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# Lesson 14 The Butterfly Effect

蝴蝶效应 祈使句 并列句

与课文关联的 18 个单词(点击每个单词可查看详细介绍)



**forecast** /'fɔ:kɑ:st/ n. 预报

**speculative** /'spekjələtɪv/

**blizzard** /'blɪzəd/ n. 暴风雪

adj. 推测的

**deteriorate** /dɪ'tɪəriəreɪt/

**multiply** \* /'mʌltɪplaɪ/ v. 增加

**cascade** /kæ'skeɪd/

v. 变坏，恶化

v. 瀑布似的落下

**turbulent** /'tɜ:bjələnt/ adj. 狂暴的

**dust devil** /'dʌst devl/

**squall** /skwɔ:l/ n. 暴风

n. 小尘暴，尘旋风

**eddy** /'edi/ n. 旋涡

**grid** /grɪd/ n. 坐标方格

**sensor** /'sensə(r)/ n. 传感器

**humidity** /hju:'mɪdəti/ n. 湿度

**meteorologist** /'mi:tɪə

**Princeton** /'prɪnstən/

'rɒlədʒɪst/ n. 气象学家

n. 普林斯顿 (美国城市)

**New Jersey** /nju:'dʒɜ:zi/

**fluctuation** /'flʌktʃu'eɪʃ(ə)n/

**deviation** /,di:vi'eɪʃn/ n. 偏差

n. 新泽西 (美国州名)

n. 起伏，波动

## 提出观点 难度：5 级

### ※ The Butterfly Effect

『 **butterfly** 蝴蝶；蝶泳；举止轻浮的人；追求享乐的人 』

- She is known as a **social butterfly**. 社交蝴蝶 (指举止轻浮或追求享乐的人)、交际花
- The children chased a beautiful yellow **butterfly** in the garden.
- He is an expert in the **butterfly** stroke.

have butterflies (in one's stomach) 忐忑不安

- It was the morning of the World Cup Final and most of the players had **butterflies (in their stomach)**.
- I always **have butterflies** before a major presentation.
- She confessed to having **butterflies in her stomach** before her wedding.

『 chaos theory 混沌理论 』

**Chaos theory** suggests that small changes in initial conditions can lead to large-scale and unpredictable variation in the future state of the system.

- The **Butterfly Effect** is a frequent metaphor for one aspect of **chaos theory**.
- The principle illustrates how minor initial differences can be amplified, leading to widely diverging outcomes.

※ Beyond two or three days, the world's best weather forecasts are speculative, and beyond six or seven they are worthless.

『 Beyond prep. after ...; later than ... 』

- **Beyond two or three days**, the world's best weather forecasts are speculative.

after... 在...之后	<b>After three days</b> , the predictions become uncertain.
later than... 晚于...	Any forecast <b>later than two days</b> is unreliable.
<b>Exceeding</b> v.超过 (数量); 超越, 越出 (权限)	<b>Exceeding two or three days</b> , the accuracy drops significantly.

『 speculative 推测性的; 投机的 』

- If so, they would gain **speculative** profits. 这样的话, 它们就有可能获得投机性收益。
- Liquidity inflow fuelled **speculative** demand. 资金流入刺激投机性需求。
- Venture capital transmogrified into **speculative** fever. 风险资本改头换面进入投机热。

be based on speculation / conjecture 基于推测

The reports are **based on speculation**, not facts.

<b>be based on guesswork / guess work</b> 基于猜测	Many long-range forecasts are simply <b>based on guesswork.</b> 只是基于猜测
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『 **worthless** 没有价值的(valueless、useless、...of no earthly use、totally useless) 』

- They finally found a small gold coin which was almost **worthless**.
- Critics say his paintings are worthless. 批评家说他的画毫无价值。
- Constant rejections made him feel worthless. 不断地遭到拒绝使他觉得一无是处。

<b>valueless / useless</b> 没有价值的/ 无用的	The old currency is now <b>valueless.</b> / The advice proved to be <b>useless.</b>
<b>of no earthly use</b> 毫无用处 (语气重)	That broken machine is <b>of no earthly use</b> to anyone.
<b>totally useless</b> 完全无用的	The new feature was <b>totally useless</b> for its intended purpose.

