

## Unit 4

### Evolution

#### Objectives

- Get acquainted with the Comparison-Contrast discourse pattern in text construction;
- Summarize the similarities and differences between Darwin and Lincoln;
- Understand the essential points of Darwin's theory of evolution;
- Explain what makes Darwin and Lincoln influential figures in human history;
- Explain the personality traits common to self-made men;
- Keep yourselves informed of the latest debate about and research on human evolution;
- Distinguish the arguments of different researchers about human evolution;
- Understand the nature of emotions from an evolutionary perspective;
- Note down the main points when listening to talks and interviews about evolution.

*Task 1: Familiarize yourselves with the following new words, set expressions or lexical chunks to prepare for reading the texts in this unit.*

a quick study	学得快的人
across phyla	跨类群
adamantly	毫不动摇地
amassing of data	数据的积累
amateur naturalist	业余的博物学家
analogous to	与.....相似的
anatomic structure	解剖结构
anthropomorphism	拟人观，拟人论
assortative mating	同型交配，选型交配
at unprecedented rates	以前所未有的速度
atheist	无神论者
autocratic	专横的
behaviorism and psychoanalysis	行为主义和精神分析
bestiaries of the medieval period	中世纪时期的动物寓言故事集
blue-green alga	蓝藻
bog down	使.....陷入困境
bombshell	炸弹
censor our own thoughts	审视自己的思想
change an amoeba into a multi-celled organism	把单细胞生物变为多细胞生物

chronic headach	慢性头痛症
cogent	令人信服的
cognitive perspective	认知的视角
coincidence	巧合, 偶然
conceive of	设想, 认为
conceptualize	概念化
concur with	同意
contingency	偶然性
contraception	节育
cub reporter	年轻的记者
culmination	顶点
cultivate a bumpkin persona	保持着乡巴佬形象
decipher God's purpose	破译上帝的旨意
detonate a bombshell	引爆炸弹
dissertation on epochal events	关于划时代意义事件的博士学位论文
do a double take	开始愣了一下, 过一会儿才恍然大悟
dribs and drabs	零零散散; 点点滴滴
eclipse	使.....黯然失色
elusive figure	难以捉摸的人物
empirical study	实证研究
encapsulate the idea	概括了这一思想
Euclidean geometry	欧几里得几何
eukaryote	真核细胞
Eureka moment	灵感产生的一瞬间
evolutionary precursor	进化过程中的前体细胞
exact coevals	完全是同时代的人
express anger, terror, jealousy, and love by their stridulations	用唧唧叫声表达愤怒、恐惧、嫉妒与 爱慕
extraversion	外向性
flirt with the idea of	并非认真地想过
gainsay	否认
genetic drift	基因漂变, 基因漂移
gestate	孕育
guppy	古比鱼, 小型鱼类
hierarchy, territoriality, and identity	等级、地域与身份
Homo sapien	现代智人
impel	迫使
imperceptible gradients	小得难以察觉的梯度
inaugural	就职演讲
indispensable	不可或缺的
inevitability	必然性, 不可避免性
inexorable demands of overpopulation	人口过多带来的必然要求
inscrutable	不可理喻的

introspection	反省，内省
irrevocably	不可挽回地
keep it under wraps	保密，隐藏起来
lisping babe	口齿不清的婴儿
log he kept on the five-year trip	五年航行中所记的日志
maladroit comment	笨拙的评论
Machiavellian skill	权术
metaphysical question	形而上学的问题
meticulous	一丝不苟的
mull over	仔细考虑
mutation	突变
random mutation	随机突变
near-mythic figure	近乎神话的人物
neurological	神经学的
overt behavior	外显行为
pathological states such as mania and paranoia	像狂躁症和妄想症之类的病态
plausible	貌似合理的
postulate	假定，假设
precipitate the emotion	引发此情此感
predator	捕食者
prevailing wisdom	主流观点
primate	灵长类动物
professional vocabulary is so arcane	专业词汇如此深奥难懂
protozoologist	原生动物学家
psychodynamic	精神动力学的
psychophysiological	精神生理学的
reduce the disequilibrium	减轻失衡状态
rich-kid dilettante	才疏学浅的富家子弟
scientific sense of skepticism and curiosity	具有科学意义的怀疑与好奇
scientific treatise	科学论述，科学论说，科学论文
scoop	抢先发表
screening	筛选
secession	(1861年美国南方11州)脱离联邦，国 家分裂
serotonin	血清素
societal dictate	社会法则
spin on his heel	转变态度
squirrel the notes away	将这些纸条好好收藏
stomach ailment	胃病，肠胃不适
subversive	颠覆性的
sui generis	独一无二的，自成一类
swaths of the Bible	《圣经》选段

tactics of camouflage, distraction and mimicry	伪装、干扰和拟态等策略
the crown of creation	万物之灵
the tip of the iceberg	冰山一角
therapeutically useful	有疗效作用的
there is little consensus on	关于.....很少有一致意见
think of them in tandem	把他们联系在一起
touch off a revolution	引发了一场革命
trigonometry	三角函数
unequivocal	不含糊的
unflaggingly meticulous in his observations	坚持不懈地细微观察
workaholic	工作狂
wrestle with religious doubt	因对宗教的怀疑而挣扎

*Task 2: Read the opening paragraph of Text I and determine what prompted the author to compare Darwin and Lincoln.*

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## Text I

### Who Was More Important: Lincoln or Darwin?<sup>10</sup>

Malcolm Jones

- How's this for a **coincidence**? Charles Darwin and Abraham Lincoln were born in the same year, on the same day: Feb. 12, 1809. As historical facts go, it amounts to little more than a footnote. Still, while it's just a coincidence, it's a coincidence that's guaranteed to make you **do a double take** the first time you run across it. Everybody knows Darwin and Lincoln were **near-mythic figures** in the 19th century. But who ever **thinks of them in tandem**? Who puts the theory of evolution and the Civil War in the same sentence? Why would you, unless you're writing your **dissertation on epochal events** in the 19th century? But instinctively, we want to say that they belong together. It's not just because they were both great men, and not because they happen to be **exact coevals**. Rather, it's because the scientist and the politician each **touched off a revolution** that changed the world.

- 2 As soon as you do start comparing this odd couple, you discover there is more to this birthday coincidence. Both lost their mothers in early childhood. Both suffered from depression (Darwin also suffered from a variety of crippling **stomach ailments** and **chronic headaches**), and both **wrestled with religious doubt**. Each had a strained relationship with his father, and each of them lost children to early death. Both spent the better part of their 20s trying to settle on a career, and neither man gave much evidence of his future greatness until well into middle age: Darwin published "The Origin of Species" when he was 50, and Lincoln won the presidency a year later. Both men were private and guarded. Most of Darwin's friendships were conducted through the mail, and after his five-year voyage on Her Majesty's Ship Beagle as a young man, he rarely left his home in the English countryside. Lincoln, though a much more public man, carefully **cultivated a bumpkin persona** that encouraged both friends and enemies to underestimate his considerable, almost **Machiavellian skill** as a politician.
- 3 It is a measure of their accomplishments, of how much they changed the world, that the era into which Lincoln and Darwin were born seems so strange to us now. On their birth date, Thomas Jefferson had three weeks left in his second term as president. George III still sat on the throne of England. The Enlightenment was giving way to Romanticism. At the center of what people then believed was that God created the world, and that man was **the crown of creation**. Darwin, at least at the outset, was hardly even a scientist in the sense that we understand the term—a highly trained specialist whose **professional vocabulary is so arcane** that he or she can talk only to other scientists.
- 4 Darwin, the man who would almost singlehandedly redefine biological science, started out as an **amateur naturalist**, a beetle collector, a rockhound, a 22-year-old **rich-kid dilettante** who, after **flirting with the idea of** being first a physician and then a preacher, was allowed to ship out with the Beagle as someone who might supply good conversation at the captain's table. His father had all but ordered him not to go to sea, worrying that it was nothing more than one of Charles's lengthening list of aimless exploits—years before, Dr. Darwin had scolded his teenage son, saying, "You care for nothing but shooting, dogs, and rat catching, and you will be a disgrace to yourself and all your family." How could the father know that when the son came ashore after his five-year voyage, he would not only have shed his aimlessness but would have replaced it with a **scientific sense of skepticism and curiosity** so rigorous and abiding that he would be a **workaholic** almost to the day he died? Darwin was also in the grip of an idea so **subversive** that he would **keep it under wraps** for another two decades. But the crucial thing is that he did all this by himself. He became the very model of a modern major scientist without benefit of graduate school, grants or even much peer review. Darwin may have been

