TPO 11 – 1 Ancient Egyptian Sculpture
古埃及雕塑

In order to understand ancient Egyptian art, it is vital to know ~~*as much as possible*~~ of the elite Egyptians' view of the world and the functions and contexts of **the art produced for them**. Without this knowledge we can appreciate only the formal content of Egyptian art, and we will fail to understand **why it was produced** or **the concepts** that shaped it and caused it to adopt its distinctive forms. In fact, a lack of understanding **concerning** the purposes of Egyptian art has often led it to be compared **unfavorably** with the art of other cultures: Why did the Egyptians not develop sculpture in which the body turned and twisted through space like classical Greek statuary? Why do the artists seem to **get left and right confused**? And why did they not discover the geometric perspective ~~*as European artists did*~~ in the Renaissance? The answer to such questions **has nothing to do with** a lack of skill or imagination on the part of Egyptian artists and **everything to do with** the purposes for which they were producing their art.

elite	**concerning**
英 [eɪˈliːt; ɪˈliːt] 美 [eɪˈliːt,ɪˈliːt]	英 [kənˈsɜːnɪŋ] 美 [kənˈsɜːrnɪŋ]
• n. 精英；精华；中坚分子	• prep. 关于；就…而言
同：aristocratic	• v. 涉及；使关心（concern 的 ing 形式）；忧虑
英 [ˌærɪstəˈkrætɪk] 美 [əˌrɪstəˈkrætɪk]	
• adj. 贵族的；贵族政治的；有贵族气派的	

要想深入解读古埃及艺术，极为重要的一点是要尽可能多地了解其精英阶层的世界观以及当时**艺术创造的**功能和背景。若是没有这些认识，我们只能窥探到古埃及艺术**的皮毛**而无法理解它们创造出来的原因和秉持的理念，也无法得知其采用独特艺术形式的原因。事实上，正是因为人们缺乏对这些根本意义的了解，让古埃及文化艺术在与其他艺术进行对比时往往遭到质疑：为什么古埃及的雕塑作品不像古希腊的经典作品那样，有空间上的弯曲和旋转？为什么那些艺术家似乎都**左右不分**？又是为什么，在那些艺术作品里，完全没有体现过文艺复兴时期欧洲艺术家普遍采用的几何透视 ？然而，这些问题的答案**完全不能说明**古埃及的艺术家技艺不佳或者缺乏想象力，而**恰恰体现了**他们创造这些艺术的意义所在。

The majority of three-dimensional **representations**~~, *whether standing, seated, or kneeling,*~~ exhibit what is called frontality: they face straight ahead, neither twisting nor turning. When such statues are viewed in isolation, out of their original context and without knowledge of their function, it is easy to criticize them for their rigid attitudes that remained unchanged for three thousand years. Frontality is, however, directly related to the functions of Egyptian statuary and **the contexts in which the statues were set up**. Statues were created not for their decorative effect but to play a primary role in the **cults** of the gods, the king, and the dead. They were designed to be put in places where these beings could **manifest** themselves in order to be the **recipients** of ritual actions. **Thus it made sense** to show the statue looking ahead at what was happening in front of it, so that the living performer of the ritual could

批注 [1]: unfavorably
英 美 [ʌnˈfeɪvərəbli]
•adv. 不利地；不适宜地

批注 [2]: The majority of
…的大多数

批注 [3]: representation
英 [ˌreprɪzenˈteɪʃn] 美 [ˌreprɪzenˈteɪʃn]
•n. 代表；表现；表示法；陈述

批注 [4]: cult
英 [kʌlt] 美 [kʌlt]
•n. 狂热；异教团体；宗教信仰；膜拜仪式；时髦的人（或事物）；信徒
•adj. 受特定群体欢迎的

批注 [5]: manifest
英 ['mænɪfest] 美 ['mænɪfest]
•v. 表明，清楚显示（尤指情感、态度或品质）；证明；（病症）显现；（鬼魂或神灵）出现；在清单上记录
•adj. 显然的，明显的；显现出的
•n. 载货单，货单；旅客名单；货运列车编组清单
•adv. 明显地