## 提出主题 难度：4 级

※ The Butterfly Effect is the reason.

~~The reason is because of the Butterfly Effect.~~ X reason和because重复

『 **reason for / behind** 背后的原因 』

- The **Butterfly Effect is the reason for / behind it.** 替换
- What is the **reason for** his sudden departure?
- She explained the **reason behind** her decision.

<b>accounts for</b> 是...的原因；解释	The Butterfly Effect <b>accounts for</b> it. 蝴蝶效应解释了它
<b>underly</b> 是...的基础/原因	The Butterfly Effect <b>underlies</b> it. 蝴蝶效应是其背后的原因
<b>The reason is...</b> 原因是...	<b>The reason is</b> the Butterfly Effect. 原因是蝴蝶效应
<b>The reason lies in...</b> 原因在于...	<b>The reason lies in</b> the Butterfly Effect. 原因在于蝴蝶效应

❖ For small pieces of weather -- and to a global forecaster, small can mean thunderstorms and blizzards -- any prediction deteriorates rapidly.

『 **mean** v.be likely to result in ... 导致、意味着... 』

- The merger will **mean** the eventual closure of the company's Shanghai Office. 意味着公司上海办事处的最终关闭
- This delay will **mean** a lot of extra work for everyone. 意味着大量的额外工作
- It would almost certainly **mean** the end of NATO. 这的确几乎导致北大西洋公约组织的终结。

『 **deteriorate** vi. 恶化, 变坏 ; vt. 恶化 』

- ... any prediction **gets worse / degenerates / becomes inaccurate** rapidly.
- The situation is expected to **deteriorate** in the coming years. 预计这种局面在未来数年还会恶化。
- Most importantly, buildings need love if they are not to **deteriorate**. 最重要的是, 建筑需要爱护才不会老化。

<p><b>gets worse / degenerates</b> 恶化, 变坏</p>	<ul style="list-style-type: none"> <li>• His condition <b>gets worse</b> every day. 每况日下</li> <li>• The quality of the film <b>degenerates</b> in the second half.</li> </ul>
<p><b>becomes inaccurate</b> 变得不准确</p>	<p>Beyond this point, the data <b>becomes inaccurate</b> rapidly. 迅速变得不准确</p>

❖ Errors and uncertainties multiply, cascading upward through a chain of turbulent features, from dust devils and squalls up to continent-size eddies that only satellites can see.

『 **multiply** v.to increase by a large amount or number, or to make sth. do this (使) 大幅增加 』

- Within the last 10 years, both sales and profits have **multiplied**. 大幅增加
- Smoking **multiplies** the risk of heart attacks. 成倍增加了心脏病发作的风险
- This will **multiply** our chances of success. 这将增加我们成功的机会。

<p><b>snowball</b> (像滚雪球般) 迅速增加</p>	<p>Unemployment <b>snowballed</b> at the beginning of 1980s.</p>
<p><b>proliferate</b> 激增, 扩散</p>	<p>Small businesses have <b>proliferated</b> in the last ten years.</p>
<p><b>mushroom</b> 迅速增长, 如雨后春笋般涌现</p>	<p>Trade between the two countries has <b>mushroomed</b>.</p>

**explode** 爆炸式增长

China's population **exploded** after 1949.

『 a chain of... 一连串的 』

- Life is **a chain of** moments of enjoyment, not only about survival. 生活是一串串的快乐时光，我们不仅是为了生存而生存。
- She had a **train of** thought. 一连串的想法
- He suffered **a string of** defeats. 一连串的失败
- We endured **a succession of cold days**. 一连串的寒冷日子

<b>a series of ...</b> 一连串的；一系列的	The scientist conducted <b>a series of</b> experiments to test the hypothesis. 科学家进行了一系列的实验来检验这个假设。
<b>a train of ...</b> 一连串的；一系列的 (尤指事件、想法)	The news started <b>a train of</b> thoughts about her childhood. 这条新闻引发了一连串关于她童年的想法。
<b>a string of ...</b> 一连串的；一系列的 (尤指相似或相关的事件)	The store had <b>a string of</b> bad luck, including a fire and two robberies. 这家商店遭遇了一连串的厄运，包括一场火灾和两次抢劫。
<b>a succession of ...</b> 连续的；接连不断的	The team won the championship after <b>a succession of</b> victories. 在一连串的胜利之后，该团队赢得了冠军。
<b>a progression of ...</b> 一系列的；进展过程中的	The painting shows <b>a progression of</b> colors from light blue to dark violet. 这幅画展示了从浅蓝色到深紫色的一系列色彩变化。

『 feature n. characteristic 特征 (指人为五官、指物为特点) 』

- The house has many appealing **features**. 吸引人的特征
- The climate is a key **feature** of this region.

