

# 인지 신경과학에 기초한 문화기호 미의식에 대한 다층위적 해석

뱀 문화 기호 중심으로

An Hierarchical explanation of Cultural Symbol Aesthetics Based on  
cognitive neuroscience

A Case Study of the snake cultural symbol

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## Abstract

There are so many creations of snake themes in a large number of archaeological materials, which indicates our interest in snakes. The works of art taking snake as the theme can be seen everywhere even in today's life. Snake always appears in works in different fields all over the world with a mysterious, evil and frightening power, such as literature, religion and so on. In addition, there are much more beautiful patterns and soft forms of snakes appearing in the fields of industrial arts and fashion design from ancient to modern times. I guess that the attention of people to snakes is an instinct, which is consistent with the love for snake patterns and shapes, with their corresponding brain structures. First of all, with the relevant materials of creations about snake, this study classifies them into literature, language art and religion. Besides, based on the theory of cognitive science, this paper summarizes the rapid detection of brain structure of primates to snakes with cognitive neuroscience. At the same time, with scientific and technological means like (fMRI) functional Magnetic Resonance Imaging, it sorts out the experimental results of the brain region and neural mechanism of human brain's rapid perception of snakes by these brain-result images, summarizing the subcutaneous visual pathway for people to quickly perceive fear when encountering the threat and stimulation like snakes. It is concluded that people are born with fear of snakes. Secondly, this paper explains the aesthetic perceptions of brain to snakes, which are the beauty of patterns and forms. On the one hand, it summarizes the aesthetic characteristics of snake patterns, such as the symmetry, order and luster, as well as the favorable structure of the brain's perception of these characteristics. On the other hand, it analyzes the structure of people's preference for the spiral shape of snakes.

This research aims to help people understand artistic behavior in a scientific way and provide scientific reference for the use of snakes in aesthetic theory research and in future artistic creation.

## Keyword

Snake culture symbol, Fear, Aesthetic preference, Cognitive Neuroscience

## 요약

많은 고고학적 기록에 등장하는 뱀은 현재에도 우리의 관심을 끌며, 예술의 소재가 되고 있다. 뱀은 늘 신비롭고 사악하며 두려운 힘을 가졌다고 여겨진다. 세계 여러 문화의 종교와 문학, 그리고 다양한 시각 표현 작품에 등장한다. 이와 동시에, 뱀이 가진 문양과 부드러운 형태의 아름다움은 미술과 공예 그리고 패션디자인에도 많은 영감을 주고 있다. 본 연구는 뱀에 대한 우리의 감정은 본능으로 본다. 그 본능이 뱀의 문양과 모습에 대한 선호도와 일치하고, 이에 대응하는 두뇌 구조를 가졌을 것으로 추측한다. 본 연구는 우선 뱀의 창작에 관한 자료를 모아 문학, 언어예술, 종교 영역으로 분류한다. 다음으로 인지과학 이론을 바탕으로 뱀에 대해 신속하게 대응할 수 있는 두뇌 구조를 정리했다. fMRI(Functional magnetic resonance imaging)를 사용한 뇌의 신경 활동 이미지를 관찰하고, 두뇌가 뱀에 반응하는 신경 메커니즘의 실험 결과를 정리하였다. 이를 통해 뱀이라는 위험 자극을 받아 빠르게 공포를 감지하는 피질하 시각 통로를 찾았다. 이를 통해 뱀에 대한 공포는 선형적인 것임을 주장한다. 다음으로 뱀의 아름다움에 대한 뇌의 신경 반응 구조를 설명했는데, 뱀에 대한 조형미다. 첫째, 뱀 문양이 지닌 미학적 특징, 즉 대칭성, 질서성, 광택성을 종합해 다음에서는 이러한 특성들에 대한 뇌의 호감 구조를 정리했다. 둘째, 뱀의 나선 형태에 대한 호감 구조를 신경학적으로 분석했다.

