THE EVOLUTION OF THE PALEOLITHIC FEMALE IMAGE OF THE *ARTIFEX INTELLIGENS FEMININA*

LA EVOLUCIÓN DE LA IMAGEN FEMENINA PALEOLÍTICA DE LA *ARTIFEX INTELLIGENS FEMININA*

Raúl García Martíns[1] y José María García Martíns[2]

Recibido: 18/11/2024 · Aceptado: 18/12/2024
DOI: https://doi.org/etfi.17.2024.43409

Abstract

Paleolithic art evolved from simple figurative representations; it signified the transition from *Homo inspiciens* to *Artifex inspiciens*. Later, Aurignacian primary sexual characteristics were replaced by Gravettian female figures with their secondary sexual characteristics highlighted. The postpartum period of raising the newborn, which defines secondary altriciality, explains their relevance. These images could be called Altricial Venus due to their intention to reflect the essential feminine sexual traits needed to bring children to their own fertile stage.

The reasons for this substantial progress must be found in an evolution due to learning, which is responsible for intellectual development. It is based on inferences that link the cause and the effect of any event, and cognitive evolution expanded the time interval between them due to two factors: social environment and intuition. They provided a prior common cultural environment and the creative spark from the unconscious. This was the leap from *Artifex inspiciens* to *Artifex intelligens*, and as women participated in the first images of art, then we could also say *Artifex feminina*.

Keywords

Paleolithic art; secondary altriciality; cognitive development; female artist.

Resumen

El arte paleolítico evolucionó desde representaciones figurativas simples, lo que supuso el paso del *Homo inspiciens* al *Artifex inspiciens*. Posteriormente, los caracteres sexuales primarios auriñacienses dieron paso a las figuras femeninas gravetienses y a sus caracteres sexuales secundarios. Su relevancia se entiende por el periodo posparto de crianza del recién nacido, que define la altricialidad secundaria. Estas

1. Ministerio de Ciencia, Innovación y Universidades. Correo electrónico: *raulgmartins@gmail.com*
2. Universidad Politécnica de Madrid. Correo electrónico: *jm.garcia.martins@upm.es*

imágenes podrían llamarse Venus Altriciales, ya que reflejan los rasgos sexuales femeninos esenciales para llevar a los hijos a su propia etapa fértil.

Las razones de este avance sustancial hay que buscarlas en una evolución debida al aprendizaje, que es el responsable del desarrollo intelectual. Se basa en inferencias que vinculan causa y efecto y la evolución cognitiva amplió el intervalo entre ellos debido a dos factores: el entorno social y la intuición que aportaron un entorno cultural común previo y la chispa creativa del inconsciente. Éste fue el salto del *Artifex inspiciens* al *Artifex intelligens*, y como las mujeres participaron en las primeras imágenes del arte, entonces podríamos decir también *Artifex feminina*.

Palabras clave

Arte paleolítico; altricialidad secundaria; desarrollo cognitivo; artista femenina.

1. INTRODUCTION

The oldest graphic manifestations of which we have evidence are attributed to *Homo sapiens* and date back to an age before 70,000 years. The latest discovery reports a cross-hatched pattern drawn on a ground flake from approximately 73,000-year-old at Blombos Cave, South Africa. Microscopic and chemical analyses have confirmed that red ochre pigment was intentionally applied to the flake with a crayon (Henshilwood *et al*. 2018). Humankind had to wait a long time for the appearance of figurative art, firstly assumed to be born in Europe, around 40,000 BP at Initial Upper Paleolithic (Fritz *et al*. 2017). Nevertheless, a reddish-orange figurative painting of an animal in a limestone cave in Indonesian Borneo, yielded a minimum date of 40,000, became recently the oldest date for figurative artwork in the world (Aubert *et al*. 2018). Later discoveries, like a hunting scene painted around 43,900 years ago (Aubert *et al*. 2019) or a narrative scene of at least 51,200 years ago, which depicts human-like figures interacting with a pig (Oktaviana *et al*. 2024), are now considered the earliest known surviving examples of representational art in the world.

A recent study has reopened the debate on the artistic production of Neanderthals, which would date it back to 64,000 years ago (Hoffmann *et al*. 2018). Immediately, a group of researchers reacted co-authoring a paper critiquing this theory and proposing that there is still no convincing archaeological evidence that Neanderthals created Iberian cave art (White *et al*. 2019), but the controversy is now in the spotlight.

Early Upper Paleolithic frequently refers to the images and symbols of the hunters of horse, bison and mammoth during the last European Ice Age. However, it is not the image of the animal, despite its overwhelming proportion, which develops in complexity and variety across Ice Age Europe for the next 20,000 years, but the image of the female. Therefore, the image of the female and its interpretation have aroused more intense emotional debates than the image of the animal (Marshack 1991).

It is particularly interesting the evolution from simple female characteristics representing vulvas to the so-called Venus figurines, stylized and highly detailed statuettes of females. No evidences have been found of a continuous development of techniques and styles between both types of representations, which seem to split into two unlinked approaches by a wide gap. Actually, our subject is not the depiction of the sexual images, but the purpose of the artist. Our main focus lies on find out the way that carried out a cognitive evolution of perception and intention in artist's mind.

2. FROM VULVAS TO BODIES

Paleolithic art is dazzling and rich, but human depictions are really scarce (Duhard 1992; Roussot 2017). In Paleolithic representations, predominate zoomorphic components, mostly large animals. 95% of the representations correspond to a limited group of seven species: horse, bison, aurochs, deer, mammoth, goat and reindeer, in variable proportions depending on the region (Angulo & García 2005).

Depending on nature, technique and style, Delporte (1979) divides the human figures into four groups. The first one is about body parts, as hands (positives or negatives), faces, busts or sexual organs, vulvas and phallus (Figure 1). The second one refers to «anthropomorphous», body representations, always simple and rough. The third group is limited to male figures, with their sex clearly represented. The fourth group includes, in contrast, only females, which can be parietal or portable and made with distinct techniques. The most important among them are the Venus figurines.

