***解释视觉审美欣赏的尝试***

***An Attempt to Explain Visual Aesthetic Appreciation***

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## Abstract（摘要）

我们通过探究（生物）进化的角度来解释为何视觉摄入作为人类审美机制的一方面如此重要。简单来说，人类在进化过程中，会经历诸如满足感和受制裁云云的生活状态，情绪也会随之在积极与消极间变化。逐渐地，人们也会去主动追求能够诱发满足感的情景，即便有的感觉不足以被称作是“满足感”。当一个人受到某种类型的视觉刺激时，大脑会产生满足感。例如：暖色调会让人联想到可口的水果，因而通常让人愉悦；复杂的图式会激发好奇心。在某一时刻，人类开始了如何能激发大脑满足感的探索，对物品进行有意识地美化，创造“艺术”。物品的实用性和（基于物品本身的）设计联想的会影响物品的最终样貌呈现，而艺术家们更倾向添加审美元素。这些元素在体现了视觉方面在实用性上不强，也不能唤起什么记忆或者让人就图像中易于辨识的形象产生什么联想。因而，我们需要去讨论审美元素究竟能提供什么满足感及相应的溯源，这理论上能在解释人类的审美机制上起些作用。

We suggest an evolutionary based explanation for why humans are preoccupied with aesthetic aspects of visual input. Briefly, humans evolved to be swayed by positive and negative feelings in the form of rewards and punishments, and to pursue situations that induce rewards, even when the feeling is not sufficiently strong to be recognized as a reward. The brain is designed to offer rewards when a person focuses on certain types of visual stimuli. For example, warm colors are typically pleasant because they are associated with edible fruits, and complex images appeal to curiosity. At some point people began exploiting these types of brain rewards by beautifying objects and creating art. The utility of objects, and the associative (or communicative) aspects of art, may dominate the design, but the artist tends to add aesthetic elements. These elements imply visual aspects that do not add to the functional value or evoke memories or associations based on easily recognized features in the picture. The adaptive rationale for the rewards offered by the aesthetic elements should help explain human aesthetic appreciation.

## Introduction（绪论）

古人类逐渐进化为直立行走的形态，因而他们能解放双手使用工具。毫无疑问，使用工具的能力是人类走向未来相当重要的一环。但尚不明晰的是，为何就算无法提升功用，但（至少当前被广泛认为是）为了增添情趣，我们的祖先开始愿意装饰自己的工具。并且到最后，人类将这种对审美的兴趣发展到了更远大的地步：创造出并没有明显使用价值，而能够被称之为“艺术”的东西。或许艺术家们会宣称艺术作品是一种交流的方式——但问题在于，对于这个目的增添的审美属性似乎也并非是必须的。在本文中我们需要关注的是审美属性，而非所谓的艺术在促进交流和链接沟通上的作用。

Hominins gradually evolved to walk in an upright position, thereby freeing their hands for the manipulation of tools. There is no doubt that the ability to use tools was of great importance for the success of humankind. It is less obvious why our forebears started to add beauty to their tools in ways that did not enhance utility but were widely recognized as pleasing.Eventually, humans moved one step further in that we create objects of art with no obvious practical value. The artist may claim that the work is meant as a way of communicating, but the point remains that aesthetic qualities are added that do not appear to be required for this purpose.Here we focus on these aesthetic qualities rather than the function of art in facilitating communication and creating associations.

美学被称作“研究感官刺激如何以及为何能获取享乐价值的学说” (Skov & Nadal, 2020)）——这意味着需要对视觉刺激的特征进行考证，这也包含审美元素通过某种方式激活大脑中的奖励回路的刺激。因而，进行审美行为意味着：为了获得满足感，人类会调配自己的时间和精力，进入到（具有审美效力的）工艺品生产中，或者欣赏此类工艺品的活动。在人类学研究中，有一些审美行为几乎在所有的文化中都不约而同地出现，并且，据当下有相当说服力的研究表明，它们属于根植于人类天性的倾向(Benton & DiYanni, 2012)。既然这能够将该问题引向人类的普遍属性，那么，满足机制或许也能被看作是由人类天生的刺激机制进化而来的；那么，我们也需要直接关切这些在我们进化史中极具适应更新性的感官输入形式。

Aesthetics has been described as “the study of how and why sensory stimuli acquire hedonic value” (Skov & Nadal, 2020) – which means it is a question of features of visual stimuli, here referred to as aesthetic elements, that for some reason activate reward circuits in the brain. Aesthetic behavior is then allotting time and energy to the production of aesthetic artifacts, or viewing such artifacts, for the sake of the rewards offered. Some form of aesthetic behavior seems to be present in practically all cultures examined by anthropologists (Benton & DiYanni, 2012), strongly suggesting that the behavior is rooted in innate tendencies. As it appears to reflect a universal human attribute, the reward mechanisms presumably evolved in accordance with stimuli coming from nature; that is, directing attention to these types of sensory input was adaptive in our evolutionary past.

在今天，并非每一个人都能攫取到由审美行为带来的什么适应成果，不过一种进化论的视角是能够帮助为这种确乎出现的现象做出解释的。当下，已经有些文章用进化论的观点来剖析美学了(Davies, 2012; Grinde, 1996; Kozbelt, 2017; Rolls, 2017; Westphal-Fitch & Fitch, 2018),我们觉得这种方法可以提供新颖的见解。这种研究思路和享乐主义美学流派相契；具体来说，对审美价值的研究关心的是如何让观者获得愉悦的问题。(Matthen, 2017)我们也了解到了对这一流派的批评。(Van der Berg, 2020)然而，我想，可以通过以下两个概念的进一步限定来回应对享乐主义流派的主要质疑：

一、就大脑回路中产生满足感和愧疚感的情绪模块如何运作的问题，我们采用了新的解释，那么“愉悦”（pleasure）一词似乎也被赋予了更广泛的含义。(Grinde, 2016)

二、我们需要重新限定“审美行为”（aesthetic behavior）一词的内涵——这也是我们接下来即将讨论的东西。

Today the individual does not necessarily obtain any adaptive benefit from aes- thetic behavior, yet an evolutionary perspective can help explain the phenomenon. Several texts have used an evolutionary perspective to explain aesthetics (Davies, 2012; Grinde, 1996; Kozbelt, 2017; Rolls, 2017; Westphal-Fitch & Fitch, 2018), we believe the present approach offers novel insight. The approach is in line with what has been described as the hedonic school of aesthetics; specifically, the aesthetic value is a question of pleasing the viewer (Matthen, 2017). We are aware of critics of this school (Van der Berg, 2020), but believe the main objections to the hedonic approach are considered by the following two constraints. For one, we take advantage of a novel understanding of how the mood modules, the brain circuits that form rewards and punishments, function; in other words, the term pleasure is given a somewhat broader meaning (Grinde, 2016). Two, we restrict what is included in the term ‘aesthetic behavior’ – as will be discussed below.

## 审美行为

观赏类审美活动的满足感可以从自然中获得，因而就像花上一小会欣赏成熟的草莓，或是品味日落之美，这都可以被构建为一种审美行为。但在本文中，我们将研究范围限制在“人造物”中。

The rewards of viewing aesthetic elements can be obtained from nature, thus spending time staring at a ripe strawberry or a sunset can be construed as aesthetic behavior. However, we shall limit the scope of this text to manmade objects.

再作进一步限制：我们关心的是人造物中，那种微妙的，能呈现出交互性和具有代表性的“审美属性”。这样限定尽管还是有些模糊，但至少可以基本排除由简单活动而非审美活动带来的愉悦（“seeing a nice landscape or a friendly face”）。当艺术家想传递“快乐”，或许他们会使用能承载善意的的审美元素；具象的内容也对我们的审美能力形成有所影响。 同时,我们也相信在没有主旨含义的人造物上，也会有一些带有审美内核的元素在起作用。总之，尽管“艺术”会触发各种机制，导致一系列情绪和感受的发生(Menning- haus et al., 2019; Schindler et al., 2017; Tinio & Gartus, 2018)，我们在此要探讨的是美带来的直观愉悦。如此限制还可以排除对“审美对象”产生兴趣的其他原因，例如：其货币价值、社会地位及其潜力等。

There is one further constraint, we are interested in the subtle aesthetic qualities that are present regardless of the communicative or representative content.This constraint excludes at least some of the pleasure of seeing a nice landscape or a friendly face, but the restriction is somewhat vague. If artists want to communicate joy, they may use bona-fide aesthetic elements; and figurative content has some bearing on how our capacity to enjoy aesthetics was formed.Yet, we believe there are core aesthetic elements that work in the absence of other subject matter. In short, although art can induce a range of emotions and feelings by various mechanisms (Menning- haus et al., 2019; Schindler et al., 2017; Tinio & Gartus, 2018), we are interested in the intuitive pleasures of beauty.The constraint also excludes other reasons for taking an interest in aesthetic objects, such as the potential for obtaining high status in society and the monetary value of the objects.

