed for the period from three to two million years ago. It had a cranial capacity identical to that of *A. afarensis*, but the morphology of the face and cranium is different (Lewin, 2005). It is unique in that it exhibits low level of sexual dimorphism with regard to canine size, which has not been found in other primates (Szpak, 2014). This species had a relatively long forearm which is a major adaptation for tree climbing (Szpak, 2014).

East Africa, specifically Ethiopia is also the location and the region that the *Australopithecus garhi* migrated within (Szpak, 2014). This species is estimated to have been in existence about 2.5 million years ago. This species had a cranial capacity of about 450cc (Szpak, 2014). Sexual dimorphism and body size canine morphology in this species is not clearly defined. It has been found to have large canines, and subnasal prognathism (Szpak, 2014). However, its other features of the cranium and dental morphology are similar to those of *A. afarensis*.

On the case of 'robust' australopithecines, *Paranthropus aethiopicus* has been found to have lived and migrated within East Africa, specifically Kenya and Ethiopia (Szpak, 2014). *Paranthropus robustus* has been found to have lived and made its migrations within the Southern part of Africa, specifically South Africa (Szpak, 2014). The last location and migration characteristics in this discussion are those of *Paranthropus boisei* whose location has been found to be East Africa and specifically in Ethiopia, Kenya, and Tanzania (Szpak, 2014).

In summary, the genus *Australopithecus* is estimated to have existed in the period between 4.9 and 2.9 million years ago. To survive, this genus mainly fed on plant food sources, mainly underground storage organs complementing that with other plant parts. It also fed on small mammals, birds, and reptiles. This genus has been found to have existed and made its movements solely within the African continent and specifically in the Southern and the Eastern parts of the continent. As can be deduced from this discussion, there is a lot about this early genus of hominids that is still not well understood in terms of how it survived (such as feeding and tool use) and migrated, hence more research in this field should be encouraged.

References

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