『 from A up to B 从A一直到B 』

- The survey covers everyone **from teenagers up to the elderly**. 从青少年一直到老年人
- The prices range **from \$10 up to \$100**. 从10美元一直到100美元

<b>from A to B</b> 从A到B	How to improve your travel <b>from</b> home <b>to</b> work? 如何改进你从家到办公地点的行程?
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工作原理 难度：6级

❖ The modern weather models work with a grid of points of the order of 60 miles apart, and even so, some starting data has to be guessed, since ground stations and satellites cannot see everywhere.

『 **work** v.(of a machine, device, etc) function; operate (指机器、设备等) 运作, 运转 』

- This machine **works by electricity.** 靠电力运作
- The delete key doesn't **work.** 不起作用

『 **grid** n.a pattern of straight lines that cross each other to form squares (地图上的) 坐标方格 』

- Streets laid out on a **grid** pattern.
- The city has **streets laid out on a grid pattern.** 街道按网格模式布置
- We located the position on the **grid.** 坐标方格

『 **of / in / on the order of...** 大约、大概(approximately) 』

- a figure **in the order of** \$7 million
- Her salary is **of the order of** \$150 a week.
- And the available volume is **on the order of** meters cubed. 整个可用的空间体积有立方米的数量级。
- They borrowed something **in the order of** \$10 million. 他们大约借了一千万美元。
- But is this simply part **of the order of** Nature? 但这是自然法则吗?
- The house cost him something **on the order of** \$200,000.

<b>in the neighborhood / vicinity of...</b> 大约、大概	The house cost him something <b>in the neighborhood / vicinity of</b> \$200,000.
<b>approximately</b> 大约、大概	The house cost him <b>approximately</b> \$200,000. 大约20万美元

『 **starting** adj. beginning 最初的 』

- ...some **starting data** 一些初始数据 has to be guessed...

<b>initial</b> 最初的; 字首的	at the <b>initial</b> stage / phase.
<b>incipient</b> 初期的; 初始的	<ul style="list-style-type: none"> <li>• an <b>incipient</b> tumor.</li> <li>• the <b>incipient</b> light of day</li> </ul>

<b>opening</b> 开始的; 开篇的	<ul style="list-style-type: none"> <li>his <b>opening</b> remarks.</li> <li>the <b>opening</b> scene of the movie. 电影的开篇场景</li> </ul>
<b>preliminary</b> 预备性的; 初步的	a <b>preliminary</b> exam / contest.

※ **But suppose** the earth **could be covered** with sensors **spaced one foot apart, rising at one-foot intervals all the way to the top of the atmosphere.**

『 **space** v.将...均匀隔开 』

- **Space** your workouts two days apart to avoid sore muscles.
- Bean plants should **be spaced** three inches apart. 应该间隔三英寸
- The columns are **spaced evenly** along the wall.

<b>interval</b>	(两事件中的) 间隔时间	..., and by measuring the time <b>interval</b> between the taps and the receipt of the echoes the depth of the sea at that point can be calculated.
	(物体之间的) 间隔空间	They planted trees in the <b>intervals</b> between the houses.

『 **all the way** 一直... 』

- He ran **all the way** home. 他一路跑回家
- **Eventually the turtle has been butted all the way down to the floor of the tank.**
- The noise could be heard **all the way** down the street. 在整条街上都能听到

※ **Suppose** every sensor **gives** perfectly **accurate readings of temperature, pressure, humidity, and any other quantity a meteorologist would want.**

『 **reading** 读数 』

- read the meter 查表
- The nurse took the patient's vital **readings.** 生命体征读数
- We need to **take the meter reading** before leaving.