批注 [6]: recipient
英 [rɪˈsɪpiənt] 美 [rɪˈsɪpiənt]
•n. 容器，接受者；容纳者
•adj. 容易接受的；容纳的

批注 [7]: 形式主语：to do sth. 就变得有道理了

interact with the divine or deceased recipient. Very often such statues were enclosed in rectangular shrines or wall niches whose only opening was at the front, making it natural for the statue to display frontality. Other statues were designed to be placed within an architectural setting, for instance, in front of the monumental entrance gateways to temples known as pylons, or in pillared courts, where they would be placed against or between pillars: their frontality worked perfectly within the architectural context.
大部分三维立体的雕像，无论是站着、坐着抑或是跪着的，都体现出一种称为 “正面描绘”的手法：它们往往直面前方，既不弯曲，也不翻转。如果脱离对其原始情境的了解和功能作用的认识，孤立地去观看，你将会对它们三千年不变的僵硬姿态发出责难。然而事实上，这种“正面描绘”的展示手法与古埃及雕塑的功能和创造背景有着密切的联系。当时，创造雕塑不仅仅是用来作为装饰，更重要的是应用于对神灵、国王和逝者的祭祀典礼上。*它们被放置在显要位置，是为了受礼者的仪式活动*。从而，那些接受膜拜的神灵和人物得以显现，能够更直接地观看到整个仪式的表演，并能与现场表演者互通心灵，传达神意。这些雕塑通常被放置在只有正面开口的矩形神龛或者壁龛中，这样也使得这些作品必须通过正面展现。有些雕塑也被放置在建筑系列中，比如说，塔门（神殿通道入口的纪念碑）的正前方，和支柱结构法庭中的支柱对面或者两柱之间——正是这种正面展示的方式让这些雕塑与周围的建筑环境相得益彰。

Statues were normally made of stone, wood, or metal. Stone statues were worked from single rectangular blocks of material and retained the compactness of the original shape. The stone between the arms and the body and between the legs in standing figures or the legs and the seat in seated ones was not normally cut away. From a practical aspect this protected the figures against breakage and psychologically gives the images a sense of strength and power, usually enhanced by a supporting back pillar. **By contrast,** wooden statues were carved from several pieces of wood that were pegged together to form the finished work, and metal statues were either made by wrapping sheet metal around a wooden core or **cast** by the lost wax process. The arms could be held away from the body and carry separate items in their hands; there is no back pillar. The effect is altogether lighter and freer than that achieved in stone, but because both perform the same function, formal wooden and metal statues still display frontality.
这些雕塑通常是由石头、木材和金属做成的。石制雕像是用长方形的石料制成，并且保持着原有的形状和比例。站姿雕塑的躯干与胳膊之间、两腿之间的石料或者是坐姿石像的大腿与座位之间的石料通常不会去掉。外观上来看，通常石像背部增加一个支撑柱可起到保护石像断裂的作用并且在心理上展现出一种力量感。**相比之下**，木质雕像是把多块木头钉在一起再进行雕刻而成，而金属雕塑是在木芯外裹上金属薄片，或是再用失蜡烛**“抛光”**。金属雕像的手臂可以与身体分离并且手上也可以单独拿东西。它们不需要背部支柱，因此效果相比于石质雕塑更明亮，表达更流畅。但是因为用途相同，木质的和金属的雕像依旧是正面描绘的表现形式。

Apart from statues representing deities, kings, and named members of the elite that can be called formal, there is another group of three-dimensional representations that depicts generic figures, frequently servants, from the nonelite population. The **function** of these is quite different. Many are made to be put in the tombs of the elite in order to serve the tomb owners in the afterlife. Unlike formal statues ~~*that are limited to static poses of standing, sitting,*~~

批注 [8]: divine
英 [dɪ'vaɪn] 美 [dɪ'vaɪn]
•adj. 神圣的；非凡的；天赐的；极好的
•vt. 占卜；预言；用占卜勘探
•vi. 占卜；预言；使用占卜勘探矿
•n. 牧师；神学家