independently wealthy, but in terms of his vocation, he was a self-made man.

- 5 Lincoln was self-made in the more conventional sense—a walking, talking embodiment of the frontier myth made good. Like Darwin, Lincoln was not **a quick study**. Both men worked slowly to master a subject. But both had restless, hungry minds. After about a year of schooling as a boy—and that spread out in **dribs and drabs** of three months here and four months there—Lincoln taught himself. He mastered **trigonometry** (for work as a surveyor), he read Blackstone on his own to become a lawyer. He memorized **swaths of the Bible** and Shakespeare. At the age of 40, after he had already served a term in the U.S. House of Representatives, he undertook **Euclidean geometry** as a mental exercise. After a while, his myth becomes a little much—he actually was born in a log cabin with a dirt floor—so much that we begin looking for flaws, and they're there: the bad marriage, some **maladroit comments** on racial inferiority. Then there were those terrible jokes. But even there, he could be truly witty: "I have endured a great deal of ridicule without much malice; and have received a great deal of kindness, not quite free from ridicule. I am used to it."
- 6 Perhaps the most mysterious aspect of this riddlesome man was just how he managed, somewhere along the way, to turn himself into one of the best prose writers America has produced. Lincoln united the North behind him with an eloquence so timeless that his words remain fresh no matter how many times you read them. Darwin wrote one of the few **scientific treatises**, maybe the only one, worth reading as a work of literature. Both of them demand to be read in the original, not in paraphrase, because both men are so much in their prose. To read them is to know these **elusive figures** a little better. Given their influence on our lives, these are men you want to know.
- 7 Darwin seems to have been able to think only with a pen in his hand. He was a compulsive note taker and list maker. He made an extensive list setting down the pros and cons of marriage before he proposed to his future wife. His first published work, "The Voyage of the Beagle," is a tidied-up version of the **log he kept on the five-year trip** around the world, and he is **unflaggingly meticulous in his observations** of the plant and animal life he saw or collected along the way. To live, for Darwin, meant looking and examining and then writing down what he saw and then trying to make sense of it.
- 8 In the Beagle log and his journals, Darwin is something like a **cub reporter**, asking questions, taking notes, delighting in the varieties of life he discovers, both alive and in the fossil record, in South America, Australia or the Cape Verde Islands. With Darwin there is no **Eureka moment** when he suddenly discovers evolution. But by the time he left the Beagle in 1836, he was plainly becoming convinced that, contrary to the **prevailing wisdom**, life is

not static—species change and evolve. Shortly before the voyage was over, he **mulled over** what he had seen on the Galápagos: "When I see these islands in sight of each other, and possessed of but a scanty stock of animals, tenanted by these birds, but slightly differing in structure and filling the same place in Nature, I must suspect they are only varieties ... If there is the slightest foundation for these remarks the zoology of the [Galápagos] will be well worth examining; for such facts would undermine the stability of species." What he did not have was a controlling mechanism for this process. It was not until two years later that he conceived the idea of natural selection, after reading economist Thomas Malthus on the competition for resources among humans brought on by the **inexorable demands of overpopulation**. There he had it: a theory of everything that actually worked. Species evolve and the ones best adapted to their environment thrive and leave more offspring, crowding out the rest.

- 9 As delighted as he was with his discovery, Darwin was equally horrified, because he understood the consequences of his theory. Mankind was no longer the **culmination** of life but merely part of it; creation was mechanistic and purposeless. In a letter to a fellow scientist, Darwin wrote that confiding his theory was "like confessing a murder." Small wonder that instead of rushing to publish his theory, he sat on it—for 20 years. He started a series of notebooks in which he began refining his theory, recording the results of his research in fields as disparate as animal husbandry and barnacles. Over the next five or six years, he went through notebook after notebook, including one in which he began to pose **metaphysical questions** arising from his research. Do animals have consciences? Where does the idea of God come from?
- 10 This questioning spirit is one of the most appealing facets of Darwin's character, particularly where it finds its way into his published work. Reading "The Origin of Species," you feel as though he is addressing you as an equal. He is never **autocratic**, never bullying. Instead, he is always willing to admit what he does not know or understand, and when he poses a question, he is never rhetorical. He seems genuinely to want to know the answer. He's also a good salesman. He knows that what he has to say will not only be troubling for a general reader to take but difficult to understand—so he works very hard not to lose his customer. The book opens not with theory but in the humblest place imaginable: the barnyard, as Darwin introduces us to the idea of species variation in a way we, or certainly his 19th-century audience, will easily grasp—the breeding of domestic animals. The quality of Darwin's mind is in evidence everywhere in this book, but so is his character—generous, open-minded and always respectful of those who he knew would disagree with him, as you might expect of a man who was, after all, married to a creationist.

- 11 Like Darwin, Lincoln was a compulsive scribbler, forever jotting down phrases, notes and ideas on scraps of paper, then **squirreling the notes away** in a coat pocket, a desk drawer—or sometimes his hat—where they would collect until he found a use for them in a letter, a speech or a document. He was also a compulsive reviser. He knew that words heard are not the same as words read. After delivering his emotional farewell speech in Springfield, Ill., in 1861, he boarded the train for Washington and, if the shakiness of his handwriting is any indication, immediately began revising his remarks prior to publication.
- 12 The Gettysburg Address apparently **gestated** in a somewhat similar fashion. The winter and spring of 1863 were one of the lowest points for the Union. In the West, Grant was **bogged down** in his protracted siege of Vicksburg. In the East, the South won decisively at Chancellorsville. Since the Emancipation Proclamation had been issued on Jan. 1, people in the North were wondering aloud just what it was they were fighting for. Was it to preserve the Union, or was it to abolish slavery? Lincoln was keenly aware that he needed to clarify the issue. The Northern victory at Gettysburg in early July gave him the occasion he was seeking.
- 13 Some witnesses at Gettysburg claimed to recall applause during the speech, but most did not, and Lincoln was already taking his seat before many in the audience realized he had finished. This was a time when speeches could last for four hours. Edward Everett, who preceded the president on the program, had confined his remarks to two hours. Lincoln said what he had to say in two minutes. Brevity is only one of the several noteworthy aspects of what is surely one of the greatest speeches ever made. Of much greater importance are what the president said and how he said it.
- 14 With his first 29 words, Lincoln accomplished what he had come to Gettysburg to do—he defined the purpose of the war for the Union: "Four score and seven years ago our fathers brought forth on this continent, a new nation, conceived in Liberty, and dedicated to the proposition that all men are created equal." He could have put this sentence in the form of an argument—the equality of all men was one of the things the war was about. Instead, he states his argument as fact: the nation was founded on the principle of equality; this is what we fight to preserve. There is a hint of qualification—but only a hint—in the word proposition: equality is not a self-evident truth; it is what we believe in. In the next paragraph, he continues this idea of **contingency**: "Now we are engaged in a great civil war, testing whether that nation, or any nation so conceived and so dedicated, can long endure." In other words, republican democracy hangs in the balance. Before the speech, none of this was taken for granted, even in the North. In 272 words, he defined the national principle so thoroughly that today no one would think of arguing otherwise.