본 연구는 과학적 관점으로 예술 행위를 새롭게 해석하는 것을 목적으로 하며, 미학 이론 연구에 뱀의 형상을 활용

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## 1. Introduction

In the long-term, people's interest in snakes has exceeded that of other wild animals, which may have originated in more distant times. Ochre and eggshells, discovered in South Africa 75000 years ago, are the earliest scale patterns similar to snakes on the back and abdomen. Art is an expression of human's understanding of the world. As the protagonist, the similarity of snake's description and artistic means reflects the brain's cognition of the essence of the world. The emotional change process of human's instinct can be reflected in artistic creation better when it came out from the primitive society with underdeveloped science and technology.

The purpose of this study is to analyze the essence behind it and the most primitive emotional structure of human to snake. It is speculated by the author boldly that people's attention to snakes is an instinct, and the

human brain has a special structure to deal with the threatening stimulation of snake. It is found that primates and human brains have a rapid detection structure for threatening snakes with a special fear module on the basis of the previous research of cognitive neuroscience. Therefore, it can be concluded that people's fear of snakes is innate without the effect of cultural regions, finally, analyzing the brain's aesthetic perception of patterns and forms of snake. From a new perspective of cognitive neuroscience, this paper explains the perceptual structure of creations on snake theme.


## 2. Artistic Expression of Snake

### 2-1. Snake and Literary Arts

In Western myths, legends and literary works like the Bible and Aesop's Fables, the snake is a


symbol of evil with strong power. In Genesis, Adam and Eve stole the forbidden fruit from the tree of wisdom with the slander of the snake (the incarnation of the devil Satan), who were expelled from the Garden of Eden. Because of that, mankind was punished. In the myth of Pangwe, the snake falsely transmitted the command of the God, deceiving people with death, but which was immortal<sup>1)</sup>. In ancient Greek mythology, Typhon. (Table 1),

**Table 1. The image of Typhon snake on pottery.**

About the creation of snakes	
A black-figure vase dated between 540-530 BCE that depicts Zeus battling the monstrous Typhon. (Staatliche Antikensammlungen, Munich, Germany)	

who fought against Zeus and drove away the gods, was a monster with snakes dancing below the waist. Hera, Zeus's wife, sent a pair of revenge angels, which were extremely poisonous pythons, to kill Zeus's illegitimate son Heracles. There are always ugly snakes circling around in the portraits of the goddess, Peleus. (Table 2 ) As we all know, in the story

**Table 2. Thetis disguised as a snake**





About the creation of snakes	
Peleus makes off with his prize bride Thetis, who has vainly assumed animal forms to escape him: Boeotian black-figure dish, ca. 500 BC-475 BC	

of the Troy, the priest Laocoon and his sons

1) ZhuLing"图腾、神话主角与原型置换——“鹰/蛇”文化符号的人类学阐释”. Journal of Fujian Normal University, 2001.Vol. 3 , p92

were tightly entangled by poisonous snakes, with pain to death. Medusa, a enchantress in Greek mythology, was one of the three sisters of Gorgon with the general image as a snake haired woman with bat wings. Anyone who sees her head will turn into stone<sup>2)</sup> (Table 3). The snake of Apep in Egyptian mythology is the God of darkness, and the night is owned by the big snake in Brazilian mythology. All of these literary images show the evil and cunning of snakes. The opposite metaphor of snake appears in the earlier literary works is the Aeschylus's tragedy, the trilogy of Orestes, in which Clytemnestra is considered as a snake entangled with an eagle, implying the author's moral criticism of the noumenon described by the snake. There are many plots that people are considered as snakes in Shakespeare's plays. For example, King Lear called his vicious daughter a "poisonous snake", and old Hamlet called Claudius a "snake that poisoned your father", as well as Cleopatra was called "flower snake on the Bank of the Nile" by Anthony. Russian fable master Krylov said in the Snake, "no matter how the poisonous snake disguises, it is always hateful" <sup>3)</sup>. According to Indian tale, snakes appear as disasters, for example, the snake demon named Kaliya in the

**Table 3. The image of medusa in all ages**

Medusa			
Medusa statue of Benigni		Typical archaic Gorgoneion. Antefix from Acropolis (Athens). Ross	
Gorgoneion of intermediate type on hemidrachm of Parium, fourth century B.C.		Medusa of ancient Greece in 4th century BC	