批注 [9]: deceased
英 [dɪ'si:st] 美 [dɪ'si:st]
•adj. 已故的
•n. 死者；[法] 被继承人

批注 [10]: shrine
英 [ʃraɪn] 美 [ʃraɪn]
•n. 圣地；神殿；神龛；圣祠
•vt. 将…置于神龛内；把…奉为神圣

批注 [11]: compactness
英 [kəm'pæktnəs; 'kɒmpæktnəs] 美 [kəm'pæktnəs,'kɑ:mpæktnəs]
•n. 简洁；紧密；密实度；紧密度

批注 [12]: psychologically
英 [ˌsaɪkə'lɒdʒɪkli] 美 [ˌsaɪkə'lɑ:dʒɪkli]
•adv. 心理上地；心理学地

批注 [13]: **注意该类词的出现，在选项中可能会混淆涵义：**
比如，
●询问原因（why? Reason?）
●询问用途、功能（function?）
●询问特征（feature?）

~~and kneeling~~, these figures depict a wide range of actions, such as grinding grain, baking bread, producing pots, and making music, and they are shown in appropriate poses, bending and squatting as they carry out their tasks.
除去为神灵、国王以及有记载的贵族成员所塑的雕像会有特定的外形，其他的非贵族成员和频繁出现的仆人都是用普通外表来描绘的。他们的用途大不相同，很多被放进贵族陵墓里为的是在来世服侍墓地的主人。跟一般的雕像不同，这些雕像形态各异，而不仅仅局限于站、坐或者跪这几种静态姿势，例如他们有的在研磨谷物，有的正在烤焙面包，制作瓦罐或者演奏音乐，他们姿态逼真，工作时弯腰或蹲下的工作非常地惟妙惟肖。

几何透视法产成与数学原理，是把几何透视运用到绘画艺术表现之中，是科学与艺术相结合的技法。它主要借助于远大近小的透视现象表现物体的立体感。 平行透视当立方体的六个面中，有一个面与画者的位置呈平行状态时，画者所看到的是它面产生的透视变化。

TPO 11 – 2 Orientation and Navigation
定位和导航

To South Americans, robins are birds that fly north every spring. To North Americans, the robins simply vacation in the south each winter. Furthermore, they fly to very specific places in South America and will often come back to the same trees in North American yards the following spring. The question is not why they would leave the cold of winter so much as how they find their way around. The question perplexed people for years, until, in the 1950s, a German scientist named Gustave Kramer provided some answers and, in the process, **raised** new questions.

在南美，知更鸟每一年都会飞往春天时的北方。对于北美而言，知更鸟每年冬天又都会在南美度过简单的“假期”。甚至，它们会飞往南美几个特定的地方，然后在第二年春年又飞回到北美相同的树界范围内。与其问他们在冬天离开的原因，不如问他们是如何找到回来的路线的。这个问题困扰了人们很久，直到 1950 年代，一位名叫 Gustave Kramer 的德国科学家给出了一些回答，意想不到地又**提出**新的问题。

Kramer initiated important new kinds of research **regarding** how animals orient and navigate. Orientation is simply facing **in** the right direction; navigation involves finding one's way from point A to point B.

就动物如何定位和航行**的问题**，Kramer 发起了意义重大的新类型的研究。定位仅仅就是朝向正确的方向，而航行还涉及寻找从点 A 到点 B 的路径。

Early in his research, Kramer found that caged migratory birds became very **restless** at about the time they would normally have begun migration in the wild. Furthermore, he noticed that as they **fluttered** around in the cage, they often launched themselves in the direction of their normal migratory route. He then set up experiments with caged starlings and found that their orientation was, in fact, in the proper migratory direction except when the sky was **overcast**, at which times there was no clear direction to their restless movements. Kramer surmised, therefore, that they were orienting according to the position of the Sun. To test this idea, he blocked their view of the Sun and used mirrors to change its apparent position. He found that under these circumstances, the birds oriented ***with respect to*** the new "Sun." They seemed to be using the Sun as a compass to determine direction. At the time, this idea seemed preposterous. How could a bird navigate by the Sun when some of us lose our way with road maps? Obviously, **more testing was in order**.