FIGURE 1. CARVED PHALLUS FROM A BISON HORN. ABRI BLANCHARD, FRANCE. AROUND 36,000 YEARS OLD AND 250 CM LONG. ONE OF THE OLDEST AND LONGEST EVER FOUND. (Modified from *https://www.donsmaps.com/phallusstoneage.html*)

The place of humans in the parietal art is around 6%, equivalent to the doe. However, the human theme is much more frequent in portable art, where sexualized human representations report more than half a thousand mobile representations. We can find many asexual or not very explicit human representations with the category of indeterminate anthropomorphic silhouettes. But among the sexualized representations, women (isolated bodies and sexes) largely dominate the corpus (around 80%), relegating men to an apparently anecdotal role (Paillet 2017). Durhard (1993) lists, only for France, around 200 female figures, as well as partial representations of vulvas, profiles of buttocks or claviforms, versus only 73 male sex figures, parietal or furniture, where the only highlighted part would be the phallus. The low representation of male images is observed not only by the greater volume of female representations, but also by the quality of those, depicted in a fuzzier or disfigured form (Delporte 1979).

Genitalia are a form of partial human representation and are generally quite rare. Far from being uniform, they have evolved over time. Female genitalia range from the Aurignacian signs in the shape of an inverted V, engraved with a wide groove on the rocks of the Cellier and La Ferrasie shelters (35-30 kyr), to the vulvas painted in red in the Tito Bustillo vulva chamber (14-11 kyr). Male genitalia, as an isolated representation, are even rarer and are generally pieces of mobile art (Angulo *et al*. 2008).

2.1. AURIGNACIAN

The female figures comprise a very extensive chronology. Vulvas appeared in Aurignacian culture, and they have been classified as part of different typological or stylistic schemes. Breuil (1952) included them in Style I of the Aurignacian-Perigordian cycle, the first division out of two of his chronology of Paleolithic art. Based on Breuil's structure, Leroi-Gourhan (1965) developed his own theory about periods and styles; he included vulvas in Style I, very similar to Breuil's one. He defined five types of female forms: A and B, triangular signs with different orientation (down, up); C, oval signs; D, rectangular signs and E, claviform signs.

These features can be found in different materials and techniques, comprehending parietal (Figure 2) and portable art as well.

Depictions are quite simple, geometric, referring only to the external primary sexual characteristic. Cut off vulvas suggest that there is a direct relationship between sexuality and artist's purpose, focusing intentionally on female visible sexual organ related to either sexual activity or reproduction.

FIGURE 2. VULVA ENGRAVING FROM THE ROCK SHELTER. LA FERRASSIE, FRANCE (C. 32,000 BP). (*https://en.wikipedia.org/wiki/La_Ferrassie*)

2.2. GRAVETTIAN

Gravettian culture made a great leap forward in representing female figure. It evolved to Breuil's Style II of the Aurignacian-Perigordian cycle (1952) or Leroi-Gourhan's Style II of the Gravettian period (1965). These similar styles include female figures in the form of statuettes (Figure 3) or low relief sculptures (Figure 4). The so-called «Venus figurines», with a slender or, more frequently, opulent form,

FIGURE 3. FEMALE TORSO. IVORY. DOLNÍ VĚSTONICE, CZECH REPUBLIC (C. 27,000 - 25,000 BP). (*https://humanorigins.si.edu/evidence/behavior/art-music/figurines/female-torso-ivory*)

FIGURE 4. LAUSSEL VENUS. LIMESTONE AND OCHRE. LAUSSEL, FRANCE (C. 27,000 BP). (*https://www.musee-aquitaine-bordeaux.fr/en/laussel-venus*)

were represented with exaggerated breasts, abdomen, hips, buttocks or thighs. Sexual primary characteristics gave way to prominence of sexual secondary characteristics, which paired with them or even replace them. Several times, vulvas disappeared or, in any case, were depicted in a very insignificant way (Figure 5).

Anyway, there are examples that escape the mainstream, such as the case of the Hohle Fels Venus, which is more than 35,000 years old and attributed to the Aurignacian, and which could be considered a prototype of the Gravettian Venuses (Conard 2009). This may demonstrate the difficulty in establishing a general temporal pattern, given that cultural evolution in different geographical areas may overlap and offer various simultaneous stages of development.

It is quite adventurous to call evolution what actually is an abrupt change, lacking continuity or, at least, recognizable intermediate steps between both styles. This does not mean that cognitive development has not evolved continuously, but that in human culture there may be specific moments of accelerated progress due to a wide variety of reasons.

We are not considering controversial techniques, chronology, meaning or interpretation, but the reasons that made Gravettian artists to neglect primary sexual characteristics, closely related to sex, reproduction and delivery, in favor of secondary sexual characteristics, as reference of nurture, breeding and growth.

3. SECONDARY ALTRICIALITY

Venus figurines represent not only the most important female depiction in Upper Paleolithic, but also human in general.

Many studies have proposed a large amount of possible meanings, but finally most of them tend to relate Venus with fecundity, in a direct or indirect link; however reproductive fitness is the combination of reproduction and survival, and their energy balance (Bradshaw & McMahon 2019). Therefore, a higher fecundity doesn't necessarily entail a higher fitness (Godfray *et al*. 1991; Shine 1988; Williams 1966), because evolutionary success depends on the number of surviving children which can, in their turn, reproduce (Bogin 1997). Consequently, the survival of human offspring in the first years of life is extremely important, greatly conditioned by the secondary altriciality.

Human newborn is exceptionally dependent on its parents for food and care, which will last for several years of life. Adolf Portmann (1994) called this exclusive feature to humans «secondary altriciality», in comparison with the primary altriciality of other primates, whose neurological and cognitive development is relatively much greater at the time of birth.

The volume of the human brain increases rapidly in the first years of life, reaching adult size with a great delay in absolute terms with regard to the rest of the primates (Leigh 2004).

Two theories propose an explanation for this pattern of rapid fetal brain growth, which is characteristic of humans and in which birth occurs during a phase of immaturity, and therefore leads to vulnerable altriciality that extends over a long period: the obstetric dilemma and the metabolic hypothesis.