2) <https://zh.wikipedia.org/wiki/美杜莎> (2021.10.01)

3) DuanShixiu".俄汉成语中动物的象征意义". Journal of Changchun University, 2001. Vol.1, p74









Arnold Böcklin's painting about Medusa in 1878.		Caravaggio painted Medusa around 1595-1596	
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Yamuna River endangered the people, which was eliminated by the hero Krishna<sup>4)</sup>. In terms of the ancient and modern China, there have been so many masters who have described the evil and terror of snakes, such as the ba snake "eats elephants" (Shanhajijing Haineinanjing). Zhu Xi's Xiaoxue Jiayan has said, "being close to the sage is like being close to the orchid, avoiding evil deeds is like being afraid of snakes and scorpions"<sup>5)</sup>. In the book, From Baicaoyuan to Sanweishuwu of Lu Xun, he exposed the malevolence of a beauty snake -- she is a monster with a human head and a snake body, who can call a person's name. If the person answers, she will come to eat him at night.

## 2-2. Snake and Languages

In Chinese, the inscriptions on oracle bone, inscriptions on ancient bronze and small seal style (calligraphy) of the Chinese character "snake" were originally the appearance of the cobra's neck bulging in anger (Table 4 ). There

**Table 4. Images of snakes in ancient Chinese characters.**

Charact ers	oracle bone script	Chinese bronze inscriptions	The lesser seal character
Image			
			

are many Chinese idioms and proverbs about snakes (Table 5 ), It reflects that the snake is a

terrible animal, and the synonymous with evil, cunning and ferocity. Moreover, there are a wide usage of "snake" in English. There are many words for snake in English like reptile, schmuck, serpent, snake, vermin, viper, zombie, etc., which often refer to someone insidious, despicable, shameful, treacherous and hypocritical, such as a snake in grass cloaked with hospitality. The English proverb -- if you have been bitten by a snake, you're afraid of an eel -- has the same meaning in the Chinese saying -- "一朝被蛇咬, 十年怕井绳". Besides, there are also some phrases like "a snake in somebody's bosom", which

**Table 5. Snake and idioms**

Chinese idioms	snake	Explain
蛇鼠同窝		to describe bad people colluding with each other, or to describe two interrelated people doing bad things in the same way
蛇蝎心肠		to describe a cruel heart
佛口蛇心		although the words are good, it is cruel inside
人心不足蛇吞象		to describe that who are greedy will be harmed by their own desires

means someone evil for good, and "a sneak in the grass", which means the latent danger and hypocritical enemy. Snakes also have sinister, poisonous and cunning symbolic meanings in Russian culture, like "змеяподколотная", which means someone sinister, and "отогретьзмею нагрудь", which means someone ungrateful<sup>6)</sup>. In German proverbs, idioms or aphorisms, the snake usually appears as a ferocious, cunning and hypocritical image, like "Sie ist falsch und listig wie eine Schlange", which means that she is false and cunning like a snake<sup>7)</sup>. There are often some usages of snakes appearing in the Bible, like "I am afraid it will be loss of all—

4) S. N. Kramer「Mythologies of the ancient world」(WeiQingZheng) Beijing: Huaxia Publishing House,1989. p281

5) DuanShixiu".俄汉成语中动物的象征意义".Journal of Changchun University,2001. Vol.1 ,p74

6) ibid., p74 .

7) Laijiong."蛇在日尔曼文化中的形象".Wirlermen Deutsch, 2001.Vol.1 , p13



all— body and soul. Mrs. Harriet Beecher." The Bible said that the alcohol can bite you like a serpent and sting you like an adder. The alcohol here is considered as serpent or even adder to describe that the alcohol is no less harmful than venom.