- 15 Lincoln's political genius stood on two pillars: he possessed an uncanny awareness of what could be done at any given moment, and he had the ability to change his mind, to adapt to circumstances, to grow. This is Lincoln in 1838, addressing the Springfield Young Men's Lyceum on a citizen's obligations to the legal system with such lines as, "Let reverence for the laws, be breathed by every American mother, to the **lispering babe**, that prattles on her lap." Here he is not quite 30 years later in the Second Inaugural of 1865 (there's a mother and child in this one, too, but what a difference): "With malice toward none; with charity for all; with firmness in the right, as God gives us to see the right, let us strive on to finish the work we are in; to bind up the nation's wounds; to care for him who shall have borne the battle, and for his widow, and his orphan—to do all which may achieve and cherish a just, and a lasting peace, among ourselves, and with all nations."
- 16 This is the language of the Bible, and if the rhetoric does not convince us of that, Lincoln mentions God six times in one paragraph. But what kind of God? Lincoln's religious history is perhaps the most tangled aspect of his life. His law partner, William Herndon, swore Lincoln was an **atheist**, and to be sure, there are plenty of boilerplate references to the Almighty scattered through Lincoln's speeches. But as the war wears on, and the speeches grow more spiritual, they become less conventional. Lincoln was a believer, but it is hard to say just what he believed. He speaks often of the will of God, but just as often **adamantly** refuses to **decipher God's purpose**. And he never, ever claims that God is on his side.
- 17 The God of the Second Inaugural is utterly **inscrutable**: "The Almighty has His own purposes." One of those purposes, Lincoln then suggests, may be to punish both North and South for permitting the offense of slavery. Then he delivers what biographer David Herbert Donald has called "one of the most terrible statements ever made by an American public official": "Fondly do we hope, fervently do we pray, that this mighty scourge of war may speedily pass away. Yet, if God wills that it continue until all the wealth piled by the bondsman's two hundred and fifty years of unrequited toil shall be sunk, and until every drop of blood drawn with the lash shall be paid by another drawn with the sword, as was said three thousand years ago, so still it must be said 'the judgments of the Lord are true and righteous altogether'." It is here, just when he has brought his audience to the edge of the cliff, that Lincoln **spins on his heel** and concludes, "With malice toward none; with charity for all ..." Even today, reading that conclusion after what's come before is like coming out of a tunnel into bright sunshine—or out of a war that claimed more than 600,000 lives. Lincoln understood that language could heal, and he knew when to use it.
- 18 Lincoln, no less than Mark Twain, forged what we think of today as the American style: forthright, rhythmic, muscular, beautiful but never pretty.

As Douglas L. Wilson observes in "Lincoln's Sword," his brilliant analysis of the president's writing, Lincoln was political, not literary, but he was, every bit as much as Melville or Thoreau, "perfecting a prose that expressed a uniquely American way of apprehending and ordering experience." What Lincoln says and how he says it are one. You cannot imagine the Gettysburg Address or the Second Inaugural in words other than those in which they are conveyed.

- 19 Lincoln and Darwin were both revolutionaries, in the sense that both men upended realities that prevailed when they were born. They seem—and sound—modern to us, because the world they left behind them is more or less the one we still live in. So, considering the joint magnitude of their contributions—and the coincidence of their conjoined birthdays—it is hard not to wonder: who was the greater man? It's an apples-and-oranges—or Superman-vs.-Santa—comparison. But if you limit the question to influence, it bears pondering, all the more if you turn the question around and ask, what might have happened if one of these men had not been born? Very quickly the balance tips in Lincoln's favor. As much of a **bombshell** as Darwin **detonated**, and as great as his book on evolution is (E. O. Wilson calls it "the greatest scientific book of all time"), it does no harm to remember that he hurried to publish "The Origin of Species" because he thought he was about to be **scooped** by his fellow naturalist Alfred Russel Wallace, who had independently come up with much the same idea of evolution through natural selection. In other words, there was a certain **inevitability** to Darwin's theory. Ideas about evolution surfaced throughout the first part of the 19th century, and while none of them was as **cogent** as Darwin's—until Wallace came along—it was not as though he was the only man who had the idea.
- 20 Lincoln, in contrast, is **sui generis**. Take him out of the picture, and there is no telling what might have happened to the country. True, his election to the presidency did provoke **secession** and, in turn, the war itself, but that war seems inevitable—not a question of if but when. Once in office, he becomes the **indispensable** man. As James McPherson demonstrates so well in the forthcoming "Tried by War: Abraham Lincoln as Commander in Chief," Lincoln's prosecution of the war was crucial to the North's success—before Grant came to the rescue, Lincoln was his own best general. Certainly we know what happened once he was assassinated: Reconstruction was administered punitively and then abandoned, leaving the issue of racial equality to dangle for another century. But here again, what Lincoln said and wrote matters as much as what he did. He framed the conflict in language that united the North—and inspires us still. If anything, with the passage of time, he only looms larger—more impressive, and also more mysterious. Other presidents, even the great ones, submit to analysis. Lincoln forever remains just beyond our grasp—though not for want of trying: it has been

estimated that more books have been written about him than any other human being except Jesus.

- 21 If Darwin were not so irreplaceable as Lincoln, that should not gainsay his accomplishment. No one could have formulated his theory any more elegantly—or anguished more over its implications. Like Lincoln, Darwin was brave. He risked his health and his reputation to advance the idea that we are not over nature but a part of it. Lincoln prosecuted a war—and became its ultimate casualty—to ensure that no man should have dominion over another. Their identical birthdays afford us a superb opportunity to observe these men in the shared context of their time—how each was shaped by his circumstances, how each reacted to the beliefs that steered the world into which he was born and ultimately how each reshaped his corner of that world and left it **irrevocably** changed.

*Task 3: Read the first 5 paragraphs of Text I and compare the background, experiences, and habits of Darwin and Lincoln to show how both of them became self-made men. Give an oral summary of the information in the chart.*

<b>Darwin</b>	<b>Lincoln</b>
He was born on Feb. 12, 1809.	He was born on Feb. 12, 1809.
He was a great man in the 19th century.	He was a great man in the 19th century.
He was a scientist who touched off a revolution that changed the world.	He was a politician who touched off a revolution that changed the world.
He lost his mother in early childhood.	He lost his mother in early childhood.
He suffered from depression	He suffered from depression
He wrestled with religious doubt.	He wrestled with religious doubt.
He had a strained relationship with his father.	He had a strained relationship with his father.
He lost children to early death.	He lost children to early death.
He didn't show prospect of success when he was young.	He didn't show prospect of success when he was young.
He published "The Origin of Species" at 50.	He won the presidency at 51.