需要做以上这般细致限定，可以反映出审美行为与人类行为的其他方面必然相生相和，无法孤立。宗教行为也伴随着审美活动：这些行为不仅仅是为求得与超自然实体的联系，以宗教艺术形式进行的交互和审美行为也包含其中。

The above delineation reflects that aesthetic behavior is necessarily mixed in with other aspects of human behavior. There is a parallel in religious activities, they are not solely about connecting with supernatural entities, but includes, for example, socializing as well as aesthetic behavior in the form of religious art.

现已有充分的研究表明艺术可以带来快乐(Lacey et al., 2011; Skov, 2010; Vartanian, 2018)，在此基础上，我们再来假设愉悦中经过上述限制后的美学元素派生出的部分。相比实际的艺术作品（因为形象或联想内容在艺术中更加重要），这些元素或许在“容器”的设计（比如花瓶或房屋）中体现得更加明显，不过这套适用于制陶工人的原则同样也能为画家所用。审美倾向反映在使物体看起来更据视觉吸引力的特质上。以绘画为例，比喻式内容的重要性暗指当前的文本关注到的可能只是审美欣赏中一个非常小的部分：无论身处何方，我们天生的倾向都会去享受一些特定程式倾向的视觉输入。这就好像就算没有任何的审美特特质，欣赏一幅画也能带给我们愉悦的体验；例如，不需要任何艺术创作技巧，也能创作出一张让男人感到快乐的裸女像。

It has been reasonably well documented that art can induce pleasure (Lacey et al., 2011; Skov, 2010; Vartanian, 2018), and we assume that some of the pleasure derives from aesthetic elements that remain after the above restrictions.

These elements may be more obvious in the design of utensils, such as vases or houses, compared to in actual works of art (because the figurative or associative content is more important in art), but the principles guiding the potter also apply to the painter. Aesthetic intention is reflected in features included to make an object more visually attractive. In the case of paintings, the importance of the figurative content implies that the present text focuses on what may be a minor aspect of the appreciation of art: Our inborn tendency to enjoy specific types of visual input regardless of the context they are in. It follows that a painting can be pleasurable to look at in the absence of any aesthetic qualities; for example, no artistry is needed to make a rendering of nude women that delights a man.

至此，我们将从勾勒大脑如何以奖惩机制来激励形成行为的模型开始，并基于该模型，考察审美行为是否也在其他物种中出现，（如果没有）那么，这是什么时候开始在古人类身上显现的？随后，我们会提出大体属于美学讨论范畴的感官刺激机制的繁多特征。

We shall start by outlining a model of how the brain uses rewards and punish- ments to motivate behavior. Based on this model, we consider whether aesthetic behavior occurs in other species, and (if not) at what point it emerged in the homi- nins. Subsequently, we suggest various features of visual stimuli that are likely to be involved in aesthetics.

# The Brain’s Mood Modules

## Rewards and Punishments（奖惩机制）

在此处使用的“感情”（feeling）一词包括了视觉（或其他的）感官带来或好或坏的体验。内感官的活动会激活大脑里的奖惩机制。感情的双重性可追溯到影响动物行为选择中起的作用——对任何动物来说，最主要需要做的选择围绕着两方面进行：要么往对基因发展更有力的方向进步（奖励），要么远离任何灾难（惩罚）。(Grinde, 2016)

The term feelings as used here includes visual (and other) sensations that have an element of something either positive or negative; that is, the sensation activates rewards or punishments in the brain. The dual nature of feelings goes back to their role of instigating behavior – the main options for any animal are to either move ‘towards’ what benefits the genes (rewards) or ‘away from’ whatever is detrimental (punishments) (Grinde, 2016).

为方便起见，各种在大脑中的功能性进化都可被看做某“模块”来整体指代。(Friston & Price, 2011; Grinde, 2012)而“模块”（modules）一词并不特指大脑中的某分区，在某模块中运作的神经系统也会广泛出现在其他模块的运行中。

The various functions evolution has added to the brain can, for convenience, be referred to as modules (Friston & Price, 2011; Grinde, 2012). The term module does not imply a particular location in the brain, the relevant neurological circuits can be widespread and overlapping with other modules.

意识经验的情绪体验主要基于两组不同的模块活动：情绪模块（mood modules）和类型模块（type modules）。喜怒哀乐的情绪就是在我们所说的情绪模块中成型的，并且这些情绪可能在脊椎动物的胎内发育阶段就已作为一种生物体在权衡各种行为选择之后形成的一种生存共识策略。(Cabanac, 1999; Grinde, 2018)可以说，预期奖励的程度是不断与潜在惩罚相权衡的。某情绪模块通常也会被其他模块的运作连带运动，在此我们将重点放在类型模块与情绪模块的相互运动上，例如：（位于视觉皮层）负责处理视觉输入的组块运作时，信息通过情绪和类型模块的共同处理构成一瞬的意识体验。类型模块给经验认知赋予特性，在同质活动中做出区分，例如：观察一朵花带来的舒缓，与享受合心意的曲子时的愉悦，是很不一样的。

The conscious experience of feelings is based on activity in two different sets of modules: the mood modules and the type modules. The positive or negative feelings are due to the contribution of what we refer to as mood modules.They were presumably introduced at the amniotic stage of vertebrate evolution as a strategy for creating a ‘common currency’ when evaluating various options of behavior (Cabanac, 1999; Grinde, 2018).In other words, the strength of expected rewards is weighed up against potential punishments.The mood modules are typically activated by another set of modules, which are here referred to as type modules; the module responsible for processing visual input (situated in the visual cortex) is one example. Input from mood and type modules merge in a moment of conscious experience. The type modules add the specific quality to the experi- ence; they explain why, for example, the pleasure of viewing a beautiful flower feels so different from hearing a favorite song.

基于神经学研究，哺乳动物的大脑可分出三组清晰的情绪模块。(Berridge & Kringelbach, 2015; Leknes & Tracey, 2008) 所有能被划分在“惩罚”这一范畴中的，以精神创伤或身体伤害为表象的消极情绪都源于**某种疼痛模块**。有两组模块能构成奖励系统：欲望模块（或称期望或激励模块），能激发个体追求机遇或受某种驱使而去追求目标的活动；偏好权衡模块（或消耗模块）能让主体确保机遇能被自己把握和使用。简单来说，欲望和偏好权衡模块的运作就像是某人先闻到了烘焙铺的香气，产生食欲，然后美美吃掉一个香香的蛋糕。

Based on neurological research, the mammalian brain has three distinct mood modules (Berridge & Kringelbach, 2015; Leknes & Tracey, 2008). **Negative feelings** originate from a single pain module, which is why all sorts of **negative feelings**, whether in the form of mental agony or physical pain, can be included in the term punishments.The reward system is divided into two modules, the seeking module (also referred to as wanting or motivating) is meant to stimulate the individual to seek opportunities and motivate for relevant action; the liking module (also referred to as consuming) makes sure the opportunities are exploited. The effect of the seeking and liking modules can be exemplified by a person who first follows the smell of a bakery and then eats a cake.