## 2-3. Snake and Religion

As the Romans said, the fear is the first mother of God. Fear is awe, which will inevitably lead to worship. Human beings from the primitive times feel that they are small and turn to seek and worship supernatural forces outside human beings, which refers to the "all things have spirits", and it is the characteristic of primitive religion. Totem worship is the religion of early clan society<sup>8)</sup>, which is the initial spiritual belief of mankind. Human beings consider some animal as a mysterious connection with them, so as to protect them in the process of seeking power beyond itself. Snakes are often worshipped as their own Totem by the primitive people, which still affects the world today. For example, Nv Wa, who is worshipped by the Chinese descendant, and the creator God, Pan Gu, are all snake body with human head (Table 6). There are still a large number of tribes in India with snakes as their totem. They hold


various snake worship rituals every August and September<sup>9)</sup>. Vietnamese mythology said that people's ancestors laid hundreds of eggs, which were the offspring of dragon (snake). The Bushman myth in South Africa holds that man changed from a snake. The myth of the Javanese people in Australia says that the snake is the mother of mankind, creating all things. Indians perform snake dance on religious festivals. It is said that it can make the land, crops and people prosperous, raining and controlling the violent natural forces. People think that the place where the snake lives is unreasonable, and the snake is a symbol of extraordinary primitive power, a sign of terrible or violent natural power in nature. The control of the terrible power of the snake is a sign of victory and honor<sup>10)</sup>. In addition, snakes are also a symbol of power in religious worship (including primitive worship) more than a symbol of natural forces. For example, in ancient Egypt, the snake was a sign of the throne. Controlling the snake is the symbol of kingship. Snakes and snake sticks are proof of spirituality and divinity, which are also their "marks of power". The snake totem of ancient Chinese bronze and pottery also reflects the awe of nature (Table 6). Some tribal chiefs or wizards in Africa would

**Table 6. Totem worship of snake in ancient China.**

About the creation of snakes	
Stone Carvings of Nuwa in Fuxi in Late Eastern Han Dynasty	
Western Han Dynasty portrait brick Fuxi Nuwa pattern	

8) HeXingliang, 「中国图腾文化」. Beijing: China Social Sciences Press, 1992, p20

**Table 6. Ancient snake pottery unearthed in China.**

About the creation of snakes		
	(1) Unearthed in Jiangsu in 1937, the pottery was covered with snake patterns.	(5) In 1989, two bean plates were unearthed in Zhejiang, decorated with snake patterns.
	(2) (3) Unearthed in Jiangsu in 1937, the pottery was covered with snake patterns.	(6) 1936, unearthed in Zhejiang, pottery pieces decorated with snake patterns.

9) LiangXuecheng, 「中外民俗」. shaanxi people's publishing house, 2002, p249

10) Xiaobing, "操蛇或饰蛇: 神性与权力的象征". National art, 2002, Vol.3 p50

	(4) pottery pieces unearthed in Shanghai from 1970 to 1970, decorated with snake patterns.	(7) (8) Unearthed in Shanghai in 1982-1983, there are two jugs with snake patterns.
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snakes around their bodies on some occasions. The standard welcome ceremony in the protocol team is to dance with snakes to bless foreign guests with full safety, power and honor. These seem to be the specific manifestations of snake worship in ancient Greece <sup>11)</sup>. The Chinese call themselves as the descendants of the dragon. In fact, the dragon is made up by the totem of the ancient Chinese nation in a snake like animal deification.

### 3. The Emotional mechanism of Brain when Snake Acts as Threatening Stimulation

#### 3-1. The Brain Mechanism of Primates Probe Snake

The detection and response to predation are always the recurring problems in our evolutionary history (mainly animals and aggressive same kind) <sup>12)</sup>. Since origin of primates, Snakes have been fatal. As a matter of fact, they are considered to be very important in the evolutionary history of primates. Primates have good visual senses, which is one of the symbols of them (Cartmill, 1974, 1992). However, snakes are not easy to see even with excellent eyesight, and any brain advantage that helps to discover snakes should still be favored today. In the long process of evolution, repeated regulatory

11) *ibid.*, p.50

12) Öhman & Mineka “The Malicious Serpent: Snakes as a Prototypical Stimulus for an Evolved Module of Fear”*Current Directions in Psychological Science*, 2003, Vol.12, No.1

responses to the clues of snake danger and fatal consequences led to natural selection. It chooses a central motivation system, called fear, and a related behavioral, psychological and nervous system, called fear module which is designed to solve the recurring problems of threat situation <sup>13)</sup>. It is shown that the fear module of primates is composed of superior colliculus, thalamus and amygdala (Isbell, 1994, 2006, 2009; Öhman and Mineka, 2003; Soares et al., 2017) .In addition, there is a subcutaneous fast pathway connecting the amygdala, which helps primates make a rapid response like attack, stiffness, escape, etc. when they feel the snake. There are medial and