*Task 4: Tell the story of Darwin's life and his research in a chronological order with the help of the following time expressions.*

On Feb. 12, 1809,

\_\_\_\_\_.

When he was 22 years old,

\_\_\_\_\_.

Shortly before the voyage was over,

\_\_\_\_\_.

By the time he left the Beagle in 1836,

\_\_\_\_\_.

After reading economist Thomas Malthus,

\_\_\_\_\_.

Two years later,

\_\_\_\_\_.

For 20 years,

\_\_\_\_\_.

When he was 50,

\_\_\_\_\_.

*Task 5: Answer the following questions based on the information in paragraphs 11-18 of Text I.*

1) What have you learned about Lincoln from this part?

- In 1838, \_\_\_\_\_
- In 1861, \_\_\_\_\_
- In 1863, \_\_\_\_\_
- In 1865, \_\_\_\_\_

2) What is Lincoln's most impressive characteristic? Give an example to explain your point.

\_\_\_\_\_  
\_\_\_\_\_

3) What was the purpose of the Civil War according to Lincoln? How did he state it ?

\_\_\_\_\_  
\_\_\_\_\_

4) What are the two pillars of Lincoln's political genius?

\_\_\_\_\_  
\_\_\_\_\_

5) According to the author, in what way did Lincoln change his belief to adapt to the different circumstances?

\_\_\_\_\_  
\_\_\_\_\_

6) What was Lincoln's writing style? How did he develop this style?

\_\_\_\_\_  
\_\_\_\_\_

7) Which statements or sentences in "The Gettysburg Address" (below) do you like most? Explain your reason.

Four score and seven years ago our fathers brought forth on this continent, a
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new nation, conceived in Liberty, and dedicated to the proposition that all men are created equal.

Now we are engaged in a great civil war, testing whether that nation, or any nation so conceived and so dedicated, can long endure. We are met on a great battle-field of that war. We have come to dedicate a portion of that field, as a final resting place for those who here gave their lives that that nation might live. It is altogether fitting and proper that we should do this.

But, in a larger sense, we cannot dedicate—we cannot consecrate—we cannot hallow—this ground. The brave men, living and dead, who struggled here, have consecrated it, far above our poor power to add or detract. The world will little note, nor long remember what we say here, but it can never forget what they did here. It is for us the living, rather, to be dedicated here to the unfinished work which they who fought here have thus far so nobly advanced. It is rather for us to be here dedicated to the great task remaining before us—that from these honored dead we take increased devotion to that cause for which they gave the last full measure of devotion—that we here highly resolve that these dead shall not have died in vain—that this nation, under God, shall have a new birth of freedom—and that government of the people, by the people, for the people, shall not perish from the earth.

Abraham Lincoln  
November 19, 1863

*Task 6: Explain the following sentences in your own words.*

- 1) At the center of what people then believed was that God created the world and that man was the crown of creation.
- 2) In the next paragraph, he continues this idea of contingency: "Now we are engaged in a great civil war, testing whether that nation, or any nation so conceived and so dedicated, can long endure."
- 3) "Fondly do we hope, fervently do we pray, that this mighty scourge of war may speedily pass away. Yet, if God wills that it continue until all the wealth piled by the bondsman's two hundred and fifty years of unrequited toil shall be sunk, and until every drop of blood drawn with the lash shall be paid by another drawn with the sword, as was said three thousand years ago, so still it must be said 'the judgments of the Lord are true and righteous altogether'."
- 4) It is here, just when he has brought his audience to the edge of the cliff, that Lincoln spins on his heel and concludes, "With malice toward none; with charity for all ..." Even today, reading that conclusion after what's come before is like coming out of a tunnel into bright sunshine—or out of a war that claimed more than 600,000 lives.

*Task 7: Note down the similarities and differences between Darwin and Lincoln.  
Then give an oral summary with the help of your the notes.*

	Similarities	Differences
Life experience		
Social context		
Career		
Personality		
Writing habits		
Beliefs		
Historical impact		
Replaceability		

*Task 8: Work in groups and discuss the following questions.*

- 1) How does the author argue that Lincoln is a greater man than Darwin? Do you agree with him? Why (not)?
- 2) What other criteria could possibly be used to judge the greatness of Darwin and Lincoln?
- 3) Is it somewhat contradictory to say that Darwin is not irreplaceable and that "No one could have formulated his theory any more elegantly—or anguished more over its implications...and each reshaped his corner of that world and left it irrevocably changed."?
- 4) What personality traits does it take to become a self-made success? What role does formal education play in one's success?

*Task 9: Write an essay to explain who you think is greater: Darwin or Lincoln. You can use the information from the article to support your viewpoint or give reasons of your own.*

*Task 10: Identify the views or arguments of different researchers mentioned in Text II on the issue whether human beings are still evolving.*



## Are human beings still evolving?

Scholars/researchers	Views/Arguments
Steve Pinker, Harvard-based evolutionary biologist	<hr/> <hr/>
Kate Douglas, author of Text II	<hr/> <hr/>
Bruce Lahn, the University of Chicago	<hr/> <hr/>
Steve Jones, University College London	<hr/> <hr/>
Christopher Wills, the University of California, San Diego	<hr/> <hr/>
Gregory Cochran, Henry Harpending, University of Utah in Salt Lake City	<hr/> <hr/>
Geoffrey Miller, the University of New Mexico	<hr/> <hr/>
Ray Kurzweil	<hr/>
Daniel Dennett, Tufts University in Boston	<hr/> <hr/>

## Text II

### Are We Still Evolving<sup>11</sup>

Kate Douglas

- 1 "Are humans still evolving? In the sense of improving morally and intellectually—by cultural changes—I think so," says Steven Pinker. "In the biological sense of changes in the gene pool, it's impossible to say." If pressed to come off the fence, however, the Harvard-based evolutionary biologist knows where he stands. "People, including me, would rather believe that significant human biological evolution stopped between 50,000 and 100,000 years ago, before the races diverged, which would ensure that racial and ethnic groups are biologically equivalent," he says. It's an understandable position given the political implications of being wrong. And in one important sense Pinker is absolutely spot on: it's very difficult, if not impossible, to observe human evolution in action. But saying it isn't happening is an increasingly difficult position to defend scientifically. Recent discoveries show that we must reject the idea that human evolution stopped dead 50,000 years ago or more. In fact, there is every reason to believe that it is going on right now.
- 2 Take the discovery last year by Bruce Lahn of the University of Chicago of two genes involved in brain development that emerged in recent human history and swept quickly through the population. One, a version of a gene called microcephalin, arose between 14,000 and 60,000 years ago and is now carried by 70 per cent of people. The other, a variant of the ASPM gene, is as recent as 500 to 14,000 years old and is now carried by about a quarter of the global population.
- 3 No one yet knows the function of these genes, but Lahn's discoveries could be just **the tip of the iceberg**. With the publication of the chimpanzee genome, geneticists are in a position to catalogue all the changes that have occurred in the human genome in the 7 million years or so since our species split from its closest relative. They will also be able to pinpoint when those **mutations** first arose—be it a few hundred or many million years ago—and what role they might have played in the evolution of our species.
- 4 The discovery of ongoing human evolution raises many questions, some of them uncomfortable. What if, for example, Pinker's fears are confirmed and racial groups turn out not to be biologically equivalent? Is natural selection still a driving force in humans, given that our survival is often less dependent on genes than on technology? To what extent might a changing genome lead to changes in attributes we value, such as intelligence? What might our

species look like 1000 years from now? Contemporary human evolution may be a minefield, but it's a minefield that can no longer be ignored.