The obstetric dilemma (Washburn 1960) proposes that in the evolution towards the current human two demands have faced each other in a competitive way: a narrowed and deformed pelvis accommodated to bipedalism, against a birth canal wide enough to allow the birth of newborns with oversized skulls (Franciscus 2009; Krogman 1951; Rosenberg 1992; Rosenberg & Trevathan 1995; Schultz 1969; Trevathan 2011; Walsh 2008; Washburn 1960; Wittman & Wall 2007). The structural modification of the pelvis would have favored bipedalism and the consequent liberation of the upper limbs from their locomotor function, which would consequently have made possible a disproportionate increase in brain size in relation to the body. Releasing the hands from locomotion favored the acquisition of new skills, such as making tools (Washburn 1960; Wolpoff 1971). An increasingly better industry would have also allowed the expansion of the diet with a greater and more varied protein intake and, therefore, brain growth (Brunet *et al*. 2002; Guy *et al*. 2005; Johanson & Edgar 2006; Klein 2009; Wood & Lonergan 2008), largely related to the increase of the neocortex, which would improve vision and gripping capabilities (Cartmill 1974). Therefore, in the Middle Pleistocene, the ratio of brain size to body size accelerated (Ruff *et al*., 1997). The new pelvic structure, which favored the attainment of bipedalism, proved to be much less efficient for childbirth, due to these enormous skulls, containing enormous brains, which with the body almost double the size of the great apes at birth (Portmann 1990; Sacher & Staffeldt 1974).

FIGURE 5. KOSTIONKI VENUS. LIMESTONE. KOSTIONKI, RUSSIA (C. 25,000 BP). (*https://www.donsmaps.com/kostenkivenus.html*)

On the other hand, the metabolic hypothesis holds that maternal metabolism limits the duration of gestation and fetal growth (Dunsworth *et al*. 2012). The gestation period entails an enormous caloric expenditure for the mother, who must support both the metabolism of fetal growth and her own (Wood 1994). This enormous energy demand in the first postnatal months would be difficult for the mother to meet. Thus, comparative data with other mammals and primates suggest the existence of a metabolic restriction for fetal growth before leaving the maternal body (Martin 1981, 1996, 1998; Sacher & Staffeldt 1974).

The «metabolic crossover hypothesis» (Ellison 2001) considers that birth begins when the metabolic requirements of the fetus overlap with the mother's capacities and exceed them. The maximum metabolic rate in humans is between 2 and 2.5 times the basal metabolic rate (Hammond & Diamond 1997; Peterson *et al*. 1990) and rarely exceeds two and a half times (Hammond & Diamond 1997). During gestation, these rates increase rapidly and reach twice the prepregnancy basal metabolic rate around the sixth month (Butte 2000; Butte & King 2005); at nine months they exceed 2.1 times the rate and with it the sustainable capacities of the mother, so giving birth reduces the energy needs of both and the increase in the growth rate of the newborn slows down with respect to that of its fetal state (Dunsworth *et al*. 2012).

This hypothesis questions the obstetric dilemma, since it postulates that childbirth is controlled by the metabolic balance between the mother and the fetus and not by pelvic restrictions.

3.1. INFANCY AND CHILDHOOD

After birth, the extrauterine development period begins and high energy requirements continue. The first phase is infancy, determined by lactation, which lasts until approximately 36 months in preindustrial societies (Dettwyler 1994). After this first stage, most mammals, including primates, are already largely capable of providing food for themselves (Bogin & Varea 2017); however, secondary altriciality led to the appearance of a phase exclusive to human primates: childhood.

Childhood prolongs the child's dependence on adults, although in this case the diet changes, thanks to the use of milk teeth. In addition to the food supply, children need special protection from predation and disease, and there is no human society whose children can survive without parental care (Bogin & Smith 1996). This stage will come to an end with the eruption of the first permanent molars, around 5.5 and 6.5 years of age (Jaswal 1983; Smith 1992) and with the completion of brain mass growth, around 7 years of age (Cabana *et al*. 1993). This will give way to the juvenile period, in which children will stop being dependent on their parents in order to survive (Pereira & Altmann 1985) and will have the cognitive and physical abilities to obtain their food and protect themselves from predators and diseases (Blurton Jones 1993; Weisner 1987).

The acquisition of this new ontogenetic stage may have arisen in Hominina from *Homo habilis*, and its duration would have been extended at the expense of that of childhood (Bogin & Smith 1996). Infancy and childhood, therefore, are essential to the secondary altriciality of *Homo sapiens*, as they determine the considerable extrauterine metabolic effort necessary for brain development.

3.2. ALTRICIAL VENUS

Most of the Venus are identified as non-pregnant adult women (Dixson & Dixson 2011; Rice 1981). In some cases, this can be largely interpreted by a gynoid-type body

shape, typical of young, nulliparous women or women with few children. Others may represent older, fertile women, but with gynoid features still recognizable in their overall shape.

The gynoid distribution, regardless of total weight, as well as having significant sexual attractiveness in very different cultures (Singh 1993, 1994; Singh & Luis 1995; Singh & Young 1995), has been shown to be the most favorable for conception and gestation. Therefore, the waist-to-hip ratio (WHR) is a determining factor for a high reproductive potential and a successful pregnancy (Pawlowski & Jasienska 2008; Zaadstra *et al*. 1993); thus, young primiparous women between 16 and 20 years of age from subsistence societies, where these characteristics are usually present, are the most likely to give birth to surviving children (Lassek & Gaulin 2021); however, these values should not be accompanied by a low body mass index, since it compromises the survival of the newborn (Lassek & Gaulin 2018) (Figure 6).