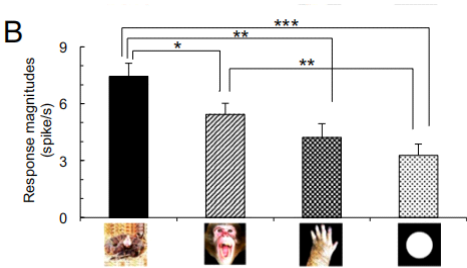


Fig. 1 Pulvinar neurons respond most to snakes.

dorsolateral pulvinar neurons in primate brain, in the process of which has been tested for the respond to snake, monkey face, monkey hand

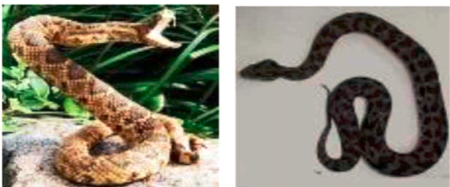


Fig. 2 The mPFC region of monkeys is more sensitive to the left aggressive snake posture (left).

13) Öhman, A., & Mineka, S, “Fears, phobias, and preparedness: Toward an evolved module of fear and fear learning.”*Psychological Review*, 2001, Vol.108, No.3, pp483–522

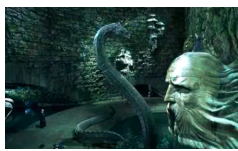
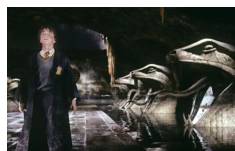
and geometry, the pulvinar neurons are more sensitive to snake images than other images when the visual system is involved in the mechanism of rapid detection to the snake. (fig.1) (Le et al., 2013, 2014, 2016) . A visual search study of Japanese macaques finds that snakes are detected significantly faster than non-threatening animals (koalas).Meanwhile, it is shown that mPFC neurons in monkeys are highly sensitive to snakes, which can distinguish between snakes with aggressive posture and snakes with non-aggressive posture. Moreover, it is shown that the monkey brain has a rapid response pathway to threats. All the results mentioned above support the existence of primates' innate fear module sensitive to images of snake.(Fig. 2)

### 3-2. The Emotional Structure of Human with Fear of Threatening Stimulation from Snake

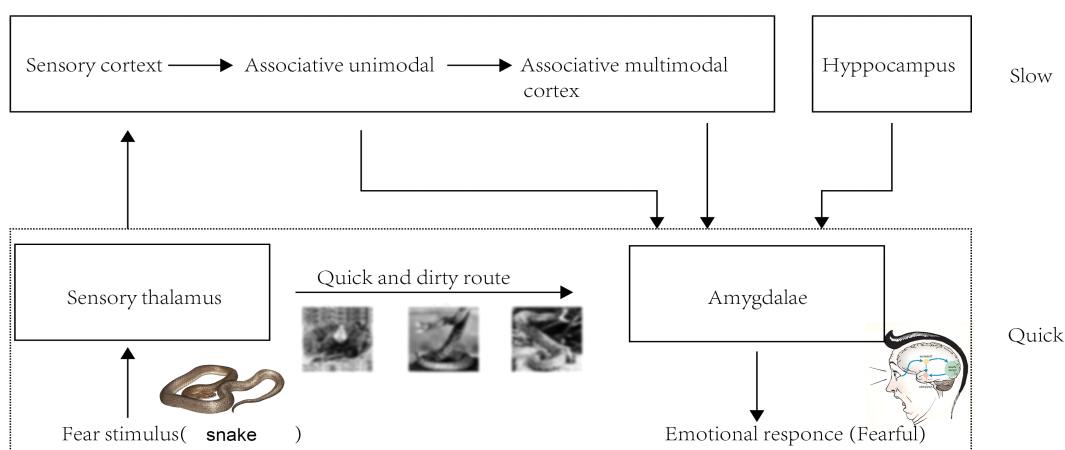
Previously on the above, the snake is regarded as a symbol of evil in many cultures, appearing in various literary, film and television works<sup>14)</sup>. (Table 7) Some researchers believe that humans are born with fear of snakes, and as the innate predisposition of humans to link snakes and fear,

this bias attention can shorten the response time to these stimulations with faster detection