对这两种有关奖励的模块作如此区分主要是基于神经学的逻辑，同时从生物进化的角度来看也是有十分意义的。生物体必然是先受“去获取有益于基因的东西”的驱使，意欲行动，再一边思考衡量可能性结果，一边采取相应的**需消耗自身的实际行动（actual consumption）**。（而在惩罚机制上）就“什么是该规避的”上做判断，一个疼痛模块就够用了。简而言之，不管是在进行某种体验还是受到刺激，喜怒哀乐的情绪是能由同一神经系统产生的。(Blood & Zatorre, 2001; Leknes & Tracey, 2008; Lieberman & Eisenberger, 2009)进一步概括地说，两种奖励模块带来的东西都能被总结在“奖励”的范畴中。主要控制情绪模块的开关属于大脑的无意识层面。而个体无法控制无意识，但它们可以对你默默产生影响。

The classification of the two reward modules is based on their neurobiology but also makes sense in evolutionary terms (Grinde, 2012). That is, to obtain what is good for the genes, it is necessary to first motivate the individual for action and then ensure that the opportunity ends with actual consumption. A single pain module suffices for whatever the individual should avoid. In short, the same neurological circuits apparently create the positive or negative content regardless of the type of situation or stimuli (Blood & Zatorre, 2001; Leknes & Tracey, 2008; Lieberman & Eisenberger, 2009). For simplicity, input from the two reward modules is combined in the term rewards. The main ‘switches’ for turning the mood modules on or off belong to the unconscious part of the brain, for the obvious reason that they are meant to control you, rather than you control them.

在这一意识模型中，由类型模块激活情绪模块。(Grinde, 2012)后者的作用仅仅是为经验增添了或忧或喜的情绪成分。但值得注意的是，特殊的类型模块本身也能产生情绪运动。就像“恐惧”，通常来说它在疼痛模块中运作，然而如同登山者在提心吊胆时伴随肾上腺素激增，恐惧感有时也能带来愉悦。“悲伤”某些时候也是一种舒缓心情的方法。(O’Connor et al., 2008)奖惩机制是能够被同时激发的，大脑也会根据具体情况即刻反应，将二者迅速转化切换，还是用登山者的例子：如果ta滑到了，攀岩的爽感（于奖励机制中）会瞬间转变为恐慌（于惩罚机制中）。

In this model of the mind, the type modules activate the mood modules (Grinde, 2012). The latter solely adds the positive or negative component of the experience. It is relevant to note that a particular type module can activate either pleasure or pain.Fear is a typical example, normally it activates the pain module, but a fearful situation can also offer pleasure, as in the case of the adrenalin kick of a climber. Even grief sometimes feels good (O’Connor et al., 2008). Both rewards and punishment can be activated simultaneously, or the brain can switch rapidly from one to the other; in the case of the climber, the kick will change to panic if he slips.

感官输入可能会将奖惩机制同时唤醒。并且二者的综合效果会共同决定此在这一刻如何被体验。比如有过闻吲哚糟糕气味的经历后，由闻到茉莉花的香气带来的愉悦感将会更强。(Rolls, 2017)这种感觉的强化或是因为不愉快经历产生的对比，或是由于曾有过的经历，个体在气味这一方面的敏感度总体增强了。据推测，类似的原理也适用于视觉刺激。

Sensory input may elicit both rewards and punishments. Their combined effect determines how the moment is experienced. For example, the pleasantness of an odor such as jasmine can be enhanced if it is combined with a component such as indole that has an unpleasant smell (Rolls, 2017).The enhancement may be due to the contrast provided by the unpleasant part, or because this part heightens the attention to odors in general. Presumably, similar principles can be at work in the case of visual stimuli.

值得一提的是，奖惩机制也并不只在有意识的层面运作。甚至某种不易察觉的愉悦或创伤实实在在地发生了。就算悄无声息如滴水，也会产生微妙的意识波动，外化为人们的无意识行为或偏好选择。(Tamietto & de Gelder, 2010)在下文对美学元素的讨论中，考虑到这些内容。

It should be noted that the rewards and punishments are not necessarily recognized consciously. Small ‘drops’ of either pleasure or pain can be acted on even if the person is unaware of why the action, or the interest, is instigated (Tamietto & de Gelder, 2010). It follows that the aesthetic elements discussed below, may or may not be recognized as such by the viewer.

审美经验基于在对大脑想象机制的研究，该类研究有时也被称为**“神经美学”（neuroaesthetics）**[[1]](#footnote-1)。当前已有一种专注于神经学与审美经验间相关性的研究方向(Cela-Conde & Ayala, 2018; Chatterjee & Varta- nian, 2014)：（*在接收到外界信息后，*）大脑中与视觉加工（在视觉艺术中）、注意力以及奖励机制相关的结构必然会运作起来。此外，产生知觉经验的系统也会被激活（该系统有时被称作“广播”（‘broadcasting’），其中包含皮质丘脑复合体）其研究发现，审美经验（aesthetics）经由大脑成像形成（而结果如何因人而异，于是关于“如何形成”的问题尚不明），而在本段中指出的大脑的诸类特性，似乎与观察结果所示的审美经验（aesthetics）对大脑某些区域的影响有相当的相关性。因此笔者认为不必再假设一个专门有关“审美”的大脑回路（或模块）。那么，当下紧要的问题当是：究竟为什么特定种类的视觉刺激会激活奖励机制。

One line of investigation has been to look for the neurological correlates of an aesthetic experience, a field sometimes referred to as neuroaesthetics and based primarily on brain imaging studies (Cela-Conde & Ayala, 2018; Chatterjee & Varta- nian, 2014).The brain**（集体名词？）** must necessarily activate structures associated with visual processing (in visual arts), attention, and rewards. Moreover, the circuits required for the creation of a conscious experience, which is sometimes referred to as ‘broadcasting’ and include the corticothalamic complex, are active (Dehaene et al., 2014). **The brain features** mentioned in this paragraph as required **seem to** correlate reasonably well with the reported observations as to regions of the brain active while engaged in aesthetics – given the **uncertainty** of brain imaging – thus in our opinion it is not necessary to postulate specific brain circuits (or modules) dedicated to aesthetics.The compelling question is why certain types of visual stimuli activate the reward system.

## Supernormal Stmuli（超常刺激）

在对生存和繁衍的的意义的角度考察审美行为的意义上，考察在审美行为上花的时间意义并不大，因为这部分主要用大脑的奖励机制的性质来解释，因而着眼于本质上已显现出来的某些形式的视觉输入才是\或也许是适合的。但这一原则仅能勾勒审美行为的基础，在时间和资源上具体的分配需要用超常刺激（supernormal stimuli）来解释。

Time spent on aesthetic behavior does not need to be adaptive in the sense that it contributes to survival or procreation, the behavior can be explained by the nature of the reward system in the brain.Paying attention to certain types of visual input when out in nature is (**or was**) presumably adaptive, but this tenet only forms a basis for aesthetic behavior, the substantial allocation of time and resources can be explained by the concept of supernormal stimuli.

超常刺激指一种能引起比进化中产生的自然刺激更强烈的回应。(De Block & Du Laing, 2010)例如巧克力中糖和脂肪能在味觉上带来满足感（rewards），因而生产商会对他们的巧克力食谱进行微调，来达到最优效果。(Casperson et al., 2019)再例如，色情作品能带来超出日常经验的性刺激。我们享受吃巧克力和对着色情片自慰的癖好并非适应性行为，而是当下所处的环境带来的各种开放机遇的结果。艺术家创作中将自然刺激的影响放大，提升视觉上的满足感，对这种作品的审美行为某种程度上也是与超常刺激有相似之处的。一些鸟和哺乳动物也表现出相似的追求超常刺激的行为，(Barrett, 2010)大概是因为与自然刺激相比，这些刺激提供了更强的满足感。动物本身也遵循最大化快乐的行为选择原则。

Supernormal stimuli imply something that elicits a stronger response than the natural stimuli for which the response evolved (De Block & Du Laing, 2010).Chocolate is an example. The taste of both sugar and fat offers rewards, the producers have fine-tuned their chocolate recipes for maximal effect (Casperson et al., 2019).Pornography can be construed as another example as it offers sexual stimuli that tend to be superior to what a person is likely to experience in real life.Our propensity for eating chocolate and masturbating to pornography is not adaptive behavior, but a consequence of opportunities available in the present environment. Aesthetic behavior is somewhat related, but only in that the artists tend to exaggerate the effect of the natural stimuli for which the visual rewards evolved. Other species of birds and mammals display similar behavior in that they prefer to engage with supernormal stimuli (Barrett, 2010), presumably because these offer stronger rewards compared to natural stimuli and because the animals adhere to the principle of choosing behavior that maximizes pleasure.