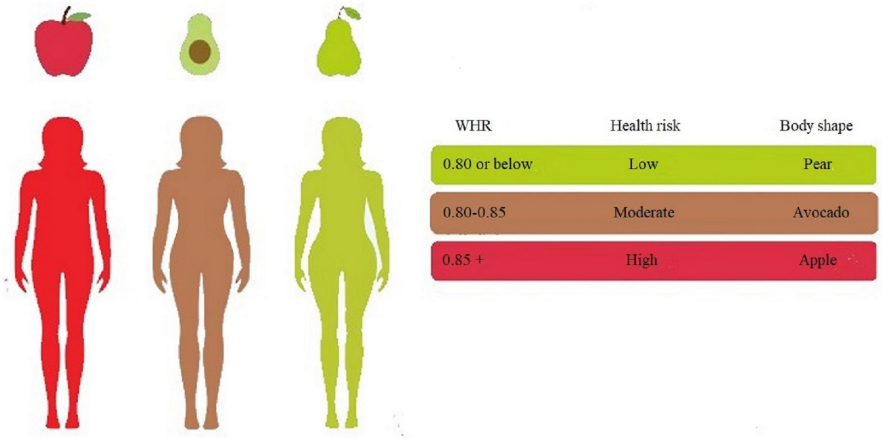

FIGURE 6. IMPACT OF WHR IN HEALTH

Usually, Venus have a morphological composition that is identified with a gynoid-type adipose distribution. The exaggeration of this characteristic feminine shape in Venus should not be identified as overweight or obesity, which are limiting factors for reproduction, with direct consequences on the health of the mother and child, before and after birth. Furthermore, a normal body mass index, without excess or deficiency of reserves, is the most appropriate for gestation, provided there is a balanced energy balance between caloric intake and expenditure. Therefore, this form in Venus must have responded to the accentuation of sexual dimorphism and not to an excess of fat. Thus, the morphological characteristics of the Venus reflect the needs of secondary altriciality: breasts are signs of lactation and relevant factors in social monogamy; buttocks and hips are the energy reserves for the production of milk with its components essential for the correct brain development of the infant. As for its interpretation as a symbol of fecundity or fertility, it must be remembered that breast growth is an indication of pregnancy and subsequent lactation, which entails a prolonged period of infertility (García-Martins & Ripoll-López 2023).

In conclusion, a gynoid conformation, with a normal body mass index and an adequate supply of food, is the most suitable for conceiving and gestating a child and,

as will be seen below, for raising it to survival. At this point, it is acceptable to consider the female figure from the perspective of secondary altriciality, that means, enlarged breasts and a gynoid ratio, with a low WHR, are key factors.

It is worth asking whether the artists who made the Venus were aware of the relationship between the conformation of the female body and its ability to raise children to adulthood, the so-called Altricial Venus (García-Martins & Ripoll-López 2023).

4. *ARTIFEX INTELLIGENS*

It's often thought that nearly 40 percent of all prehistoric babies born in prehistoric populations did not survive their first year. However, it has been suggested that infant mortality in ancient societies is likely a reflection of the number of babies that were born and fertility had a greater influence on the number of deceased infants than the infant mortality rate. Therefore, burial samples cannot prove that a high percentage of babies that were born, died, but rather do suggest that a lot of babies were born (McFadden *et al*. 2021).

Nevertheless, since Middle Paleolithic, nomadic hunter gatherer population did not grow due to low birth rates and the difficulty in surviving up to the age of 15 as the cost of children was high (Johnson & Earle 1987). In fact, Paleolithic women used to bear children until they were about 30; considering that breastfeeding went on for two or three years, and that they gave birth to their first child at around fourteen, it means a maximum of five or six births per woman (Cirotteau *et al*. 2023).

Paleolithic food systems can be explained as a search for balance between the reproductive pressures of the human population that promote the intensification of production, and the consequent deterioration of the environment. Instead, the irreversible overexploitation of the environment, humans opted for the control of the population, keeping it low through the control of the potential fecundity of women, so that only an average of 2.1 children survived to reproductive age. The role of prolonged breastfeeding (up to three or four years) and on-demand (depending on the baby and not on maternal imposition) had the effect of prolonging postpartum amenorrhea, because, with the extra caloric demand of breastfeeding, they would hardly reach the 23,000 kilocalories of reserve necessary to ovulate while breastfeeding, even if breastfeeding were prolonged (Aguirre 2001).

Beyond early mortality, there was a high share of children who died before reaching the end of puberty, around the age of 15. This mortality rate of Paleolithic hunter-gatherers reached 56%, but from puberty on, 67% of these humans lived to an age of 45 or older (Gurven & Kaplan 2007), making human population remain stable for hundreds of thousands of years (Zahid *et al*. 2016).

Hence the relative importance of fecundity, for the objective is to ensure that children reach a full reproductive age. The focus is shifted from reproduction to motherhood, from sexual intercourse to childbirth and child-rearing. In this new context, not only is the survival of the newborn at stake, but also the increased risk to the life of the parturient.

In this Upper Paleolithic context, the loss of a woman during delivery also represented the loss of a contributive group member (Ehrenberg 1989). Such loss may also have compromised the future of any previous children she may have had. The manner in which she died may have produced an immediate effect on other women within the group, whether they had birthed or not (O' Donnell 2004). This turning point in female life would also change the rest of her life, since average life expectancy for Paleolithic women was 28.7 years, for 33.2 of men. This difference shows that there was a greater risk of physical deterioration in childbirth than in big game hunting (Angel 1975).

Since focus is shifted from primary to secondary sexual characteristics, we can consider that artists realized the relevance of secondary altriciality for children to get the adult reproductive, in order to maintain a successful group, not merely based on fecundity.

Furthermore, each child has a different reproductive value for the parents (Trivers 1972, 1974) and, therefore, those with a greater chance of survival until reproductive age will be favored by the parents to the detriment of others with lower expectations (Buss 2015), in which case age has a high value (Redondo & Carranza 1989).

To support his theory, it is essential to assume that the author of these images in the Upper Paleolithic was not only an anatomically modern human (AMH), but also similar in cognition and behavior to the current one (Henshilwood & Marean 2003; Higham *et al*. 2011; McBrearty & Brooks 2000) and that, therefore, he would be aware enough to understand and interpret sexuality, pregnancy, childbirth and life cycle.

4.1. LEARNING

Cognitive abilities of modern humans were present in Paleolithic artists, thus the difference lies with the driving force of the evolution of image expression: learning.

Many theories have been formulated regarding human evolutionary psychology throughout its scientific development, although it is possible to base the comparative study on the evolution of Paleolithic art from a traditional perspective.