**Table 7. Snake in film**

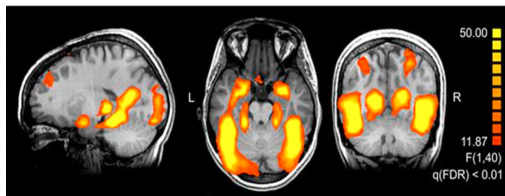
Harry Potter and the Chamber of Secrets. 2002.	
	

(Öhman & Mineka, 2001, 2003; Quinlan, 2013). The visual search advantage of human beings for the threatening stimulation of snakes may be their special biological or evolutionary significance (Blanchette, 2006; Isbell, 2006; Öhman & Mineka,2003). From the perspective of evolution, humans will be more likely to successfully avoid the danger of threatening stimulation to survive if they can search for frightening threatening stimulations like snakes and spiders more effectively and quickly (Isbell, 2006; LoBue et al., 2010; Öhman, 2009). In addition, in terms of infants and young children, it is shown that the



**Fig. 4 A fast pathway for dealing with snake threat stimuli.**

14) Lynne A.Isbell, "Snakes as agents of evolutionary change in primate brains" *Journal of Human Evolution*, 2006, Vol. 51, No.1, pp1–35



**Fig. 4 Brain areas activating stronger for threatening stimuli than for neutral stimuli.**

infants and young children can also show a rapid awareness response similar to that of adults to snakes without the influence of acquired experience, which is the strong support for human beings' natural fear of snakes (faster awareness response to snakes).(fig 3) At the same time, studies have shown that threatening stimulant activation can activate the bilateral amygdala of the brain (fig. 4). As a central emotion processing area, the amygdala is closely related to emotion processing, especially the perception of fear. In addition, both snakes and fear faces may give priority to the use of subcortical visual system, which is the rapid and rough processing of fear stimulation. Fear stimulation can project directly from the retina to amygdala (AMY), passing superior colliculus and pulvinar (PUL), so as to avoid cortical activity.This retino-collicular-pulvinar-amygdala pathway is called "low road" (Ledoux, 1996), which occurs automatically with no require cognitive processing of stimulation (Lundqvist & Ohman, 2005). Because it will bring obvious benefits to survival (hman & Mineka, 2001; Tamietto & de Gelder, 2010). In other words, when we see a snake, the brain will unconsciously and quickly

**Table 8 .Research on snake detection for infants.**

Year	Researcher	Research objects	Stimulant	Result
2008	LoBue & DeLoach	3-5 years old	Search neutral stimuli (flowers, frogs and caterpillars) for threatening stimuli (snakes).	Quick response to snakes.

2008	Waters, Lipp & Spence	9-12 years old	And flowers and mushrooms.	Find the snake quickly.
2009	DeLoache & LoBue	7-9 and 14-16 months	Play snake and other non-snake video clips.	Snakes' gaze responds quickly.
2020	Bertels & Bourguignon	Babies aged 7-9 and 14-16 months	Pictures of snakes, frogs, caterpillars and other animals.	Snakes cause stronger neural responses.





awaken the amygdala in charge of fear (Table 8), so that we feel fear.