体验超常刺激会白白消耗时间甚至对健康造成损害，因而从生物机能运行上看是无益的，但它可以带来快乐，那么我们好奇——此种行为会如何影响（长期的）生活质量呢？艺术家在全神贯注创作时，有些情况会对健康有害——可以说这是在进行一种完全搁置了基础生存需要的纯消耗行为。尽管如此，大多数人也还是会为了提升生活幸福感参与到审美体验中去。

ngaging in supernormal stimuli may be biologically unproductive, in that the time spent is wasted or the consequences are detrimental to health, but it is not necessarily maladaptive in terms of happiness. We believe the pertinent question to be how the behavior affects (long-term) quality of life. Although an artist’s preoccupation with art can in some cases have a negative effect on health, in that the behavior becomes so all-consuming that basic sustenance is not cared for, most people are likely to improve their lifetime sum of happiness by engaging in aesthetics.

有一种可能即：我们谱系最近的演变正在朝着增强我们对艺术的兴趣发展。如果在性伴侣的选择中，有艺术才能的人优先级更高，那么这就可以解释审美对象的生产为何会成为当下社会如此显著的特征。(Prum, 2012) 然而，性选择在解释我们所要探讨的问题上相关性有限：其一，人类种群已经分化了15万年有余，(Schlebusch et al., 2017)我们的祖先是否在审美行为上花费大量时间尚不能清楚；再者，如果审美行为是性选择在漫漫历史中发展而来的结果，那么要么为趋同进化，要么该行为仅存在于特定种群中；此外，性选择通常以已经存在的特征或行为为出发点，其结果会加强审美行为，但这种选择形式不太能解释审美行为最初的出现原因。

It is possible that the recent evolution of our lineage has been in the direction of enhancing our interest in art. If those with artistic talent were preferred as partners, sexual selection would help explain why the production of aesthetic objects is such a prominent feature of society (Prum, 2012).There are, however, reasons to assume that sexual selection has limited relevance. **For one**, the present human populations started to split more than 150,000 years ago (Schlebusch et al., 2017). It is not obvious that our ancestors spent much time on aesthetic behavior prior to that. If aesthetic behavior is a consequence of sexual selection occurring after that time, it would imply either convergent evolution or that the behavior is present only in particular populations. Furthermore, sexual selection generally takes as a starting point features, or behaviors, that are already present. Thus, the consequence of sexual selection would be to strengthen the engagement in aesthetic behavior, but this form of selection is unlikely to explain why the behavior appeared in the first place.

# Aesthetic Behavior in Animals and Early Humans（动物和早期智人的审美行为）

所有哺乳动物大脑中都有可以对应于人类情绪模块的结构，一些在能激活奖励机制的视觉输入上的特征至少与我们的近亲如猿类相似。例如，猿类的饮食中通常包括水果，因此他们对暖色调会是有兴趣的。简单来说，至少我们在猿类身上是能看到对审美体验有认知需求的，但实际情况也关于是否有能真正完成这个行为的现实机遇。人类有对双手的灵活使用的能力以及思考出参与艺术生产手段的智性能力，这就是我们的可能性。

All mammals have brain structures corresponding to those responsible for the mood modules in humans. Moreover, some of the features of visual input that can activate rewards are presumably relevant for at least our closer relatives such as the apes; for example, fruit is typically included in their diet thus they should take an interest in warm colors. In short, at least the apes presumably have the cognitive requirements for aesthetic appreciation, but actual behavior also depends on opportunity. In humans, opportunity is cared for by the dexterity of our hands and the intellectual capacity to produce the means to engage in artistic processes.

猿类具备部分灵活性，但缺乏手段，否则猿也是能够参与到审美行为中的。戴斯蒙·莫里斯（Desmond Morris）就曾发现了一只喜欢画画的黑猩猩Congo。(Morris, 1994) Congo的画作中的图案并不具象，但他现出了对颜色有偏好的使用，画面中诸如扇形和圆形的几何形状组合也能看出他对把握画面平衡感的兴趣。在此过程中他并没有产生满足感，但如果有人试图在他构思好一幅画作之前就把他拉走它会抗议——这非常能说明在当下这一刻他确实正在进行审美行为。

Apes have some dexterity, but normally lack the means. If given the chance, at least some of them do engage in aesthetic behavior. Desmond Morris describes the chimpanzee Congo who became fond of painting pictures (Morris, 1994). Congo did not produce figurative images, but he did show an appreciation for color, and he preferred a balanced, patterned composition with geometrical shapes such as fans and circles.He was not rewarded for participating, and he protested if anyone tried to remove him before he considered a painting finished, which strongly suggests aesthetic behavior in the present sense.

对人类儿童类似行为的观察证实了这一点。2-3岁的儿童使用蜡笔时体现出了他们的灵巧性，且最开始都是非具象的涂鸦。(Morris, 1994)在4-5岁的阶段，他们的画中开始出现几何形状，对可辨认形象的勾勒逐渐成型。这些行为都是自发的，并且具有普适性。再之后他们的成长经历才会反映到“艺术创作”（‘art’）之中。也就像Congo的案例一样，他们都享受着这种忽视生产的进步。

The point is substantiated by the observation that human children behave in a similar way. By 2–3 years of age, their dexterity is sufficient to use a crayon, but the first images are non-figurative scribble (Morris, 1994). By the age of 4–5, they start to depict geometrical shapes and subsequently pictorial images. The behavior is performed voluntarily and is pretty much the same regardless of the culture the children belong to; only later does their ‘art’ reflect their upbringing. As in the case of Congo, they enjoy the process, but do not care much about the product.

在分析儿童和Congo案例中的美学行为都能被看作是一种游戏（play behavior）。游戏是为让婴儿学习成长为人所需的技巧而进化出的方式，他外化为例如控制手部动作，或学习识别和解释视觉输入的形式。大多数物种中，当生物体接近成年时，“游戏”就会终止。但似乎人类对这种行为乐此不疲，也许是因为在我们的一生中，对学习新知有更大的需求。这一点或许可以解释为何审美行为在成人中也还是如此普遍。再者，不止是儿童在用油画棒涂涂画画随便耍耍，现代人类社会普遍朝着专业化行为的方向发展——这意味着艺术生产当今也主要掌握在专业艺术家手中。

The aesthetic behavior of children and of Congo can be described as a form of play behavior.Play evolved for infants to learn skills required as adult, for example in the form of controlling hand movements and learning to recognize and interpret visual input.In most species, play behavior ceases when the individual approaches adulthood, but in humans it seems to linger, perhaps because we are in greater need of learning throughout our lives. The point presumably helps explain the prevalence of aesthetic behavior in adults. Then again, while all children enjoy their crayons, modern human societies generally move in the direction of specialist behavior, whether in art or engineering, which means that aesthetic production tends to be primarily in the hands of professional artists.

某种意义上动物的行为也是有审美属性的，就像孔雀开屏、园丁鸟筑巢(Borgia, 1986)还有(Lewis & South, 2012)小鸟带来定情信物(Lewis & South, 2012)。但根据目前的划分，这些例子是能被称为审美行为的特征并不明显。孔雀具有审美性质的身体并非由其创造的，而只是一种性选择进化的产物；筑巢和带来定情信物确实由动物创造（哪怕是“收集”），在此过程中对于观者和创造者来说都能享受愉悦，但这些也只是求偶的一环，如果没有配偶的需求，动物们也不大可能会消耗时间来做类似的事情。简而言之，野生动物不会单纯为享受创造的快乐而生产具有视觉意义的工艺品，他们在这些行为中的喜悦更类似于人类久旱逢甘露或春心萌动时的体验。人类会发现孔雀尾巴的审美价值，但这对于该种鸟类本身，只是一个适应物种特定繁殖要求的功能而已。

Certain aspects of animal behavior have an aesthetics component, for example, peacocks showing off their colorful plumage, the nest building of bowerbirds (Borgia, 1986), and the presentation of nuptial gifts (Lewis & South, 2012). However, it is not obvious that these examples qualify as aesthetic behavior according to the present demarcation. Decorative bodies are generally not something the animals create, but simply a product of sexual selection. Nests and nuptial gifts are created (at least collected) by the animals, and the process may involve pleasure for both the creator and the spectator, but the behavior is part of courtship, and the animals seem unlikely to spend time on similar behavior in the absence of a chance for mating. In short, animals in the wild do not appear to produce visual artifacts simply for the joy of the creation, their delight is more akin to what humans’ experience when finding a ripe fruit or spotting a potential lover. Humans find aesthetic value in the peacock’s tail, but for the bird it is solely a feature tuned to species-specific require- ments for procreation.