在研究早期，Kramer 发现被关在笼子里的侯鸟同往常去野外开始迁徙的时候变得焦躁不安。而且，他注意到，当这些鸟在笼子里躁动不安时，它们通常会飞向迁徙路径的方向。于是，Kramer 用星椋鸟做实验，将它们关在笼子里，总结出了它们的迁徙方向。事实上，它们基本都能朝向正确的迁徙方向，**阴天**除外。因为阴天的时候它们的骚动不安使得它们难以清楚分辨方向。因此，Kramer 推测，星椋鸟 是通过太阳方位来确定方向的。为了证实这一推测，他将这些鸟的眼睛蒙住，并且用镜子改变太阳的自然方位。他发现，在这种环境下，这些鸟会依照新的“太阳”来定位。似乎它们把太阳作为一个罗盘来决定它们的方向。当时人们认为这种观点非常荒谬可笑，有些人在有地图的情况下都有可能迷路，鸟儿又怎么能够用太阳进行导航呢？

批注 [14]: restless
英 ['restləs] 美 ['restləs]
•adj. 焦躁不安的；不安宁的；得不到满足的

批注 [15]: flutter
英 ['flʌtə(r)] 美 ['flʌtər]
•v. 飘动；（鸟或昆虫）鼓翼；飞来飞去；（心脏等）怦怦乱跳；（人）奔忙
•n. 振动；（非正式）小赌注；紧张兴奋；（心脏的）怦怦乱跳；扑动；（重放录音的）颤振

批注 [16]: surmise
英 [sə'maɪz] 美 [sər'maɪz]
•vt. 猜测；推测
•vi. 猜测；认为
•n. 推测；猜度

批注 [17]: with respect to
英 美 [wɪð rɪ'spekt tu]
•关于；至于

批注 [18]: preposterous
英 [prɪ'pɒstərəs] 美 [prɪ'pɑːstərəs]
•adj. 荒谬的；可笑的

很显然，**接下来还需要做更多的实验**。

So, in another set of experiments, Kramer put identical food boxes around the cage, with food in only one of the boxes. The boxes were stationary, **and the one containing food was always at the same point of the compass**. However, its position ***with respect to*** the surroundings could be changed by revolving **either** the inner cage containing the birds **or** the outer walls, **which served as the** background. As long as the birds could see the Sun, no matter how their surroundings **were altered**, they went directly to the correct food box. Whether the box appeared in front of the right wall or the left wall, they showed no signs of confusion. On overcast days, however, the birds were disoriented and had trouble locating their food box.

批注 [19]: revolve
英 [rɪ'vɒlv] 美 [rɪ'vɑːlv]
•vi. 旋转；循环出现；反复考虑
•vt. 使…旋转；使…循环；反复考虑
•n. 旋转；循环；旋转舞台

因此，Kramer 又做了外一组试验，他在鸟笼周围摆放上相同的鸟食罐，但是只有一个食罐中有食物。所有食罐的位置都是固定的，**而且装有食物的那个食罐始终置于罗盘的同一个方位。**但是，这个位置会随周围环境而发生变化，**转动**关着鸟的笼子或者背景墙都会使得这个食罐的位置相对改变。可是，只要这些鸟能够看见太阳，不管周围环境如何**变化**，它们都能立即找到那个装有食物的食罐。不论这些食罐是在右侧还是左侧墙壁前方，它们都没有表现出一丝疑惑。可是阴天的时候，它们就无法定位方向，很难找到装有食物的食罐。

In experimenting with artificial suns, Kramer made another interesting discovery. If the artificial Sun remained stationary, the birds would shift their direction with respect to it at a rate of about 15 degrees per hour, ~~*the Sun's rate of movement across the sky*~~. Apparently, the birds were assuming that the "Sun" they saw was moving at that rate. When the real Sun was visible, however, the birds maintained a constant direction as it moved across the sky. In other words, they were able to **compensate** for the Sun's movement. This meant that some sort of biological clock was operating-and a very precise clock at that.