## 4. Aesthetic Perception of Brain to Snake

### 4-1. Aesthetic Preference of Brain to Snake Patterns

Although with the fear of snakes, human cannot get rid of the beautiful patterns of them. People seem to forget the fear of snakes with fashion, even skin patterns from head to toe. (Table 9) If the snake skin reaction is analyzed

**Table 9. Snake pattern and fashion.**

Contemporary application of snakeskin.			
Prada's snakeskin boots	Gucci snakeskin bag	Snakeskin dress in Paris Fashion Week.	Hermès snakeskin belt.
			

from the perspective of aesthetic, it has the following characteristics that the symmetry of patterns, the order of patterns, and the luster of snake skin. From the perspective of evolution, people's love and rapid perception of symmetrical



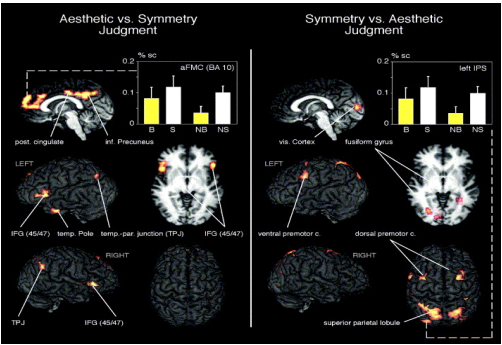


Fig .6 Brain activation caused by symmetry

graphics are innate, which reflects that biologically important objects like humans, predators and prey are also symmetrical. Besides, the patterns on the body are also a kind of communication signal, and the symmetrical patterns always prove the health and physical quality of the living body, which makes symmetrical perception a key discrimination for processing visual information, therefore, it is very important for survival (Wynn, 2002; Hodgson, 2009). For example, we think symmetrical faces are more beautiful.<sup>15)</sup> In addition, studies have proved that ancient humans made symmetrical hand axes, which could trigger dopamine release and pleasure. It is found that the region of the medial occipital gyrus (MOG) in the human brain

Table 10. Snake patterning properties and processing brain regions

Snake skin characteristic	image	Brain perception	Brain region
symmetry			dorsal premotor cortex the superior parietal lobule, the intraparietal sulcus, left ventral premotor cortex, FFA; visual cortex.

15) Gillian Rhodes The Evolutionary Psychology of Facial Beauty Annual Review of Psychology, Vol.57,pp199–226

Order			Prefrontal cortex, anterior cingulate gyrus, left angular gyrus
glossiness			PFs V3B KO

contains neurons that are particularly sensitive to symmetry. At the same time, FMRI experiments have shown that observing symmetrical graphics will activate dorsal premotor cortex the superior parietal lobule, the intraparietal sulcus, Left ventral premotor cortex, FFA; visual cortex. and other areas, and affect the perception and judgment of beauty(fig 6). Therefore, the brain structure provides the basis to perceive symmetrical patterns, besides, symmetrical patterns with regular order (Table 10) will improve the efficiency of the brain in processing information. The visual system can efficiently combine repetitive elements (Biederman, 1987; Reber et al., 2004), so as to ensure perceived fluency. It has been proposed the relationship function between perceived fluency and aesthetic pleasure in some studies that the more fluency the perceiver handles the object, the more positive

his aesthetic response is. Reber, Schwarz and Winkielman say that if an object can be easily perceived, this kind of ease or fluency seems to increase our love for an object.<sup>16)</sup> And high fluency is a certain degree of familiarity. Familiarity will activate the prefrontal cortex, anterior cingulate gyrus and left Angular gyrus of the brain to a certain extent, thereby triggering the brain's aesthetic pleasure in the order patterns of snakeskin. On the other hand,





16) Rolf Reber., Processing Fluency and Aesthetic Pleasure: Is Beauty in the Perceiver's Processing Experience? Personality and Social Psychology Review, 2004. Vol.8, No. 4, pp364–382,

the scales on the snake have the characteristics of luster, for shininess, several researchers have proposed that the visual appeal of glossiness “is innate and stems from the human need for fresh water as a resource” (Meert, Pandelaere, & Patrick, 2014). Coss and Moore (1990) proposed that people find glossy things appealing because of innate mechanisms that many animals use to detect the presence of water, a vital resource that humans cannot survive without for long (Jéquier & Constant, 2010).Therefore, the luster of snakeskin can cause people unconscious aesthetic pleasure.

#### 4-2. Aesthetic Judgment of Brain to Snake Form

The snake's own curve shape is often used to make some shapes other than the snake pattern. For example, during the Spring and Autumn Period and the Warring States Period in ancient China, the coiling pattern called "Pan





Table 11. Coil hui grain on bronze ware.