基于以上的探讨，真正的审美行为在人类谱系之外可能很少见，不过，这种行为也或许早在现代智人前就出现了。（据考古发现）约300万年前，就有南方古猿找到一块与人脸相似的鹅卵石并将其带回山洞。具明显审美属性和/或象征意义的工艺品真正开始生产要追溯到30万年前或更早。(Kissel, 2018)并且在考虑遥在历史另一边祖先的审美行为时，别忘了只有材料硬度大的制品（像是石头、贝壳、象牙）才会被留下来——或许早期智人就已经在审美追求上下功夫了，像是木雕、木炭皮革画之类的，不过这些材料很难保存，难以考究。然而，直到更适合审美创作的方式被发明出来之前，这种审美行为产出的模式可能在人们的生活中重要性都是有限的。在山洞中以绘画和雕像留下的其他文物的历史通常都在距今5万年之内。(Clottes, 2016)

Based on the above discussion, true aesthetic behavior is likely to be rare outside the human lineage; however, it may predate Homo sapiens.Some three million years ago one of our Australopithecine ancestors found a pebble with a clear resemblance of a face and decided to bring it back to his or her cave. Actual production of artifacts with apparent aesthetic and/or symbolic intent date back 300,000 years or more (Kissel, 2018).When considering aesthetic activity in our distant ancestors, it is important to keep in mind that only objects made of a hard material (such as rocks, shells, and ivory) are likely to survive.It is possible that early hominins spent time on aesthetic pursuits, for example in the form of woodcarving or drawing on hides with charcoal, even if no such remains are found. Yet, this form of **behavior** probably was of limited importance until the invention of more suitable means for creating aesthetic objects. Remaining artifact, in the form of cave paintings and figurines, are generally less than 50,000 years old (Clottes, 2016).

# Aesthetics Elements（审美元素）

## Color（颜色）

人类对颜色的偏好很大程度上取决于对物品的选择和目之所及的环境(Gong et al., 2017; Torres et al., 2020)。不过，在普遍共识中，颜色本身也能增强视觉舒适感。(Birren, 2016; Elliot & Maier, 2014)此外，在一些特殊情况下，颜色给人的感觉也是能够转换的。

Color preferences in humans depend largely on the choice of objects and the circumstances in which they are viewed (Gong et al., 2017; Torres et al., 2020). However, there is a general agreement that colors can enhance visual comfort (Birren, 2016; Elliot & Maier, 2014). Moreover, certain colors tend to have connotations that make them agreeable or disagreeable, if not under any circumstances, so at least in some situations.

水果（以及浆果）的不同色彩能让动物在绿色环境中觅食时辨识到并食用，人类也如此，我们的三原色视觉系统也在此过程中不断发展。

且当我们在寻找水果过程中，大脑会在留心到具相应颜色的各目之所及之物时释放奖励机制，以便提升食的成功率——而这或许也能解释为什么普遍意义上的暖色调能带来“愉悦感”。(Palmer & Schloss, 2010)经考据发现，当前能发现的人类早期用于装饰的颜料是黄色和红色（原料为赭石），这也为这一颜色偏好的猜想提供了证据。赭石被用作颜料的历史可追溯到20多万年前的尼安德特人，(Hodgskiss, 2020) 而有趣的是，黑猩猩刚果最喜爱的颜色也是红色。(Morris, 1994)

Fruits (and berries) are meant to be eaten by animals, which is why they typically have a color that makes them conspicuous in the green environment of the forest

– such as red, orange, or yellow. Humans seek and eat fruit, which is one reason why we have trichromatic color vision. The brain presumably offers a reward for paying attention to objects of relevant color so that we are more likely to spot the fruit and thus find a meal. This notion may explain a delight in warm colors (Palmer & Schloss, 2010). The fact that the early pigments found to be associated with human decoration are yellow and red, in the form of ochre, adds evidence to the idea of a preference in this direction.Apparently, ochre was used already by the Neanderthals, and the use dates back more than 200,000 years (Hodgskiss, 2020). Interestingly, Congo’s favorite color was red (Morris, 1994).

红色受青睐也有很多其他的原因。雌性的生殖器就呈红色和粉红色。特别当灵长类雌性动物体温升高，以吸引雄性时，也会以臀部肿胀变粉作为信号。(Dunbar, 2001)因此，雄性依据“红色”这一信号来接收雌性发出的性相关的信号，久而久之前便潜移默化成一种“红色”与“性”的潜意识联系。同时雌性也会因这种功能对红色有如此的特殊印象。这一点或许也反映在当今在口红、粉饼产品制作时对红色的偏好，以及也更能帮助我们理解俚语使用中如“红灯区”之所以被冠以“红”之名的原因。不仅如此，红色也与对“血液”的印象，与在工业文明中诸如“警告”和“禁止”之类的能引起负面情绪的联想有关。

Red may be appreciated for another reason as well. The female genitalia are red or pinkish. In certain primates the buttocks of the female swell and turn pink when she is in heat, a signal employed to attract males (Dunbar, 2001).Thus, males may value the conscious or unconscious sexual associations accompanying something red, while females may value the color for its ability to attract men. The point is presumably reflected in the inclination to use red pigments in lipsticks and powder, as well as in the use of red in red-light districts.On the other hand, red is also associated with blood, and in industrialized cultures with alarm and the stop signal, associations that are more likely to cause negative feelings.

相比观看城市景观或人工环境，人们更喜欢自然景观，这种偏好被称作“親生物性（biophilia）”。(Grinde & Patil, 2009)除上文讨论到的“觅食”这一生物行为带来的偏好之外，我们也能合理猜测对某风景带来的愉悦可能与该处可以是“人类友好栖息地”有关：有水源，有能提供住处的选择，且生机勃勃。(Brielmann & Pelli, 2018)据此便可试图追溯人类对蓝色和绿色的偏好。据考，女性对暖色调更喜爱，相比之下男性更喜欢蓝绿色调。(Hurlbert & Ling, 2007)这种差异可能来自石器时代时女性更多承担采集水果的工作，而男性在（狩猎行为中）更关心环境的整体情况。

Humans tend to prefer a view of nature, compared to looking at a cityscape or an artificial environment, a tendency referred to as biophilia (Grinde & Patil, 2009).Beyond the chance of spotting edible objects, it seems reasonable that we can take delight in scenery suggesting a human-friendly habitat; that is, a lush place with water and options for cover (Brielmann & Pelli, 2018). One would expect this to imply an appreciation for green and blue. According to one study, women have a stronger preference for warmer colors, while men take comparatively more delight in blue-green (Hurlbert & Ling, 2007). The difference could be that women in the Stone Age were more focused on collecting fruit while men were more tuned to the general quality of the environment.

棕色就不那么受人待见——许多粪便和腐烂水果的颜色。(Palmer & Schloss, 2010)大多棕色或者灰色的坚果也是营养物，而相比水果，坚果的颜色就并非为供动物食用而形成了，反而或许这正是一种不被动物吃掉的策略，在自然中更好地伪装自己。

Brown tends to be undesirable as it is the color of feces and rotten fruit, both of which should be avoided (Palmer & Schloss, 2010). Most nuts come in shades of brown or gray. They are nutritious, but in contrast to fruit, not designed by the plant for animal consumption. The color of nuts may be partly intended as camouflage but may also reflect a strategy to make them less desirable for hungry animals.