- 5 If asked whether we are still evolving, most experts would **concur with** Pinker: it depends on what you mean by evolution. So, what are the options? In the loosest sense of the word, evolution is simply the change over time in a species' gene pool—all the genes in all the individuals alive at one time. In that sense, all species are evolving, even those that reproduce by cloning, because DNA inevitably changes over time through **random mutation**, and because some individuals of a species will have more offspring than others.
- 6 Beyond this, though, things get a bit more complicated. When considering how evolution might be happening, it is perhaps easier to think of a "gene boat" rather than a "gene pool" to represent all the genes present in the human population at the moment. Imagine this craft bobbing on a sea of all possible human genes, with the water under its hull representing the combination possessed by the species at any particular time. Left to its own devices, the boat drifts aimlessly. This is "**genetic drift**", where a species is changing randomly without any driving force from its environment.
- 7 Now imagine our boat has a sail, so that when the wind blows, it heads off with seeming purpose. That's like natural selection or sexual selection, in which an external force influences the direction taken by the gene boat. In the case of natural selection, the driving force is adaptation to a change in environmental conditions. For sexual selection, the force is exerted by other members of the species preferring to mate with individuals who possess desirable characteristics, which then become more prevalent.
- 8 Imagine now that the boat has a tiller and someone at the helm to steer it. This would be the equivalent of artificial selection similar to dog or plant breeding. The gene boat even encompasses artificial selection by genetic engineering. These are the possibilities, but to what extent is the evolution of our species being shaped by these various forces?
- 9 Genetic drift undoubtedly plays a role. Its scale is difficult to measure, however, given that drift produces no obvious trends in the way a species looks or behaves. Some experts argue that natural selection is diminishing in importance, and as it does genetic drift comes to the fore. It's a contentious suggestion, but even if they are correct, the aimlessness of drift makes it of limited interest.
- 10 Which takes us to natural selection. It's clear that the raw genetic material upon which selection could act is being generated all the time — the human genome is not immune from mutations, some of which could confer a selective advantage. But are there any selection pressures at work?
- 11 Steve Jones, a geneticist at University College London, has famously argued that natural selection is no longer important for humans. He points out that

natural selection works by ensuring that individuals whose genes are best adapted to the prevailing environment are most likely to survive and reproduce. But, he says, in the developed world, survival no longer depends on genes. "Just 500 years ago—yesterday in evolutionary terms—a British baby had only a 50 per cent chance of making it to reproductive age. Now, the figure is around 99 per cent," Jones says. There is also a more level playing field in the reproduction game. "No longer, as in the Middle Ages, do a few rich men have many children while many of those in poverty are forced into the army or into monasteries," he says. Jones admits that measuring reproductive success, particularly for men, can be difficult, but he calculates that the changes in survival and reproduction rates have led to a decrease of around 70 per cent in the opportunity for natural selection to act today, compared with the time when our ancestors lived as peasant farmers.

- 12 That's not quite the "zero" natural selection that some reports of Jones's views have suggested. Even he accepts that genes can still make a difference to survival and reproduction. One obvious example is genes that confer resistance to emerging diseases. Some parts of Africa, for example, have seen an increase in the frequency of a gene called CCR5-32, which offers some protection against infection with HIV-1.
- 13 There are other, more puzzling examples. One form of the dopamine receptor gene DRD4 has become much more common over the past few thousand years. The rate of increase suggests the gene has been positively selected for, though it's not clear why: the variant is associated with attention deficit hyperactivity disorder.
- 14 So natural selection is still at work, and some evolutionary biologists believe it would come as no surprise to find many more examples. They point out that we live in an era of rapid technological progress, and hence a fast changing environment, exactly the conditions under which you'd expect natural selection to act. Technological change has clearly driven natural selection in the past. The invention of dairy herding, for example, selected for a gene that gives adults the ability to digest milk sugars. So why not now? It's not hard to dream up selection pressures that could be acting today. Caesarean sections, for example, could be selecting for genes that allow babies to grow bigger in the womb.
- 15 Some experts, including Pinker, argue that technological change doesn't necessarily drive natural selection. Once culture emerged, they say, it provided non-genetic means to adapt to change, such as more technology or culturally inherited changes in behaviour. Though that is true in many ways, it does not necessarily mean that evolution has stopped. Technology and medicine, by enabling almost everyone to have children, could be causing "reverse evolution" by preventing unfit genes from being purged from the gene pool. "Relaxed selection combined with a high mutation rate is

probably causing gradual deterioration of many functions, especially disease defences," says Gregory Cochran, adjunct professor of anthropology at the University of Utah in Salt Lake City.

- 16 There are also **plausible** ways in which culture itself could be driving natural selection. This view has been expounded by Christopher Wills of the University of California, San Diego. In his book *The Runaway Brain*, he argues that there has been, and still is, positive feedback between our culture and our genes that led to the rapid evolution of the most characteristic human attribute, the mind. It began when the relatively advanced brains of our ancestors allowed them to succeed because of their wits rather than physical attributes. "Without a doubt, the most important selective pressures continue to be on brain function," says Wills.
- 17 This is one reason why Lahn's discovery of recent brain evolution has created such a stir. Lahn agrees with Wills that the defining feature of human evolution is that our minds have shaped our environment, which in turn has led to evolutionary changes in the way we think, and he is convinced it is continuing. Wills goes further, arguing that in the modern world nobody can do everything, so the advantage lies in being good at something that not many others can do well. "My prediction is that we are not simply getting smarter, we are selecting for more variability in our behaviours," he says. If he's right, that means our gene boat is getting bigger.
- 18 Lahn's discoveries have also given a boost to some controversial ideas. Last year, Cochran and his colleague Henry Harpending published a paper claiming that natural selection has increased the intelligence of Ashkenazi Jews in the past 1000 years. Intelligence is notoriously difficult to measure, but this ethnic group scores between 12 and 15 points higher than average on IQ tests. Cochran and Harpending point out that from about AD 800 to 1700, Ashkenazim were forbidden to work in common trades and tended to make a living from more intellectual pursuits such as finance. The most successful had the most offspring and so there was natural selection for intelligence, argue the pair. They say they have genetic evidence to back them up, though the details have yet to be published.
- 19 Similarly, Lahn himself has found that the new microcephalin gene, which has been positively selected for and therefore appears to confer a useful trait, is relatively rare in sub-Saharan Africa, and the new form of ASPM is most prevalent in people from Europe and the Middle East, suggesting that both mutations originated in non-Africans after our ancestors migrated out of Africa. Lahn, though, has been keen to stress that both genes may still have arisen in Africa and that, anyway, having the genes may make brains "fitter" in certain environments, but doesn't necessarily mean they are "better".
- 20 Natural selection, however, isn't the only reason why a gene might become more prevalent. It's also possible that the driving force is sexual selection.

Among the most prominent supporters of this idea is Geoffrey Miller of the University of New Mexico, Albuquerque, author of *The Mating Mind*. He believes that the rate of human evolution is accelerating, and that selection for sexually desirable traits is the driving force. "Our high rates of migration, outbreeding, and cross-ethnic mating are recombining our genes **at unprecedented rates**," he says.