在关于人工太阳的试验中，Kramer 还有一些很有意思的发现。如果人工的太阳位置保持不变，这些星椋鸟会以每小时 15° 角的速度改变它们的方向，而这一速度正好是太阳在天空中运行的速度。显然，这些鸟认为它们看见的“太阳”是按照这个速度移动的。但是，当它们看见真正的太阳时，却保持了恒定的方向，正如太阳在天空中移动一样。也就是说，它们可以**适应**太阳的运行。这就意味着，它们形成了非常精准的生物钟。

What about birds that migrate at night? Perhaps they navigate by the night sky. To test the idea, caged night-migrating birds were placed on the floor of a **planetarium** during their migratory period. A planetarium is essentially a theater with a domelike ceiling **onto which** a night sky can be projected for any night of the year. When the planetarium sky matched the sky outside, the birds **fluttered** in the direction of their normal migration. But when the dome was rotated, the birds changed their direction to match the artificial sky. The results clearly indicated that the birds were orienting according to the stars.

那些在夜间迁徙的侯鸟又是怎样的呢？也许它们通过观察夜晚的天空来定向飞行。为了证实这一推测，把在夜间迁徙的侯鸟关进笼子里，并在它们的迁徙的时间段，将笼子置于一个**天文馆**的地板上。这个天文馆实际上是一个剧场，天花板呈穹顶状可以投射出一年四季所有夜晚的景象。当天文馆的穹顶与外面的天空相吻合时，这些鸟就会朝着往常迁徙的方向**拍打着翅膀**。但

是当穹顶旋转时，这些鸟就会改变方向以适应这个人造天空。这就清楚地表明这些夜间迁徙的侯鸟是通过星宿位置来定位方向。

There is **accumulating** evidence indicating that birds navigate by using a wide variety of environmental cues. Other areas under investigation include magnetism, landmarks, coastlines, sonar, and even smells. The studies are complicated by the fact that the data are sometimes contradictory and the **mechanisms** apparently change from time to time. Furthermore, one sensory ability may back up another.
这些**不断积累的**证据表明鸟是通过广泛多样的外界环境信息来引导它们迁徙的。而包括磁场、地标、海岸线、声波甚至气味也被作为实验对象进行观察。由于这些数据有时会自相矛盾并且**物理过程**经常随着时间发生变化，使得这些研究非常的复杂。此外，一种感知能力可能会支持另一种。

批注 [20]: back up
英 美 [bæk ʌp]
•v. 支持，援助；（资料）备份；倒退；裱；堵车

星椋（liang）鸟，羽毛蓝色，有光泽，带乳白色斑点，嘴小带黄色，眼靠近嘴根，性好温暖，常群居，吃植物的果实或种子.

TPO 11 – 3 Begging by Nestlings
雏鸟的乞食行为

Many signals that animals make seem to impose on the signalers costs that are overly damaging. A classic example is noisy begging by nestling songbirds when a parent returns to the nest with food. These loud cheeps and peeps might give the location ~~of the nest~~ away to a listening hawk or raccoon, resulting in the death of the defenseless nestlings. In fact, when tapes of begging tree swallows were played at an artificial swallow nest containing an egg, the egg in that "noisy" nest was taken or destroyed by predators before the egg in a nearby quiet nest in 29 of 37 trials.

有些动物发出的信号可能会给他们自身带来极大危害。一个典型的例子就是歌鸟的雏鸟在它们的父母带着食物归巢时吵闹的乞食行为。这些喧闹的叫声可能会让巢外的老鹰和浣熊听到并获取到它们的位置信息，从而致使毫无抵抗能力的雏鸟丧命。事实上，如果在一个盛有鸟蛋的人工燕窝旁播放树燕讨食的录音，这个试验做了 37 次，有 29 次的结果都是，这个“嘈杂”鸟巢里的树燕蛋比周围安静的鸟巢里的树燕蛋更早被捕食者掠走或破坏。

Further evidence ~~for the costs of begging~~ comes from a study of differences in the begging calls of warbler species that nest on the ground versus those that nest in the relative safety of trees. The young of ground-nesting warblers produce begging cheeps of higher frequencies than do their tree-nesting relatives. These higher-frequency sounds do not travel as far, and so may better conceal the individuals producing them, who are especially vulnerable to predators in their ground nests. David Haskell created artificial nests with clay eggs and placed them on the ground beside a tape recorder that played the begging calls of either tree-nesting or of ground-nesting warblers. **The eggs "advertised" by the tree-nesters' begging calls** were found bitten significantly more often than the eggs associated with the ground-nesters' calls.