In 1937 Piaget proposed the most famous theory of cognitive development based on four stages:

- Sensorimotor (0-2 years): infants interact within their immediate environment.
- Preoperational (2-7 years): children begin thinking symbolically.
- Concrete operational (7-11 years): preadolescents show logical concrete skills.
- Formal operational (11-16 years): adolescents develop systematic thinking, ponder the possibilities and infer relationships.

Furthermore, there are immutable conditions: phases of the sequence are not exchangeable and these stages cannot be skipped (Figure 7).

Children's evolution is driven by a gradual learning not founded on a passive assimilation, but on a dynamic process of adaptation to reality where knowledge is

constructed and tested by themselves (Piaget 1964). Thus, Piaget's constructivism proposes that knowledge evolves from the interaction of human's experiences and his ideas and that learning is different for every individual, because persons build knowledge in his mind over his own previous knowledge (Piaget 1973).

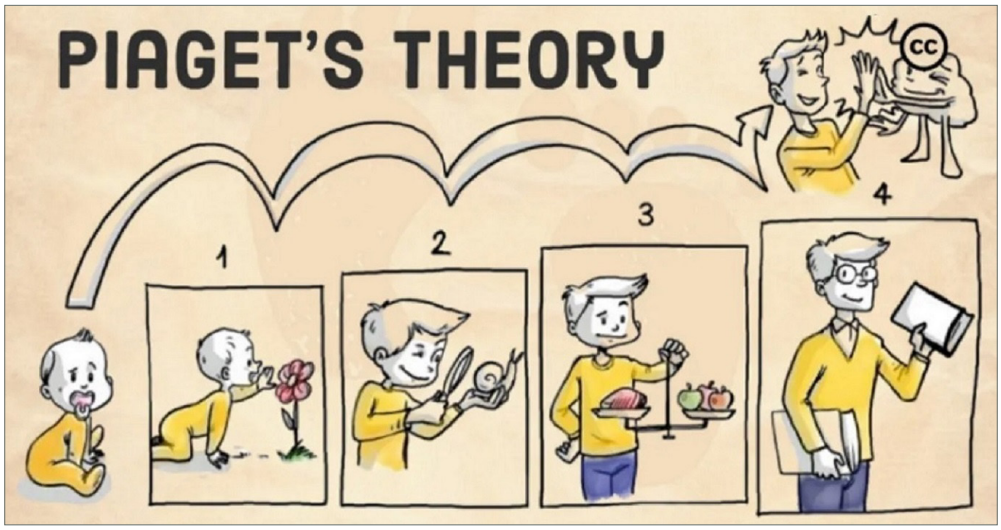

FIGURE 7. PIAGET'S STAGES. (Modified from *https://medium.com/@pivotpathways/piagets-theory-of-cognitive-development-0a9b2368be8a*)

Cognitive evolution can be studied from another point of view that reflects those intellectual achievements: drawing. Luquet (1927) was one of the first who linked drawing to intellectual development. He described four stages related to children's intellectual evolution, which began with a period of scribbling, called fortuitous realism, followed by failed realism, intellectual realism and visual realism. Piaget and Inhelder (1956, 1969) adapted Luquet's approach to describe their own division of drawing stages, closely connected to Piaget's cognitive stages. Lowenfeld (1947) extended the number of stages and divided some of the precedents into close periods (Figure 8). In the preschematic stage, there is a conscious reproduction of perceived forms attempting to draw things as they really are.

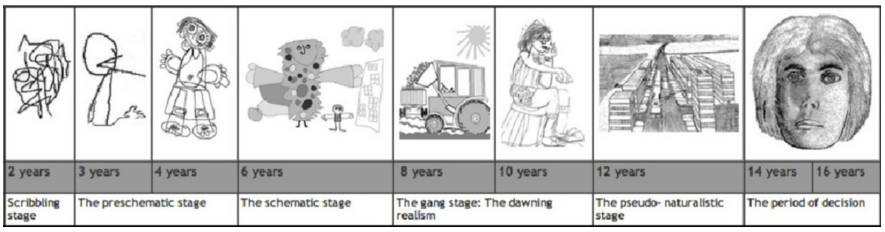

FIGURE 8. LOWENFELD STAGES. (Modified from Mitchell 2014)

Vygotsky (1962, 1978, 2024) develops a model on the relationship between development and learning. He argues that the ability to learn does not improve as the child develops his intellectual abilities during his biological growth, but that cognitive development follows learning, that is, each new achievement in learning results in a consequent improvement in intellectual evolution. The sociocultural theory proposes that children improve their learning abilities thanks

to the interaction with their social environment, through which they acquire new skills and improve existing ones. Thus, the internalization of all the experiences learned, assumed and developed is proper to human nature and represents the differential step from animal to human psychology. Thus, it is possible to propose an ontogenetic intellectual development structured around learning. It is worth asking whether a similar phylogenetic development could be established in human social evolution.

According to the parameters of evolutionary psychology, the concept of cognitive niche appears, based on an innate conception of many of our cognitive capacities, which have been developed and modulated by natural selection, in order to solve specific adaptation problems that humans have frequently had to face. The key skills would be two: the use of causal reasoning to make inferences regarding the contingencies of the local environment, and the ability to learn from each other, therefore the cost of acquiring the information necessary to adapt to the environmental conditions of each place is greatly reduced (Pinker 2010). Many other authors have focused on the cultural niche, in which cognitive development is based on the cultural environment and the ability to learn from others, as it allows information to be accumulated generation after generation, and tools, knowledge and practices to be developed, which no individual could develop or invent on their own. This cultural evolution would have accumulated and combined adaptive elements over generations to use them without having to understand the mechanisms of their operation (Bickerton 2009; Boyd *et al*. 2011; Rivera & Menéndez 2011; Tomasello, 1999).

At some point, Paleolithic man would have discovered by chance the possibility of leaving permanent marks on surfaces, perhaps by accidental stains, by his own will and not by natural causes such as smoke in caves. However, the first Palaeolithic representations that can be attributed to a desire for permanence are significantly intentional.