- 21 What is more, the vast human population means that our gene boat is acquiring new mutations faster than ever. Miller also points out that people are far more likely to meet and have children with someone who is like them. "**Assortative mating**—for intelligence, personality traits, mental health, physical health, attractiveness—is getting ever more efficient through higher education, urbanisation, singles' ads, internet dating and speed dating," says Miller. Taken together, that is likely to mean that advantageous new mutations have a greater opportunity than ever to become fixed in the population.
- 22 Assortative mating is also promoted by **contraception**. And other reproductive technologies are probably exerting an influence on human evolution too. "Willingness to be a sperm or egg donor is being strongly favoured by current selection," says Miller. And if germ-line genetic engineering became commonplace, the effect would be much more profound. "I suspect," says Lahn, "that way before the next millennium, we will have figured out ways to manipulate our own genome, such that evolution will operate on a whole new set of rules that even Darwin did not envision." Miller agrees. "Within a few generations, market-based genetic technology will **eclipse** socio-sexual selection as the driving force in human evolution," he says.
- 23 Miller foresees a future in which parents try to eliminate traits that they personally find undesirable, but says it's impossible to predict how that will affect the human gene pool. There are, however, human characteristics that will probably always be seen as desirable, and are likely to be actively selected for by genetic technology. In 1000 years, Miller predicts, "people will be much more beautiful, intelligent, symmetrical, healthy and emotionally stable, due to 40 generations of genetic screening against harmful mutations". And if futurologists such as Ray Kurzweil are correct, our gene boat will also get some shiny new high-tech additions, as humans merge with technology to become cyborgs and biological evolution is rendered obsolete.
- 24 Our gene boat may even find new waters to sail on. "One way in which we could evolve in a truly spectacular fashion is if we colonise other planets," says Wills. "Those colonists—and the animals and plants that they take with them—will undergo dramatic evolutionary changes in the process of adapting to incredibly different conditions." It's possible that colonists would

even become a separate species if there was no interbreeding with people on Earth.

- 25 All in all, it's hard not to conclude that humans are still evolving, probably quite rapidly. "All species are evolving, but at different rates—some so slowly that the term 'glacial' would comically miss the mark," says Daniel Dennett from Tufts University in Boston. "But I expect that **Homo sapiens** is evolving at a rather swift pace."
- 26 So where are we heading? Most experts agree that trying to predict the direction of evolution is a fruitless exercise. "Evolution is not really a predictive science," says Jones. Others point out that we may not like where we're heading. "Perhaps we will so befoul our planet," says Dennett, "that only an eccentric and hardy remnant of our species—which can survive on earthworms while living in underground burrows, for instance—will remain." Wherever we end up, it seems clear that the story of human evolution has only just started.

*Task 11: Read Text III and complete the following notes.*

**Notes:**

- 1) It is difficult to study emotion

Reasons:

- There is little consensus on the meaning of the term.
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

- 2) We can study emotion from a psychoevolutionary perspective.

- The adaptive function of *fear* and *anxiety*:  
\_\_\_\_\_  
\_\_\_\_\_
- The adaptive function of *love* and *emotional attachment*:  
\_\_\_\_\_  
\_\_\_\_\_

- 3) Definition of emotion from an evolutionary perspective

- A complex chain of loosely connected events that

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- 4) The modeling of emotions based on the psychoevolutionary theory  
Eight basic bipolar emotions model:

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### Text III

#### The Nature of Emotions<sup>12</sup>

Robert Plutchik

- 1 Almost everyone agrees that the study of emotion is one of the most confused (and still open) chapters in the history of psychology. By one estimate more than 90 definitions of “emotion” were proposed over the course of the 20th century. If **there is little consensus on** the meaning of the term, it is no wonder that there is much disagreement among contemporary theoreticians concerning the best way to **conceptualize** emotion and interpret its role in life.
- 2 In everyday human existence we **conceive of** an emotion—anger, despair, joy, grief—as a feeling, an inner state. The internal experience of emotion is highly personal and often confusing, particularly because several emotions may be experienced at the same time. Imagine, then, how difficult the objective study of emotion must be. Most of us often **ensor our own thoughts** and feelings, and we have learned to be cautious about accepting other people’s comments about their feelings. The **empirical study** of a psychological phenomenon so complex and so elaborately cloaked cannot help but present a special challenge.
- 3 Compounding the distrust of verbal reports of emotion are the influences of **behaviorism and psychoanalysis** on psychological research. The behaviorists of the 20th century believed that the only truly reliable, objective information obtainable from living creatures was information about their behavior. A classical behaviorist would hold that emotion is an



inner state and thus simply outside the realm of science. For their part, psychoanalysts have made us aware that emotions may be repressed, inhibited or unconscious, and thus unavailable to **introspection**. Finally, language itself introduces ambiguity and does not make it easy to describe mixed emotions in an **unequivocal** way. The meaning of emotion terms is often obscure. For example, many people are not sure about the differences between fear and anxiety, guilt and shame, or envy and jealousy. As a result, we often resort to metaphor to attempt to describe emotion. Think, for example, of such expressions as “blowing off steam,” “hating someone’s guts,” “pain in the neck,” “lump in the throat” and “a broken heart.”

- 4 How, then, can emotion be studied and understood? The challenge of developing a theoretical approach is important, because emotions are an essential part of who we are and how we survive; emotional distress **impels** people to seek help, and indeed the primary concern of psychotherapy is the repair of emotional disorders. To simply declare emotion outside the bounds of scientific study would be irresponsible.
- 5 I believe that a scientific and **therapeutically useful** understanding of emotions is possible. In fact, there are several scientific intellectual traditions that have dealt with this issue. There is an evolutionary (launched by Charles Darwin), a **psychophysiological** (William James), a **neurological** (Walter Cannon) and a **psychodynamic** tradition (Sigmund Freud), in addition to the **cognitive perspective** that began emerging in the 1950s. More recently neurobiological evidence has begun to inform the discussion; however, identifying the structures of the brain related to emotion is not a theory of emotion, nor can such a theory be built from a knowledge of the chemicals involved in mood states, just as an adequate theory of depression cannot be constructed simply from a knowledge of the availability of **serotonin**. As the University of Iowa neuroscientist Antonio Dalasi has pointed out, when the **amassing of data** does not resolve a complex issue, it may be necessary to find new ways to conceptualize the problem.
- 6 In my view, evolutionary theory provides a way to unify a number of theoretical perspectives. Using the tools and methods of evolutionary biology, and pulling together information from other species, we can put emotions in a functional framework—define them in terms of what their adaptive function might be, and thus understand better their biological basis and the apparent connections between them.
- 7 Some work along these lines has been widely popularized in recent years; by now we’ve all heard authors of bestselling books describe jealousy, love, anxiety and fear in dogs, cats, chimpanzees, baboons, elephants and lions. The **bestiaries of the medieval period** contained detailed descriptions of emotions in animals. The popular appeal of such explanations may lie in their ability to touch a deep-seated sense of the connectedness of all living

things. Although many psychologists have warned of the dangers of **anthropomorphism**, recent thinking by cognitive scientists and others sees this attitude as an outdated prejudice.