可见人类（整体）更喜欢饱和度高、明亮的颜色。明亮且易被辨认的颜色会令人愉悦，而灰黯和较浑浊的颜色则更令人沮丧。对光亮的追逐也反映我们是日间活跃的动物。相比傍晚或清晨较昏暗的环境，日光在功能上也对我们的活动更有利。我们也因此在光线充盈的环境会更有活力，反之情绪会相对低落一些。(Pjrek et al., 2020)夜晚带来的难以辨清的视觉体验会让我们陷入不确定的慌乱之中。

Humans appear to prefer colors that are saturated and bright (Camgöz et al., 2002). Colors that are light and easily distinguished tend to be regarded as pleasant, while darker and muddier colors are more depressing. The effect of brightness may reflect that we are diurnal animals. Daylight is more useful for our activities than the dimness of the evening or early morning; we therefore thrive where there is plenty of light and tend to become depressed in its absence (Pjrek et al., 2020). Colors that are difficult to discern may leave us uncertain.

## Complexity and Fluency（错综复杂和流畅度）

为寻求机遇，就如各种动物一般，人类也会受此驱使进行探索。(Xu et al., 2021)大脑两种奖励机制的其中之一就归属负责“探索”的系统。(Wright & Panksepp, 2012)我们会享受获取新知的感觉，是因为好奇心会激活大脑的奖励机制。我们的眼睛是从四周环境获取信息的重要媒介。我们在观看景、物时的那种流连忘返正是为了能从观察中获取更深的了解。

Humans are pushed toward exploratory behavior, as are many other animals, because that way we may discover novel opportunities (Xu et al., 2021). In fact, one of the two reward modules is referred to as the seeking system (Wright & Panksepp, 2012). We enjoy gathering information because our curiosity can activate brain rewards. Our eyes are the most important tool for obtaining information regarding our surroundings. We cherish inspecting objects and scenery just for the sake of finding out more about the environment.

“无聊”一词在审美体验中用于描述没有足够有新鲜感的视觉输入。一幅画在色彩或形式感上没有所需的丰富度，就不能吸引我们的注意；缺少耐人寻味的细节便无法满足我们的好奇心，缺乏足够的内涵而不值得细品，就像市郊景观中单一房屋类型的规律分布相当令人乏味。独创性和丰富度（富有细节与新奇感）本身也是能激发我们的好奇心并带来愉悦的因素。简单来说，如果一个设计复杂(Landwehr et al., 2011)又新奇(Hekkert et al., 2003)，是符合审美偏好的积极部分的。

The term boring is used in aesthetics to describe visual input without sufficient variety or novelty. A painting may lack the required complexity in color or form to attract our attention; there are no surprising details to feed our curiosity and not enough content to make a visual scrutiny worthwhile. A suburb consisting of a single type of housing regularly spread out is considered depressing. On the other hand, originality, and variety – richness of detail and novelty – stimulate our curiosity and are therefore pleasing. In short, aesthetic liking is positively influenced if the design is complex (Landwehr et al., 2011) and novel (Hekkert et al., 2003).

再者，如果事物或图像过于错综复杂我们也会失去兴趣或对此消极反应的。(Papadimitriou, 2020)大脑的综合也需要帮助组织和理解视觉输入的纽带，我们需要从经验储备中提取相似的模式或联系理解所呈现的信息，因而就算是“多样性”，也应具有一定的连贯性。对一幅图像无法理解的困惑心情会带来不适，因为怪异和陌生的物品或组合暗示着未知的危险。更有甚者，大量的信号和脉冲可能会造成意识处理系统的 “过载”（Lipowski，1974）。当我们理解所处环境时会有满足感，反之会激发大脑的惩罚机制。可见“复杂性”到“愉悦”间的路径是“倒U形”的。（“过犹不及”捏）

Then again, we may lose interest or react negatively if the object or picture is too intricate (Papadimitriou, 2020). The mind needs clues to help it organize and understand visual input. There should be a degree of coherence in the diversity, as we need to find patterns or connections to make sense of the information presented. The confusion of not understanding an image is uncomfortable because strange or unfamiliar objects and settings could imply danger. Moreover, a heavy load of signals and impulses may lead to an unpleasant ‘overload’ in the conscious processing machinery (Lipowski, 1974). We are rewarded for understanding our environment and punished when we do not; that is, there appears to be an ‘inverted U-shape’ to the relationship between complexity and the pleasure obtained (Berlyne, 1970).Conceptual fluency is a related term, it refers to how easy it is for the viewer to process the visual impact (Friedenberg & Liby, 2016; Graf & Landwehr, 2017). A painting should offer a spontaneous appreciation without the viewer having to strug- gle with disturbing visual elements. Too much complexity, or elements that do not ‘fit in,’ will tend to reduce the fluency. In order to grab our attention, the painting (or object) needs to induce an immediate positive experience.

我们的视觉系统在观看中倾向于去寻找能引起注意的特定模式或元素。例如，在视觉图景中发现并辨认出诸如方形或圆形这样的基础又规整的几何图形是能带来一定程度满足感的。这能解释立体主义这一艺术流派的盛行。这一普适的设计原则原理也正如上文所述，是通过提供可供辨认的信息给观看者带来愉悦感的。如上文所指，人类幼儿和黑猩猩Congo都表现出对几何图形的兴趣。对曲线的偏好会比直线或角线更强烈(Bar & Neta, 2006)或许也是因为曲线在能辨识的同时又略有变化。

Our visual system seems to be tuned to look for certain forms, or elements, that it can recognize – for example, basic shapes such as squares or circles – identifying these elements presumably offers drops of satisfaction. The notion could help explain the popularity of Cubism as a school of art, but the principle applies to any form of design, and is related to the above suggestion that it pleases us to find comprehensible information. As pointed out above, both human children and the chimpanzee Congo seem to appreciate geometrical shapes. Curvature is apparently better than straight and angular lines (Bar & Neta, 2006), perhaps because curves offer more in terms of complexity.

## Symmetry and Balance（对称平衡感）

在一众美学法则中“黄金比例”享有盛名。(a proportion of 1:0.62) (Konecni, 2003)许多画作中的主体部分都会依此比例划分画面。均分的比例会有点无聊，过于倾斜的比例又会造成不平衡的观感。在这两种极端之间找到的黄金比例可以说是最优折衷解。

One of the few rules of aesthetics that has won a certain acceptance is the golden ratio (a proportion of 1:0.62) (Konecni, 2003). For example, the main item in a painting should divide the canvas in this proportion. What the principle possibly suggests is that a 1:1 ratio is boring, while a too skewed ratio produces an unbalanced appearance. The golden ratio is then the optimal compromise between these two undesirable extremes.

对不和谐画面的方案可能与我们对倾覆的恐惧有关。虽然摔倒对陆上动物来说不是什么大问题，但别忘了我们的祖先一度栖息在树上。而且就算是陆栖动物也要预防被石子绊倒的可能性。图像中的主体过于偏向一侧会让人不适，所以也需要一些东西在另一侧平衡整体画面。另一方面，完美平衡的画面又缺乏动感。

The disagreeable effect of an unbalanced picture may relate to our fear of falling. Falling is not a major problem for an animal based on the ground, but our ancestors did once live in trees. Moreover, even ground-dwelling animals need to be aware of the possibility of an unsteady rock tipping over and making them stumble. A dominant object on one side of a picture gives the unpleasant impression that the whole picture is tilting toward that side; something is needed on the opposite side to provide a counterbalance. On the other hand, a perfectly balanced picture lacks excitement.

某些情况下，精妙的平衡也是有好处的，因为人类整体是偏好对称的。(Adkins & Norman, 2016; Bertamini et al., 2013)动物显然也有这种视觉偏好。(Bertamini et al., 2018)对此的解释之一是这与择偶相关：所有的脊椎动物身体形态大体是可以对折重合的，那么根据经验，理想上应该是中心对称的。不对称则标志着健康情况或基因质量较差，籍此人们也倾向于选择外观上是对称的伴侣。而也可以在设计上解释：这与降低景象的复杂度，并使视觉体验更流畅有关。(Chen et al., 2011)对称积极的美学价值或许在建筑中有最好的体现，许多被称为杰作的建筑都是对称的。

In some situations, an exact balance can add value because we delight in sym- metry (Adkins & Norman, 2016; Bertamini et al., 2013). This appreciation is apparently shared with animals (Bertamini et al., 2018). One possible explanation is related to mate choice. All vertebrates have bilateral bodies, meaning they are, as a rule of thumb, meant to be symmetrical around a central plane. Breaches of this symmetry is a sign of inferior health and gene quality, which is why people tend to prefer a symmetrical partner. In design features, it may also be a question of reducing image complexity and making the visual impression more fluent (Chen et al., 2011). The positive aesthetic value of symmetry is perhaps best recognized in archi- tecture, many buildings considered great works of art have symmetrical features.