一项关于地面筑巢的黄莺与住在相对安全的树上的黄莺对比的研究进一步为乞食行为的代价提供了证据。地面筑巢的黄莺雏鸟发出乞食叫声的频率要高于树上筑巢的黄莺。这种高频的声音不会传播的很远，可以更好地隐藏在地面鸟巢里单独发出这种声音而容易成为捕食者攻击的雏鸟。David Haskell 制做了一些装有泥制鸟蛋的‘假巢”并放在录音机旁的地面上，播放着地面筑巢或树上筑巢的黄莺的乞食声音。**(由树上筑巢者乞食声音宣传的鸟蛋)**~~置于树上筑巢的声音旁边的“被注意的”鸟蛋~~被发现的几率显然要比地面筑巢的黄莺的鸟蛋高得多。

The hypothesis ~~that begging calls have evolved properties that reduce their potential for attracting predators~~ yields a prediction: baby birds of species ~~that experience high rates of nest predation~~ should produce softer begging signals of higher frequency than nestlings of other species less often victimized by nest predators. This prediction was supported by data collected in one survey of 24 species from an Arizona forest, more evidence that predator pressure favors the evolution of begging calls that are hard to detect and pinpoint.

一个关于乞食行为的假说认为，乞食声已经进化出一种避免引起捕食者注意并及时作出预警的特性：比起那些较少受到捕食者捕食的雏鸟相比，被捕食率高的鸟类的雏鸟需要发出更轻柔频率更好的叫声。对亚利桑那森林里的 24 个物种的调查所收集的数据证实了这一假说，更多的

批注 [21]: impose
英 [ɪm'pəʊz] 美 [ɪm'poʊz]
•vi. 利用；欺骗；施加影响
•vt. 强加；征税；以…欺骗

impose on
英 美
•利用；欺骗；施加影响于

批注 [22]: overly
英 ['əʊvəli] 美 ['oʊvərli]
•adv. 过度地；极度地

批注 [23]: cheep
英 [tʃi:p] 美 [tʃi:p]
•n. 吱吱的叫声
vt. 吱吱地叫（过去式 cheeped，过去分词 cheeped，现在分词 cheeping，第三人称单数 cheeps，名词 cheeper）
peep
英 [pi:p] 美 [pi:p]
•v. 窥视，偷看；隐约出现，微现；发出吱吱声
•n. 窥视；说话；啾啾声；瞬间的景象
•n. (Peep) （美、荷、瑞）佩普（人名）

批注 [24]: tapes
英 [teɪps] 美 [teɪps]
•n. 录音带，胶纸带；条带，边带

批注 [25]: 磁带录音机

批注 [26]: favor
英 ['feɪvə(r)] 美 ['feɪvər]
v. 较喜欢；偏袒；有利于；（非正式）长得像；悉心照料
•n. 帮助；提拔；徽章；赞同；偏袒；同意性交

证据也表明捕食者的存在迫使乞食声变得难以察觉和难以定位。

Given that predators can make it costly to beg for food, what benefit do begging nestlings derive from their communications? One possibility is that a noisy baby bird provides accurate signals of its real hunger and good health, making it worthwhile for the listening parent to give it food in a nest where several other offspring are usually available to be fed. If this hypothesis is true, then it follows that nestlings should adjust the **intensity** of their signals in relation to the signals produced by their nestmates, who are competing for parental attention. When experimentally deprived baby robins are placed in a nest with normally fed siblings, the hungry nestlings beg more loudly than usual-but so do their better-fed siblings, though not as loudly as the hungrier birds.
既然捕食者可以让雏鸟为食物付出巨大代价，那么乞食的雏鸟们到底可以从这种交流方式中得到什么益处？可能原因之一是吸引注意力的雏鸟可以准确传达它们很饿而且很健康的信号，它们这么做是为了让父母在同一鸟巢的众多雏鸟中将食物喂给自己。如果这一假说成立，那么我们可以断定雏鸟会根据其他争相引起父母注意的同伴所发出的信号来调整它们信号的强度。人们做了一个实验，将饥饿的知更鸟雏鸟放进那些正常喂养的同类的巢中，饥饿的雏鸟会发出比平时更响亮的乞食声，而其他喂养的很好的雏鸟们也是如此，尽管没有饥饿的雏鸟们叫的响。