- 8 Over the past four decades I have pulled together evidence from various studies to form a psychoevolutionary theory of emotion, with the goals of clarifying what emotions are, finding ways to measure them, relating emotions to other psychological disciplines, and informing the practice of psychotherapy. Like many concepts in science, emotions can be best understood by making inferences from certain classes of evidence. Such inferences suggest that emotions or their **evolutionary precursors** (or prototypes) can be found among lower animals as well as human beings, a fact that can provide fascinating evolutionary insights into our emotions, moods and personality traits. They suggest further that emotion, cognition and action interact in feedback loops and that emotion can be viewed in a structural model tied to adaptation.

### **Evolution and Emotion**

- 9 What we call cognition—the activity of knowing, learning and thinking, of which emotion is a part—evolved over millions of years. Charles Darwin recognized that the process of evolution by natural selection applied not only to **anatomic structures** but also to an animal’s “mind” and expressive behavior—a conclusion that led him to write a book on emotional expression. Those who have followed Darwin in studying the evolutionary origins of emotion have sought to understand how emotions increase evolutionary fitness for the individual.
- 10 As mentioned above, a few evolutionary origins are easy to **postulate**. *Fear* and *anxiety* in people closely parallel the state of heightened arousal of an animal who senses a **predator** or a threat to its offspring, a similarity that has been found in neurochemical, anatomical and imaging studies that show these states. *Love* and *emotional attachment* clearly promote pair bonding, reproduction and parental investment, basic to evolutionary fitness in human beings. But the origins of some other emotions are harder to find. Is there a general principle that can be applied?
- 11 The place to start might be with the definition problem. An emotion is not simply a feeling state. Emotion is a complex chain of loosely connected events that begins with a stimulus and includes feelings, psychological changes, impulses to action and specific, goal-directed behavior. That is to say, feelings do not happen in isolation. They are responses to significant situations in an individual’s life, and often they motivate actions. This definition of emotions allows the concept to be generalized to lower animals without difficulty. From his studies of animals, human infants and human adults, Darwin concluded that expressive behaviors communicate information from one animal to another about what is likely to happen;

therefore they affect the chances of survival of the individual demonstrating the behavior. “Even insects,” he wrote in his 1872 book, “**express anger, terror, jealousy, and love by their stridulations.**”

- 12 Extending Darwin’s idea a bit, I propose that in general, emotions are activated in an individual when issues of survival are raised in fact or by implication. Such situations include threats, attacks, poisonous substances or the sighting of a potential mate. The effect of the emotional state is to create an interaction between the individual and the event or stimulus that **precipitated the emotion**. The interaction usually takes the form of an attempt to **reduce the disequilibrium** and reestablish a state of comparative rest.
- 13 **Protozoologist** Nicola Ricci of the University of Pisa in Italy pointed out in 1990 that every single-celled organism, from the **blue-green alga** to the **eukaryote**, is a complete, self-sufficient organism. Single-celled organisms are exposed to daily risks in their environments. They take in food, excrete waste products, avoid predators, reproduce by exchange of genes in many cases, seek safe environments and explore their microbiological world. Thus these simple organisms adapt to many of the same problems as higher, multicellular organisms. Bacteria are capable of very complex metabolic pathways, and, as Ursula Goodenough detailed in these pages in 1991, viruses and bacteria have evolved **tactics of camouflage, distraction and mimicry**. Even plant cells such as green algae show defensive reactions to touch, and chemical messages signal everything from alarm to sexual attraction in organisms from bacteria to human beings.
- 14 As one moves up the evolutionary ladder, it is remarkable to note that a small number of developmental genes can radically alter the behavior of cells and **change an amoeba into a multi-celled organism**. Developmental biologist William Loomis of the University of California, San Diego, estimated in 1988 that “the important evolutionary differences between a **guppy** and a **primate** probably lie in only a few hundred genes.” Along with the genetic continuum, and evolutionary continuities in structure, function and development, then, it is not surprising that one can discern a behavioral continuum.
- 15 Writing in 1980, the late zoologist John Paul Scott of Bowling Green State University pointed out that it is the nature of the environment that creates certain functional requirements for all organisms if they are to survive. Like Ricci’s alga, a higher organism must take in nourishment and eliminate waste products. It must distinguish between predator and prey and between a potential mate and a potential enemy. It must explore its environment and orient its sense organs appropriately as it takes in information about the beneficial and harmful aspects of its immediate world. Organisms that are

relatively helpless at birth must have ways of indicating the need for care and nurturance.

- 16 Only a few classes of adaptive behavior, Scott noted, are found in most species. These include eating, the fight-or-flight response, care giving and investigation. These patterns might be considered prototype adaptations. The connections between behavior and inner states and processes are less obvious. Yet such connections can be made by inference from a variety of evidence. This evidence includes knowledge of stimulating conditions, the effects of behavioral acts, knowledge of typical behavior patterns of the individual and species, choices made when alternatives exist, and reactions of other members of one's group or species. A single overt display of emotions can reflect complex states such as approach and avoidance, attack and flight, or fear and pleasure. Emotion is far more complex than the subjective experience familiar to a human adult, and the concept of emotion can be applied to lower animals as well as human beings. Emotions have an inherent complexity that is in part related to their evolutionary history.

### Modeling the Emotions

- 17 In English there are a few hundred emotion words, and they tend to fall into families based on similarity. I have found that the primary emotions can be conceptualized in a fashion **analogous to** a color wheel—placing similar emotions close together and opposites 180 degrees apart. Other emotions are mixtures of the primary emotions, just as some colors are primary and others made by mixing the primary colors. Such modeling can be used as an analytical tool in understanding personality as well. I have extended the model into a third dimension, representing the intensity of emotions, so that the total so-called structural model of emotions is shaped like a cone.
- 18 The notion of modeling is not my invention, nor is it new. Social psychologist William McDongall noted the parallel between emotions and colors in 1921, writing that “the color sensations present, like the emotions, an indefinitely great variety of qualities shading into one another by **imperceptible gradients...**” The model was first developed by Brown University psychologist Harold Schlosberg in 1941, after he had asked research participants to judge the emotions posed in a standard set of pictures of facial expression. Schlosberg added the intensity dimension to his model. My own model was proposed in 1958, when I suggested eight basic bipolar emotions: *joy* versus *sorrow*, *anger* versus *fear*, *acceptance* versus *disgust*, and *surprise* versus *expectancy*.
- 19 Over the centuries, from Descartes to the present, philosophers and psychologists have proposed anywhere from 3 to 11 emotions as primary or basic. All the lists include *fear*, *anger* and *sadness*; most include *joy*, *love* and *surprise*. There is no **unequivocal** way to settle on a precise number, although factor-analytic studies, child-development studies and

cross-cultural studies are useful. But in the final analysis, this is a theoretical decision to be evaluated in terms of the inferences and insights to which it leads, the research it suggests and the extent to which empirical data are consistent with it. The psychoevolutionary theory assumes there are eight basic emotion dimensions arranged in four pairs.