Coil hui grain and decorative accessories		
		
Yuhuan of coil hui grain	Yuheng of coil hui grain	Tiger-shaped Yu Pei of coil hui grain
		

Hui" was popular as the form of snakes to form geometric figures. Some are arranged continuously in two directions, and some form a continuous pattern in four. (Table 11 ) although these snakes have some symbolic meanings on these artifacts, in terms of artistic techniques, the arrangement according to symmetry and repeated order is also in line with the aesthetic

pleasure mentioned above. Except for the beautiful patterns formed by the arrangement of many snakes, there are also objects made with the help of the snake's own physical characteristics, such as the "snake stick" which symbolizes the power. It is recorded that the snake sticks are generally double snake sticks and single snake sticks, such as the Sumerian God Ningizzida is accompanied by two Griffins, which is the oldest double snake stick known in 2600 BC. In 2100 BC, the double snake stick was also found on the liberation vase of the Sumerian ruler, Gudea, which also symbolized the God Ningishzida. In addition, in Greek mythology, the stick held by Asclepius, the God of Medicine, is a wooden stick wound by a




Table .12 Application of spiral snake

About the snake rod.	
The earliest double snake rod appeared at about 2600BC in Sumerian.	
Around 2100 BC, the cane on the liberation vase of the Sumerian ruler Gudiya was the symbol of the god Ningishzida.	
Medical God Asclepius and Single Snake Cane.	
Images of Fuxi and Nuwa in Tang Dynasty.	

snake, symbolizing rebirth and health (Table 12). In ancient Chinese culture, pictures of "Fu Xi" and "Nv Wa" in the Tang Dynasty also depicted the winding of two snakes except for the walking sticks. From the perspective of visual aesthetics, the curve visual effect brought by the snake's own physiological structure is more

attractive, due to people prefer curved visual objects to sharp objects. In turn, using data collected in a functional MRI (fMRI) study, Vartanian et al. (2013) demonstrated that curvilinear spaces were more likely to be judged as beautiful and pleasant than rectilinear spaces, and that viewing curvilinear spaces activated the anterior cingulate cortex—a structure in the brain's core emotion network that is responsive to the reward properties and emotional valence of objects. Thus, affect appears to contribute to aesthetic preference for curvilinear spaces. The preference for curved objects may be biologically motivated (Claus-Christian Carbon, 2010). The spiral rising form produced by the snake body corresponds to logarithmic spiral, which is very common in nature, such as Nautilus, sunflower, Aloe rotata, etc, (Table 13). Such spiral arrangement will inevitably connect with Fibonacci sequence and golden section, and there are symmetrical regions in the human brain that can perceive such natural structures.

Table .13 The curve in nature

	nautilus	sunflower	Aloe rotata
Curves in nature			

Therefore, any artifact that conforms to the natural structure will cause the pleasure of the brain.

#### IV. Conclusion

Taking a large number of snake images in art as the cutting point and the cognitive neuroscience as the basis, this paper concludes the mechanism of snake detection in primate brain, which means the exploration mechanism of eye conducive to survival, through the recognition of the previous research results of neuroscientists and intuitive experimental

observations of brain images, so as to change the previous abstract interpretation of artistic creation. It is clarified that people have a rapid perception of snake image vision in early infancy with the knowledge of cognitive neuroscience. It is also affirmative that the amygdala region of the fear emotion center of the brain is activated to cause emotional response when people observe the face of snakes, based on the intuitive and objective brain magnetic resonance imaging. The objective experiments help the author prove the guess, exploring the essential reasons for people's fear and worship of snakes.

At the same time, combined with brain knowledge, this paper also summarizes people's aesthetic preference for the characteristics of snake skin, that is, the left-right symmetry of the brain to the snake pattern, the organization and order of the snake pattern, and the pleasant structure of the luster of the snake skin. Based on the neuroscience, from the perspective of the level of brain nervous system, taking the snake cultural symbols that appeared in primitive society and civilization as clues, this paper probes into the nature of fear and worship of snakes and the aesthetic preference of the characteristics of snake skins, explores the nature of existence of things by interdisciplinary methods, and provides scientific reference for future human thinking, creation and appreciation of artistic works.

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