If parent birds use begging intensity to direct food to healthy offspring capable of vigorous begging, then parents should make food delivery decisions on the basis of their offsprings' calls. Indeed, if you take baby tree swallows out of a nest for an hour feeding half the set and starving the other half, when the birds are replaced in the nest, the starved youngsters beg more loudly than the fed birds, and the parent birds feed the active beggars more than those who **beg** ~~less vigorously~~.
如果鸟父母 是根据乞食声音的响亮程度来给那些健康且更积极乞食的幼鸟喂食，那么鸟父母应该是根据幼崽乞食声来分配食物的。所以，如果你将树燕雏鸟带离鸟巢一个小时，并将一半雏鸟喂饱同时不让另外一半吃东西，当把雏鸟们放回巢时，饥饿的雏鸟们会比已经吃饱的雏鸟们叫得更响，而鸟父母会给积极乞食的雏鸟们比不积极的雏鸟喂更多的食物。

As these experiments show, begging apparently provides a **signal** of need **that** parents use to make judgments about which offspring can benefit most from a feeding. But the question arises, why don't nestlings beg loudly when they aren't all that hungry? By doing so, they could possibly secure more food, which should result in more rapid growth or larger size, either of which is advantageous. **The answer lies apparently not** in the increased energy costs of exaggerated begging-*such energy costs are small relative to the potential gain in calories*-**but** rather in the damage ~~*that any successful cheater would do*~~ to its siblings, which share genes with one another. An individual's success in propagating his or her genes can be affected by more than just his or her own personal reproductive success. Because close relatives have many of the same genes, animals that harm their close relatives may in effect be destroying some of their own genes. Therefore, a begging nestling that secures food **at the expense of** its siblings might actually leave behind **fewer** copies of its genes overall **than** it might otherwise.

批注 [27]: given that
英 美 ['gɪvn ðæt; 'gɪvn ðət]
•只要是，考虑到；假定，已知

批注 [28]: deprive
英 [dɪ'praɪv] 美 [dɪ'praɪv]
•vt. 使丧失，剥夺

deprived (被剥夺了（食物）的…)
英 [dɪ'praɪvd] 美 [dɪ'praɪvd]
•adj. 贫困的，穷苦的，严重匮乏的；（人）丧失的，被剥夺的

批注 [29]: 这里的两个破折号，不能看错了！！！
前面一个破折号是表示转折。
后面一个破折号是 better-fed 的连接符号。

批注 [30]: vigorous
英 ['vɪgərəs] 美 ['vɪgərəs]
•adj. 有力的；精力充沛的

批注 [31]: relative to
英 美 ['relətɪv tu]
•相对于；涉及

批注 [32]: cheater
英 ['tʃiːtə] 美 ['tʃitɚ]
•n. 骗子；背叛者；眼镜

批注 [33]: in effect
英 美 [ɪn ɪ'fekt]
•实际上；生效

批注 [34]: at the expense of
•以…为代价；由…支付费用

这些实验表明，乞食行为很明显为鸟父母提供了一个判断谁能吃的最多的需求信号。但是问题又出现了，为什么雏鸟不在它们不饿的时候大声乞食呢？**如果它们这么做**，就可以保证更多的食物，也就能更快的成长或者拥有更壮的身体，怎么说都是有利的。这个问题的答案显然不是因为过分乞食会消耗更多的能量——*损耗的能量相比于其潜在能得到的热量来说只是很小部分*——而是因为任何这么做成功骗取食物的雏鸟会带来跟它们拥有相同基因的同伴们造成危害。一个物种成功延续它的基因所产生的影响要比它自身繁殖所带来的影响大的多。因为近亲中有很多相似基因，动物伤害它们的近亲的同时很可能会摧毁一些它们特有的基因。因此，一个乞食的雏鸟如果**以**牺牲它的同类**为代价**来获取食物，事实上可能它能保存下来的基因要远远少于相反的做法。

鸟类在孵化和育雏期间，相对于幼体双亲，被称为“亲鸟”。