## Functionality（功能性）

对“对称”的选择偏好，可以被纳入更广泛意义上的美学元素“功能性”中来讨论。德国哲学家亚历山大·鲍姆伽登（Alexander Baum garten）在18世纪首次创造“美学”一词，他认为，“美”建立在人对感性信息的极致体验上。“艺术的工作当是在自然的基础上放大感受力”这一观念在当下作用为“功能主义运动”的传统(Hansson, 2005)。其中心原则是功能性大于形式。

A preference for symmetry can be seen as an example of a somewhat broader aes- thetic element – that of functionality. The German philosopher Alexander Baum garten, who first coined the term aesthetics back in the eighteenth century, considered beauty to rely on perfection of sensible information. Art should try to improve on nature. The idea is reflected in the more recent tradition referred to as the functionalist movement (Hansson, 2005). A central doctrine is that form should follow function.

重视功能性并对愉悦感有至臻追求，看来是很合理的。就像吃病肉或变质的水果是危险的，然而食用最好的样品却当是可以保持你的健康的；认识到工具有用的属性也非常重要。因此，大脑会在当我们注意到物体（对我们而言）的“正确属性”时会触发奖励机制是有道理的，愉悦感会刺激我们分辨好坏去获得好的东西。

It seems reasonable that looking for functionality and perfection relates to an agreeable sensation. For example, consuming sick animals or spoiled fruit may be dangerous, whereas eating the best specimens ought to keep you healthy; and it is important to recognize the features of a tool that make it useful. It therefore makes sense that the brain rewards us for noticing objects that have the right quality, the pleasant sensation stimulates us to distinguish good from bad and to obtain what is good.

就艺术而已，功能性并不那么明显，但能感到这一原则在艺术家做出的努力上当是会尽量追求完美的。事实上我们都可以想见，若一个极小失误出现在一件伟大的艺术作品上，那么这几乎会彻底使这件作品的价值崩塌。这些小毛病可能是因为艺术家创作时走神，也可能是就像油画布裂开之类的后期损坏。

In the case of art, function is not that obvious, but the principle is presumably reflected in that there should be perfection in the effort laid down by the artist. The relevance of this principle is exemplified by the fact that a minor fault in an otherwise great work of art drastically decreases its value. The fault could be due to the artist’s lack of concentration or later damage, such as a tear in the canvas.

我们对人外貌的评估也能进一步说明这一点。一次实验中，研究者给出在各种肖像，要求被试从中选择最吸引人的一张脸。结果表明最有视觉吸引力的人不仅有对成型的特征，也表现出总体协调的特性(Grammer & Thornhill, 1994)。而对称的正向作用或也能为此做反证——正是因为不对称打破了对协调偏好的原则(Baudouin & Tiberghien, 2004)。从经验和常规典型解剖学的意义上来看，也能从外表判断健康状态是如何。同时人体异常则意味着不良的基因或身体有患病的迹象。

Our evaluation of human appearance may be used to further illustrate the point. Experiments where people are asked to choose among a wide variety of photographic portraits indicate that the visually most attractive persons not only have symmetrical features, but also display average features (Grammer & Thornhill, 1994). In fact, the positive effect of symmetry may reflect that asymmetry breaches the rule of a preference for average features (Baudouin & Tiberghien, 2004). As a rule of thumb, a regular and prototypical anatomy implies health, while abnormalities can be interpreted as a sign of bad genes or a sick body.

## Depth and Movement（景深与动感）

与其他的哺乳类动物相比，灵长类动物的眼睛更向前。双眼的同向限制了视野，但也因此可以更好地感知深度。灵长类动物被如此设计可能与居住在树上的生理环境有关。在树枝间移动需要能够精确估计距离的能力。然而测量深度的能力也是需要实践的——有实践则就意味着有奖励驱动介入行为。因此，当接受到相关的视觉输入时，人们通常会获得满足感。一则关于业余绘画的经典艺术批评则是“画面太平”。我们欣赏能掌握构建景深感的画家时，也从而训练了我们自己的这项观察能力。类似的讨论还有我们对于“运动”的感知能力。不管是人类还是对动物，具备关注并能预测物体运动轨迹的能力都是很重要的，因为这也是一门有关感知危险或捕食猎物的生存技巧。因此，大脑也会在诸如此类的行动过程中释放奖励机制。舞蹈和电影显然都有关这种运动机制的激活，雕塑偶尔也有动感的元素。真正的运动虽然并不实际地出现在画作中，但一幅图像或许包含能引导视线的“线”。在阅读习惯于从左往右阅读的文化中，我们能感知到整体线条自左上向右下角延伸，也因此会带来一种压抑感；而从相反的对角线方向延伸线条则有种“升腾感”。观者在跟随这些指引时，会希望获得满足感——不管是哪个方向的引导——在此过程中能不断确认和强化对运动感的把握能力。

The eyes of primates are facing more forward compared to those of other mammals. Having both eyes pointing in the same direction limits the field of vision but allows for a better perception of depth. The primate design is presumably connected with the requirements of living in trees, where moving from branch to branch demands an ability to measure distances accurately. However, the ability to gauge depth requires practice. Practice implies reward-driven behavior. Thus, humans are presumably rewarded when they engage in the processing of relevant visual input. A typical criticism of amateur paintings is that they appear flat. We appreciate a painter who manages to create an impression of depth, thereby training an important processing skill. A similar argument can be made regarding our capacity to detect movement. It is important for both humans and animals to take an interest in, and anticipate the trajectory of, moving objects because they could imply danger in the form of predators or opportunities in the form of prey. Thus, the brain should deliver rewards for relevant practice. Dance and films obviously involve movement, and sculptures occasionally include moveable components. True movement is not practical in paintings, but a picture may contain ‘lines’ that the eyes are induced to follow. In a culture where people are trained to read from left to right, lines running from the upper left toward the lower right are perceived as going down – and thus tend to give a depressive effect – while lines running along the opposite diagonal can be interpreted as elevating. The viewer who lets the eyes follow these lines can hope for drops of rewards – regardless of the direction – as they engage the capacity to investigate movement.

## The Human Factor（人为因素）

我们对人类特别的兴趣和好奇之处在于其人格本性，观察人造物就是一个能反推造物者信息的途径。这意味着当我们体会到其中的“人情味（人类的质感？）”，并且当我们觉得有所发现时，就会得到满足感。

Our interest and curiosity for fellow humans, particularly the nature of their personality, suggest that we can appreciate manmade objects for what they tell about the creator. It means that we look for the ‘human touch’ and receive drops of rewards when we believe we find something.

我们不只是天生爱管闲事，主要我们天生会被同类他者吸引并很有兴趣。和他人交往能够减轻负面情绪（孤独感），也能带来愉悦感（暖暖人情味）。艺术家与艺术品间连着无形的脐带。通过观看作品本身，其中蕴藏着的艺术家的精神世界也得以向我们呈现，观者也就得以在此过程中感知到那个他/她某种形式的陪伴。

Not only are we naturally nosy, but we are also rather fond of people. To associate with others diminishes negative sensations (loneliness) and adds agreeable feelings (geniality). An object of art contains clues regarding the mentality of the artist, and by viewing them we may sense a form of companionship with him or her.