- 20 If there are eight basic emotion dimensions (each with a number of synonyms or related terms), how can we account for the total language of emotions? Various published studies imply that the few hundred emotion words tend to fall into families based on similarity. If we follow the pattern used in color theory and research, we can obtain judgments about combinations—the emotions that result when two or more fundamental emotions are combined, in the same way that red and blue make purple. Judges in these studies have agreed that mixing *joy* and *acceptance* produces the mixed emotion of *love*; *disgust* plus *anger* produces *hatred* or *hostility*. Such mixtures have been called *primary dyads* in the theory. One can continue on this way and account for hundreds of emotion terms by mixing two or more emotions at different levels of intensity.
- 21 As noted above, it is interesting and perhaps important that one of the hypotheses generated from this structural model is that personality traits should have a similar structure. Again we can take cues from language. Although personality is usually taught in universities as if it had little or nothing to do with emotions, words such as *gloomy*, *resentful*, *anxious* and *calm* can describe personality traits as well as emotional states. An individual can feel depressed, or be a depressed person, feel nervous or be a nervous person. Often people are able to measure both emotional states and personality traits using the same checklist of adjectives, with a simple change in instructions. When research participants are asked how they feel now, or within the past few days, the instruction asks for a self-report of an emotional state or a mood. But they can be asked how they usually feel, a question that yields information about personality traits. At the extremes are **pathological states such as mania and paranoia**—but even these can be conceived as extreme expressions of such basic emotions as sadness, joy and disgust. Thus personality traits may be conceptualized as being derived from mixtures of emotions. With my colleague Hope Conte, I have been able to find a structural for certain classes of personality traits.
- 22 Furthermore, in recent years there have been more than 100 published studies concerned with identifying personality characteristics in lower animals. Of course lower animals probably should be said to have temperament rather than “personality,” but extraversion, emotional stability and agreeableness have shown considerable generality across species.

### Some Implications

- 23 An evolutionary framework supplies the study of emotions with such concepts as functional thinking, the generality of mechanisms **across phyla**, developmental theory (to explain, for instance, attachment), and the concepts of inclusive fitness and proximate and ultimate causation.
- 24 Happily, evolutionary theory can provide not only a way of organizing data in the fields of emotion, personality and psychopathology, but also new tools for clinical practice.
- 25 A therapist must uncover and identify emotions. An evolutionary approach suggests that the subjective feeling states of emotion (the labels they are given) are usually more ambiguous and obscure than are the associated impulses to action. We need not insist like the behaviorists that only **overt behavior** is suitable for study; however, impulses to action may be probed whether or not the action takes place.
- 26 In addition, successful adaptation implies the ability to feel and express all emotions in appropriate settings. Applied to emotion, the **societal dictate** that “there is a time and a place for everything” actually **encapsulates the idea** that all emotions can be adaptive within human society. It is a matter of sorting out the specific circumstances in which emotions can sometimes fail in their adaptive tasks.
- 27 The psychoevolutionary theory has guided the development of tests for measuring moods, personality traits, ego defenses and coping styles. It has also proposed a connection between emotions and the existential crises that all human beings are subject to—those involving **hierarchy, territoriality, and identity**.



*Task 12: Note down the answers people would give to the following questions back in the 1790 or 1800 at the end of the Enlightenment.*

- 1) How old is the world?

They would say: \_\_\_\_\_

- 2) Where did all these species on the planet come from?

They would say: \_\_\_\_\_

\_\_\_\_\_

- 3) Have there ever been any species that went extinct?

They would say, \_\_\_\_\_

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*Task 13: Answer the following questions about Darwin's early life based on what you hear.*

1) How did Darwin like the med school he went to in Edinburgh?

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2) What did he love as a young man?

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3) How old was Darwin when he got on the British ship to go around the world?

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4) What was his goal in life?

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*Task 14: Complete the following passage with the information you hear.*

He reads the Reverend Malthus on population growth. Malthus's book had come out in 1798. Malthus said basically that populations grow exponentially but agriculture grows linearly. Therefore populations will always outstrip their resource base. This convinced Darwin that all organisms are in a (1) \_\_\_\_\_, and that that must inevitably be the case. He saw very clearly how (2) \_\_\_\_\_ is at generating exponential population growth. We will come back to that in the ecology portion of the course.

And we now know that organisms are in competition really essentially not just over (3) \_\_\_\_\_, they are in competition over anything that will get their genes into the (4) \_\_\_\_\_. So that can be competition for mates. It can be competition for nesting sites, competition for food; lots of different things. But at any rate this primed

Darwin's thinking. So he writes down the idea of (5) \_\_\_\_\_. It comes to him in 1838; it's in his notebooks in 1838.

Basically, I'll run through natural selection in a minute. It's a deceptively simple idea because the (6) \_\_\_\_\_ looks so simple, but the (7) \_\_\_\_\_ are so wide ranging. Darwin recognized what the consequences were. And he didn't publish immediately. He did other things. He went off and he worked five or six years on barnacles. He wrote down lots of ideas about things unrelated to natural selection, and he wasn't really jogged out of this until a letter arrived in 1858 from Alfred Russel Wallace, a young (8) \_\_\_\_\_ who had, in a fit of malarial fever, had the same idea, in Indonesia.

And Wallace knew that Darwin had been thinking about these things, and he sent Darwin a letter. And at that point Darwin, British gentleman as he was, had to decide whether he would do the sort of gracious, honorable thing and (9) \_\_\_\_\_ or do the honest thing, which, his colleagues knew, was that he had already had the idea. And what they decide upon is that they will (10) \_\_\_\_\_.

So if you go to the Biological Journal of the Linnaean Society for 1858, which is in the Yale Library, you can look up the back to back papers by Alfred Russel Wallace and Charles Darwin in which the idea of Natural Selection is laid out. And then Darwin (11) \_\_\_\_\_. So he has been working on a book that was probably going to be about 1200 pages long, and instead he publishes an abstract of it, which he calls "The Origin of Species", which is about 350 pages long. And it sells out on the first day, sold all 6000 copies on the first day, and has (12) \_\_\_\_\_ ever since.

*Task 15: Listen to a talk about evolution and answer the following questions.*

- 1) The three possibilities of evolution:



- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

2) The main points of each possibility:

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

*Task 16: Answer the following questions according to an interview about an evolutionary explanation of friendships.*

1) What new approach does Professor Robin Dunbar use in his research?

\_\_\_\_\_

2) What's is the title of Robin Dunbar's new book?

\_\_\_\_\_

3) What is the size of "Dunbar's Number"? What does this number mean?

\_\_\_\_\_

4) What is the evolutionary theory behind the Dunbar's number?

\_\_\_\_\_

5) What is the average size of an 16th century or 18th century village?

\_\_\_\_\_

6) What factors have shaped our networks of friendships in the 20th century?

\_\_\_\_\_

*Task 17: Complete the following notes according to what you hear.*

1) Coyote vs. its prey

- Place to live: \_\_\_\_\_
- Skills to learn for survival: \_\_\_\_\_
- Success rate of its hunting: \_\_\_\_\_
- Way to detect its prey: \_\_\_\_\_
- Horned lizard's self-protecting method: \_\_\_\_\_

2) Wild dogs vs. impala

- The key to its successful hunting: \_\_\_\_\_
- Success rate of its hunting: \_\_\_\_\_

3) Scavengers

- Animals that eat dead animals killed by another animal: \_\_\_\_\_
- Their food: \_\_\_\_\_

4) Crocodile vs. wildebeest

- Reason for fighting: \_\_\_\_\_
- Way of killing its prey: \_\_\_\_\_  
\_\_\_\_\_
- Ways of animals to achieve a bloody balance: \_\_\_\_\_

*Task 18: Watch the video and answer the following questions.*

1) Why don't bison and elks enjoy winter?

\_\_\_\_\_

2) Why are coyotes known as super survivor?

\_\_\_\_\_

3) How do coyotes resolve disputes among themselves?

\_\_\_\_\_

4) Why are the black-billed magpies called highly adaptable hunters?

\_\_\_\_\_