These first naturalistic representations would correspond to Style I (Breuil 1952; Leroi-Gourhan 1965) such as hands or primitive zoomorphic figures. There is no intention beyond that of copying one's own environment. In the first stages of children's drawing, there is always the will of reflecting reality, even in the stages of scribbling (Luquet 1927; Lowenfeld 1947). The qualitative leap appears in the pre-schematic stage in which, in addition to the conscious intention of drawing reality as it is, a personal interpretation appears with an underlying meaning, varying elements of the drawing according to child's own intention, such as the size of family members or of body parts according to their own hierarchy (Lowenfeld 1947). Similarly, the Paleolithic representation of a phallus or a vulva would respond to another intention than the mere imitation of nature.

Some animals show a learning mechanism based on certain elementary cause-effect inferences. These must be sustained, in any case, by a reinforcement mechanism. This is operant conditioning as determined by Skinner (1938). In his experiment, a rat receives food every time it performs an action. The food acts as a positive reinforcement that invites the rat to repeat the action, and therefore the rat establishes a cause-effect relationship between the action and obtaining food.

Likewise, children in sensorimotor stage present a goal-oriented behavior that leads to a desired result. For example, they have learnt to cry to wait their mother's attention (Piaget 1937, 1964).

The real change that occurs in humans is the delay in obtaining the response. In animal operant conditioning, reinforcement is immediate or within a short period of response. In contrast, human development relies on establishing cause-effect relationships with increasingly longer periods between action and response or with more intervening elements. This already occurs in the reasoning of the higher stages of child cognitive development.

Simple copies of nature and animal behavior show evidences of an early thinking, but limited to simple inferences along a short lapse of time between cause and effect. In that moment *Homo inspiciens* (human who observes, examines) became *Artifex inspiciens* (artist who observes, examines), not only able to grasp environment but reflecting it on works of art. However, a higher intelligence requires longer periods, abstraction and intermediate steps, sometimes apparently unlinked.

Both men and women were aware of their role in procreation, and understood fertility and sexuality. Furthermore, copulation, pregnancy and childbirth were perfectly sequenced in their minds (Angulo *et al*. 2008). Therefore phallus and vulvas don't only express the sexual activity, but a biological need whose final goal is birth. There are also reasons to believe that other primary needs, as important as reproduction (Maslow 1943), didn't deserve such a relevancy among Paleolithic humans as though they were conscious of its primacy.

Artists depicting primary sexual characteristics were able to find the delayed result of sex without scientific evidences, but with mere rational inferences of its consequences nine months later. Furthermore, thanks to a progressive increase in this inferential capacity due to the evolution of intelligence, Venus makers procrastinated for years the knowledge of secondary altriciality to assume the relevance of secondary sexual characteristics in rearing period and to reflect them on their works.

Now the question is, how did humans evolve from immediate inference cause-effect to long-term delayed inference?

4.1. INTUITION AND SOCIETY

Authors of hands, animals, vulvas or Venus belonged the same cognitive potential, as children in their progressive stages; it cannot be considered otherwise. Then it is necessary to find out the principles that developed that learning potential from short-time inference for vulvas to long-time inference for Venus, in other words, from *Artifex inspiciens* to *Artifex intelligens* (artist who can make inferences).

Bergson (1903) contended that in animal development, there are two traits which are at the core: instinct and intelligence. Instinct over times can turn into intuition, the privileged vehicle of knowledge. Intuition is instinctive, or more exactly, a higher development of instinct.

According to Bergson (1908), instinct is the unconscious form of the inner knowledge, while intuition is instinct become conscious. He believes that this mode of consciousness is compulsory for the production of real novelty as it is the appropriate way to comprehending the most intimate secrets of life, which we can feel in our internal process, but we cannot have not yet found express. Bergson sees other forms of consciousness. These are the forms of consciousness that have usually been associated almost exclusively with animals, despite that beneath our rational minds, we too are animals, and that animals often have instinctual capacities that modern humans generally do not possess.

For Bergson (1908) intellect is an analytic mode of thinking that can only split emergent qualities into their constituent parts. Intellect alone cannot discern the materialization of anything genuinely novel. He shows that the emanation of human consciousness appears to pure intellect as new variations of existing elements. A genuine novelty cannot have been foreseen by intellect, for it is driven by ways of experience that surpass pure intellect involving the whole of our person. There are things that intelligence alone is able to seek, but which, by itself, it will never find. These things instinct alone could find; but it will never seek them. Ultimately, Bergson believes that intelligence and instinct are both indispensable means of knowing the world, hence he proposes the integration of intellect in these unconscious repressed modes. Intellect gives way to what is already known, to what has already been regularized in formal systems like language and mathematics, while intuition is a concept for the way of perception that can directly find out what transcends human knowledge.

In main terms many authors, as Gilovich, Griffin and Kahneman, conceive intuition as automatic, biased, fast and effortless processing (Gilovich *et al*. 2002; Kahneman 2011) (Figure 9).

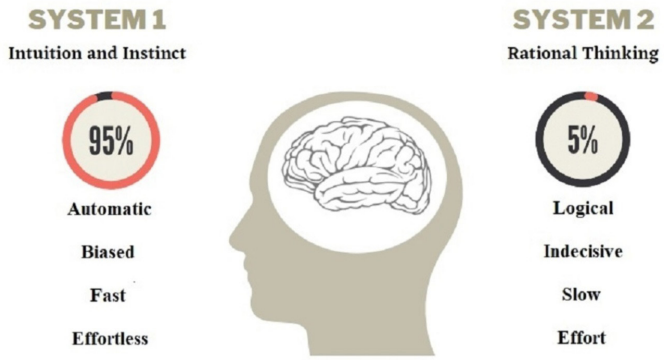

FIGURE 9. LEVELS OF CONSCIOUSNESS

As Bergson, Jung (1971) considers intuition the force that finds out new ideas. It's a sense of knowing without having an explanation. He argues that through these processes intuition can supply some information, which results of the utmost relevance for understanding the environment in the world. It can predict new possibilities, situations, events, which later actually become true.

FIGURE 10. INTUITION-INSTINC VS. RATIONAL THINKING

For Jung (1968) intuition is a cognitive event. It is one of four psychological functions, present in all individuals. These functions get different levels in each person and, in combination with two levels of consciousness and two orienting attitudes, predispose each individual's own behavior. These functions are thinking, feeling, sensation and intuition.