美学理论中有一悖论，即：为何人们也欣赏会唤起悲伤或有关负面情绪的图像？有典例就如许多人在观影时会哭；一件甚至可能以棕灰色调主导的，描绘战争、毁灭的画作会得到极高赞誉。就像之前提到的，就算是灰黯也是能带来好感的(O’Connor et al., 2008)。这一观察结果能部分的归因于这样一种观点：在引起同情心和求救信号的反应机制中，“悲伤”可能是基因渴望的一种理想状态。就像在面对一幅描绘穷人的油画或能反映艺术家本人的悲惨处境的作品时，人们会通过观赏行为实现精神共情，旁观者也能在与所描绘的悲惨境遇者共情中，获得大脑的奖励。

A paradox in aesthetic theory is why people seem to enjoy images that are expected to evoke sadness or related negative feelings. A characteristic example is that many people appreciate films that make them cry. A painting depicting war and destruction, perhaps dominated by brown and dark colors, can be highly acclaimed. As mentioned before, even grief can feel good (O’Connor et al., 2008). The observation may be partly due to the idea that grief can be a desirable state for the genes in that the reaction solicits sympathy and help. The bystander can obtain brain rewards for empathic engagement with the victim, for example, people appreciate the chance to offer mental sympathy to the poor person depicted on the canvas, as well as to the artist who appears to be in such a miserable state.

我们的同情心反映了我们强烈的社交本能。在帮助他人时：我们增强了连接感；也可能会以直接或间接互惠的形式得到一些回报。正如在更多有关美学元素的案例中，情绪的传达可以使润物细无声的，无需作者在画面中不断地刻意强调。

Our capacity for compassion reflects our strong socializing instincts. By helping others, we enhance bonding; moreover, we are likely to receive something in return in the form of direct or indirect reciprocity. As in the case of the other examples of aesthetic elements, the sentiment does not need to be consciously recognized to have an impact on mood.

## Discussion（讨论）

我们认为，人类在艺术作品或其他物品中添加审美元素的倾向，是我们大脑构造影响行为的结果。我们相信，加深有关视觉信号的认识这件事本身，对创作者或观者来说，都是有益的。因为这种知识能够帮助人们适应自己的审美倾向。我们提出了一系列被称作“审美元素”的特征，其运作独立于比喻和联想的范畴。或独立作用，或结合反应，它们为观看艺术作品或其他事物带来了额外的愉悦感。

We suggest that the human inclination to add aesthetic elements to works of art, or other objects, is a consequence of how our brains are designed to influence behavior. The brain offers rewards when we focus our attention on features of nature that have certain visual qualities. We believe both the artist and the spectator may benefit from an awareness of relevant visual signals, as this knowledge should help them tune in to their aesthetic propensities. We propose a list of such features, referred to as aesthetic elements, that works independently of figurative and associative content. Alone, or in combinations, they add some extra pleasure to the viewing of works of art or other objects.

奖励在潜意识中作用，可以影响人的情绪和对所见艺术作品的评价。（在此过程中，面对一些所谓的具审美价值的对象，）可能因为有的奖励机制尚未被唤醒而令观者无动于衷；有时又尽管大脑在有意识地思考后告诉你“这只不过是个红色的油漆点而已！”，但在一件成功的艺术作品中，也确实能够接合被唤醒的各种“奖励”，综合为一种实实在在的快乐。

Rewards are initiated in the unconscious mind. They can influence your mood, and appraisal of art, even if the individual drops of rewards are not recognized, and even if conscious consideration tells you that what you are looking at is simply a blot of red paint. The reward of seeing a single aesthetic element can be minuscule, but in a successful piece of art the rewards combine to form a substantial delight.

人类的大脑可以说是在任何现存生物的大脑中最灵活和最具适应性的，因此审美体验会受到个人及所处文化环境的极大影响，在具体的“艺术”作品中，就能很明显发现作者对审美元素的使用相当各异。就像喜欢坐过山车、享受速降惊险的人群，可能也非常喜欢能带来惊恐的画面动荡的作品；而与之相反的人群则更喜欢视觉感平和的作品。有趣的是，虽然艺术和设计在很大程度上取决于个人和文化品味，但在面对自然图案的美感时，仍存在广泛的共识（Vessel et al., 2018）。该结论或许也能说明，所有美学元素的原初都要归于自然中去寻找。

The human brain is arguably the most flexible and adaptive of any brain, thus aesthetic appreciation will be drastically influenced by personal and cultural factors. This is obvious in the case of figurative aspects of art, but the impact of aesthetic elements will also vary. For example, those who enjoy riding a roller coaster where they experience the horror of falling, may also enjoy the thrill of an extremely unbalanced picture; while those who dislike roller coasters prefer the more balanced version. It is interesting to note that while art and design is largely a matter of personal and cultural taste, there is a higher concordance when evaluating the beauty of natural motifs (Vessel et al., 2018). The observation presumably reflects that all aesthetic elements have their origin in nature.

当前各种审美理论并不意在将艺术家的创作局限在某种狭隘的规则中。本文也并不是一篇如何成就杰作的说明书，而是希望提供一种能辅助大家理解审美行为的思路。从艺术家角度看，为了唤起特定情感（如好奇、激情）或许会有意取舍一些审美元素，就像尽管红蓝色调能作为元素，构建一种和谐的审美体验，但当要勾勒忧郁或惆怅的情绪时，棕色会是更好的选择。

The present theory of aesthetic appreciation does not restrict the artist to narrow rules. The text is meant to help us understand aesthetic behavior, not to suggest a recipe for the creation of a masterpiece. For the sake of curiosity, excitement, or to evoke specific emotions the aesthetic elements may be deliberately disregarded. Although a delight in reddish or bluish colors may constitute an element of aesthetics, the artist may choose to use brown if the intention is to evoke sorrow rather than cheerfulness.

特定的视觉输入带来的感觉也是有两面性的，那么就需要：如果在观察某物时被希望是愉悦的，就使奖励和惩罚机制共同综合的效果要为正值。杰出的艺术表达可能会使用审美元素来增强所想赋喻的内容。就像体现谋杀的场景通常会以深棕调呈现，而情爱则会用葱郁又和煦的颜色体现；要表现一座稳定对称的房子，你甚至还需要把它的位置也布局在画布中央，而描绘攀登者则需要以强烈的动荡感来增强叙事的戏剧性。

A particular visual input can induce pleasure, but it can also produce negative feelings. If the object of focus is considered as pleasing, it means that the sum of rewards and punishments is above zero. The best art may use aesthetic elements to enhance the figurative content. For example, the portrayal of a murder is typically rendered in dark brown, while a love scene is rendered in lush and warm colors. When painting a symmetrical house, you may choose to put it in the middle of the canvas, while a painting of someone climbing a rock could include highly unbalanced features to add drama.

美学元素大多令人愉悦也部分源于从游戏中学习而得到的（来自大脑的）奖励。眼睛可以说是我们最重要的感官，去认识并能试图解释视觉刺激对我们来说相当重要；艺术能保持较恒常的魅力也有人类在生命中并不失去对游戏的兴趣的原因。大多数动物在闲暇时间只是休息，而人类则寻求提供奖励的活动——包括参观艺术画廊；对艺术的选择就像一个显性的指示牌，也隐含关于性选择在其中的促进作用(Prum, 2012)。而诸如对艺术品的价值评估、艺术创作者本人地位的文化因素，或许在当下发挥着更大的作用。

The aesthetic elements are presumably pleasant partly due to the rewards offered for learning through play behavior. The eyes are arguably our most important sense organ, and we are encouraged to practice recognition and interpretation of visual stimuli, whether in the form of depth, symmetry, or finding the ‘human touch.’ The popularity of art may be partly due to humans carrying a considerable propensity for play behavior even as we age. Where most animals apparently use spare time simply to rest, we seek activities that offer rewards – including a visit to an art gallery. The choice of art as a diversion may have been boosted by sexual selection (Prum, 2012), but present cultural factors, including the monetary evaluation of objects of art, and the status obtained by being recognized as an artist, probably have a larger impact.

若追逐幸福被视作生活的指导原则，那么着眼于美学（aesthetics）或许会是一个很好的策略。了解特定形式的视觉输入并构成“欣赏”的原理会有助于这样的追求。

If one considers the pursuit of happiness as a suitable guiding principle for living (Grinde, 2012), taking and interest in aesthetics seems like an excellent strategy. Understanding why we do have the propensity to enjoy certain types of visual input should help in that pursuit.

## Translator（译者）

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1. 神经美学是认知神经科学的一个领域，研究审美体验的神经基础，特别是在视觉艺术中（*Neuroesthetics: The Body in Esthetic Experience*，V. Gallese, C. Di Dio, in Encyclopedia of Human Behavior (Second Edition), 2012） [↑](#footnote-ref-1)