With Bergson (1908) and definitely with Jung (1971), the rational and intelligible world becomes mostly unconscious and its intuitive perception is equated with automatic and biased processing. In preoperational stage appears intuitive intelligence (Piaget, 1937) along with language, based in socialization, thought, intuition and affection. Primary intuition requires a global action, therefore we could consider it the beginning of making inferences.

Jung (1971) thought that intuition was a sort of perception that did not go exactly by the senses, but via the unconscious, and at that he didn't know how it worked. Jung discovered what he termed the personal and collective unconscious. Personal unconscious contains all the aggregated personal experience and knowledge. These intuitions depend upon the individual's life and grade of expertise (Baylor 2001). On the other hand, collective unconscious assumes that some elements of the primary layers of the unconscious mind are not linked to personal experiences but inherited through genetics. This implies that there are universal symbols, archetypes, and themes that are shared by all human beings, regardless of their cultural or individual differences. Archetypes are not learned through individual acquaintance, but participate in the innate part of the human psyche.

Piaget didn't consider the way that culture and society could affect children's development, but according to Vygotsky (1978) children learn by adopting the activities, habits, vocabulary, and ideas of the members of the community in which they grow up through the establishment of a cooperative atmosphere. From here on we can extend ontogenetic learning to phylogenetic learning inside the members of the tribe through common knowledge and culture.

We can effortlessly access the wisdom of the universal collective unconscious through our intuition. This level relates to all the accumulated collective experience and knowledge. Intuitions from the collective unconscious are considered by Jung (1971) much more important than intuitions from the personal unconscious. This thereby transcends cultural and individual boundaries. Then the intuitive process becomes a direct channel to the collective wisdom embedded in the human experience (Figure 10).

Finally, we discover that potential intellectual capacities of Paleolithic artists could have been enlightened by their social life and intuition along a gradual process in developing the representation of their environment with not a merely reflect of nature, but with a deep significance.

4.2. *ARTIFEX FEMININA*

Multiple interpretations have been carried out to reveal the meaning of Venus figurines. Whatever it is the answer, this question has necessarily conveyed the focus on the identity of the authors and users of these images, especially on their sex. And the response can also be hidden in other forms of art.

Paleolithic art was made by a myriad of individuals throughout time (Fritz & Tosello 2007). In any case, it has primarily been presumed a male world (Russell 1991; Conkey 1997; Van Gelder & Sharpe 2009), even despite the enormous new attention dedicated to the roles of women in Paleolithic societies (Conkey 1991, 1997; Soffer *et al*. 2000; Cohen 2003; Owen 2005; Adovasio *et al*. 2007). However, there are neither reasons nor evidences for men to be assigned as usual Paleolithic artists.

Women artists have been involved with art throughout history; however, their contribution has been overlooked, undervalued, and often misappropriate. The assumption over 20th century determined that parietal art reflected animals they usually hunted, while women were cooking, caring for children and cleaning the cave (Gustlin & Gustlin 2023). The historic prevalence of male scientists has probably promoted and kept the biased conception of men leading any form of human evolution, especially about intellectual achievements.

Theories about male artists are open to a wider field than regular adults (Fritz *et al*. 2016). Guthrie (2005) suggested that most of the handprints in parietal art belonged to young men. Adolescents isolated from the rest of the group would have expressed their frustrations and desires through the representation of exaggerated sexual characteristics under testosterone influence. Besides, the predominance of prepubescent males could involve initiation rituals.

Whitley (2000) attributes art to shamans trying to connect with the spirit world. In caves, sensory deprivation appears very quickly, what can spin shamans into an altered state of consciousness. Anyway, that wouldn't exclude women among the artists, since in some hunter-gathered societies they are the shamans.

However, before the more sophisticated universe of Venus figurines, new theories support the role of women in art. Snow (2006) postulates that authors of positive and negative hands were women due to differences in fingers relative length. Women tend to have index and ring finger of similar length, whereas men tend to have ring finger longer than index finger (Manning 2002). Dozens of cave sites in France and Spain contain hand stencils. The most important have already been studied, like Gargas in France (Barriere 1976; Leroi-Gourhan 1967) and El Castillo in Spain (Ripoll Lopez *et al*. 1999, 2000). Snow (2013) analysed 32 hands of European caves and determined that 24 of them, 75 %, were female. Now we can support that women made most of the oldest-known cave art paintings. Most scholars had assumed that these ancient artists were predominantly men, so the finding overturns decades of archaeological dogma (Hughes 2013) (Figure 11).

McDermott (1996) proposes for Venus the theory of self-portrait, because females represented their own bodies better than males could have been able to do. White and Bisson (1998) emphasize the small size and perforated hole in many portable statuettes to distinguish their use like pendants or even protecting amulets against

motherhood difficulties. In this case, women manufactured figurines for their personal use or for that of other women.

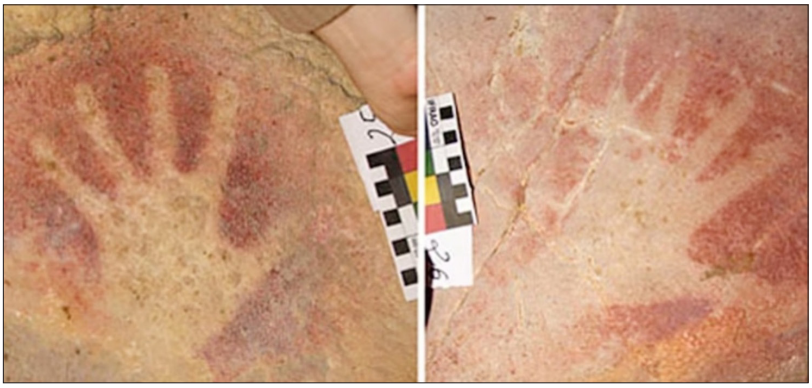

FIGURE 11. THESE HAND STENCILS FOUND IN THE EL CASTILLO CAVE IN CANTABRIA, SPAIN, WERE PROBABLY MADE BY A MAN (LEFT) AND A WOMAN (RIGHT), RESPECTIVELY. Photograph courtesy Dean Snow. (Modified from Hughes 2013)

A current pending study based on fingerprints and scratch marks found in artifacts in Dolni Vestonice includes children in statuettes makers. They could safely get into ceramics very young simply by playing with clay. The figurines were made near a hearth, and then fired and left there (Seaton 2024).

However, specialization depended on the type of art produced. In some places, different sizes and shapes for similar artifacts indicates distinctive expressions of women and men. Besides, pottery manufacturing techniques might show a sexual division of places and roles (Cohen 1996).

It is probably true that men used to go hunting, hence some level of knowledge not only of animal anatomy, but also of animal behavior would have perhaps been only mastered by hunters, but that don't exclude women of at least participating in parietal and portable art production (Cohen 1996). Furthermore, hunting for large game is dangerous and unsuitable for pregnant women or women accompanied by very young children; this kind of argument, as has been much discussed over the past decades (Slocum 1975), derives from some problematic universal assumptions about biologically based notions as well as on the assumption that big game hunting is the primary marker of life in prehistory (Fritz *et al*. 2016); but on the other hand women participating in hunting cannot be discarded at all (Owen 2005).

In any case if men are assumed to be the main animal painters because of their close knowledge of hunting, why wouldn't women be considered the manufacturers of female images and especially Venus figurines due to their particular knowledge of their own biology, which remained mostly foreign and ignored by males?

From the moment of conception, the man is only aware of pregnancy for a few weeks, the time when the swelling of the woman's belly is evident; the rest of the gestation and the subsequent period of secondary altriciality are practically alien to his knowledge and interest, at least as far as female anatomy and physiology are concerned. In contrast, the woman is able to detect early signs of pregnancy and body changes throughout all the years of these processes.

The first sign appears with the loss of menstruation. Human female, unlike other primates, lacks signs of ovulation (Strassmann 1981; Dixson 1983; Sillén-Tullberg & Moller 1993; Rooker & Gavrilets 2018) and concealed estrus hides her reproductive situation from the male and allows a continuous sexual availability (McCance *et al*. 1937). Later, although less evident, come the subsequent hormonal changes totally unnoticed by the male.

Another feature exclusive to human is the presence of a permanently swollen breast from its development in puberty (Harris 1989). Composed mostly of adipocytes (Johnson 2010), although the breast increases in volume an average of 96 ml from initial 420 ml (Bayer *et al*. 2014), the proportion is barely noticeable to the male's perception, but not to the female. This factor is also decisive in the altricial phase for breeding. On the other hand, women deposit peripheral and subcutaneous fat, especially in the buttocks and hips (Tichet *et al*. 1993; Lassek & Gaulin, 2007, 2008; Taylor *et al*. 2010), producing the aforementioned gynoid type. The energy expenditure necessary for gestation (Taggart *et al*. 1967; Hytten & Leitch 1971; Adair & Pollitt 1983; Adair *et al*. 1984; Forsum *et al*., 1989) and rearing (Schutz *et al*. 1980; Forsum *et al*. 1989; Prentice *et al*., 1994; Butte & Hopkinson 1998) comes mostly from these reserves (Rebuffé-Scrive *et al*. 1985). This process reduces the reserves and deforms the initial gynoid distribution, increasing the WHR, which is never completely restored back to the nulliparous shape; changes will continue in successive children (Butovskaya *et al*. 2017). It is evident that this prolonged mutation, even more so in multiparous women, will be more recognizable by her than by him.

Considering the female Paleolithic image as tributary of secondary altriciality, it is undeniable that these circumstances would have been more familiar to women with all its features and, therefore, they would have felt inclined to these figures emotionally and personally.

5. CONCLUSIONS

Paleolithic art is possibly the first example of human intelligence outside the realm of practical use. As it progresses, it moves from simple figurative representations to others more elaborate and even schemed or abstract ones.

The first representations are reflections of nature with limited symbolic content, such as hands, positive or negative, or animals; it is the transition from *Homo inspiciens* to *Artifex inspiciens*. The appearance of primary sexual characteristics, vulvas and phalluses, implies an underlying intention beyond their sexual content, which is to identify them as generators of life, since at that time the internal physiological processes of procreation were unknown. Then a radical leap occurs with the creation of almost full-bodied female figures with their secondary sexual characteristics highlighted. These do not come into play directly in genesis and pregnancy, so it is acceptable to intuit another less obvious meaning. Their relevance is understood when considering the postpartum periods of feeding and raising the newborn, especially infancy and childhood, which is currently exclusive to human

beings, and which define secondary altriciality. Thus, these images could be called Altricial Venus, due to their intention to reflect the essential feminine sexual traits to bring children to their own pubescent and fertile stage.

The reasons for this substantial progress must be found in an evolution due to learning. The Paleolithic artist, like a child, possesses all the cognitive capacities of his species, although in some cases they are still potential. Learning will cause the start-up of new skills responsible for intellectual evolution.

The necessary intelligence is based on inferences, which involve establishing the appropriate connections between the cause and the effect of any event. Immediate inferences are within the reach of a large number of animals; however, cognitive evolution expands when the time interval between both extremes does so at the same time. The impetus for these capacities is given by two different but linked factors: social environment and intuition. The first provides a prior common substrate, as well as an appropriate cultural environment; the second produces the creative spark from the unconscious, independent of the intellect, which illuminates the ideas that were hidden. This is the leap from *Artifex inspiciens* to *Artifex intelligens*.

Finally, it is worth asking about the authorship of the Altricial Venus in terms of sex, although there are also hypotheses that involve children and adolescents. Traditionally, authorship has been attributed to men, especially due to their intimate connection with animals and hunting, both present in some of the first artistic representations. However, this same direct knowledge of the content represented could logically be applied to the Altricial Venus, revealing characteristics and vital experiences clearly alien to men and, possibly, of little interest to them, even more so when it seems to be demonstrated that already at the beginning of art it women participated in most of the first images of the hands. Perhaps we should refer to *Artifex feminina* in the near future.

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