※ (Suppose) Precisely at noon **an infinitely powerful computer takes all the data and calculates** what **will happen** at each point at 12.01, then 12.02, then

## 12.03...

### 『 Precisely at noon 正午时分(12点整) 』

- **Precisely at two-thirty** someone knocked on the door. Lamar opened the door. 两点半的时候, 有人敲门。拉马尔开了门。
- It is **precisely at this juncture** that the boss finds himself in double jeopardy. 恰恰在这个关键时刻, 上司发现自己处于进退两难的境地。
- It is difficult to measure the density of rocks **precisely at every part** of the mountain region. 而要准确的测定各部分岩石密度又是十分困难的。

<b>at high noon</b> 正午时分	The duel was set for <b>at high noon.</b> 正午时分
<b>at 12 o'clock sharp</b> 12点整	The meeting starts <b>at 12 o'clock sharp.</b> 12点整
<b>at punctually 12 o'clock</b> 准时12点	Please arrive <b>at punctually 12 o'clock.</b> 准时12点

### 『 infinite 无限的, 无穷的; 无数的; 极大的 』

- The universe is **infinite.** 无限的
- The technology has been working well for me at the office, but there are **infinite** applications. 这项技术在我的办公室里运行得很好, 但它有无限的应用。
- Never lose your heart and continue to explore life since it is full of **infinite** possibilities. 永远不要灰心, 要继续探索生活, 因为它充满了无限的可能。

<b>finite</b> 有限的; 限定的 (反义词)	Human knowledge is <b>finite.</b> 有限的
<b>infinitive</b> adj. 原形的, 不定式的	It is wrong to ever split an <b>infinitive.</b> 将不定式分割永远是错误的。
<b>definite</b> adj. 一定的; 确切的	Our ideas began to crystallize into a <b>definite</b> plan. 我们的想法开始形成了一个明确的计划。
<b>indefinite</b> 不确定的; 无限的; 模糊的 (形近词)	<ul style="list-style-type: none"><li>• The project was postponed for an <b>indefinite period.</b> 不确定的时期</li><li>• an <b>indefinite</b> answer</li></ul>
<b>definitive</b> 最终的; 确定的 (形近词)	a <b>definitive verdict.</b> 最终裁决

### 『 calculate 计算 』

- Can you **calculate** the total cost of these items? 你能计算出这些物品的总成本吗?
- Can you **work out** the total cost?

<b>work out</b> 计算出 (phr. v.)	We need to <b>work out</b> the exact amount before we proceed. 在开始之前, 我们需要计算出准确的金额。
<b>figure out</b> 计算出; 想出 (phr. v.)	I can't <b>figure out</b> how much we owe them. 我算不出来我们欠他们多少钱。
<b>compute</b> 计算 (v.)	The system can <b>compute</b> complex equations in seconds. 该系统可以在几秒钟内计算出复杂的方程式。
<b>reckon</b> 计算; 估计 (v.)	The inflation is <b>reckoned</b> to be 10%. 通货膨胀被估算为10%。

## 现实情况 难度: 4 级

※ The computer will still be unable to predict whether Princeton, New Jersey, will have sun or rain on a day one month away.

『unable to do sth. 不能做某事』

- The team was **unable to score** in the second half.
- I was **unable to attend** the conference due to illness.

『one month / week / year away 一个月以后』

- Ross and Emily set a wedding date just **one month away**. 罗斯和艾米丽计划下个月结婚。
- The election is only **one week away**. There are rallies all over town tonight. 只剩一个星期就要选举了。今晚全城各地都有群众大会。
- London's games are a mere **two years away**. 距伦敦奥运会开幕仅剩两年的时间。
- Cant believe we are **two days away** from 2027. 不敢相信离2027还有两天了。

※ At noon the spaces between the sensors will hide fluctuations that the computer will not know about, tiny deviations from the average.

『fluctuations 波动, 起伏』

- We observed constant **fluctuations in the stock market**.
- Temperature **fluctuations** can affect the experiment's results.

『deviations from the average 与平均值的偏差』

- Any **deviation from the standard procedure** must be reported.
- The quality control checked for **deviations from the norm**.

❖ By 12.01, those fluctuations **will already have created** small errors one foot away.

『 **already have created** 已经造成了 (将来完成时) 』

- By next month, I will **already have finished** the entire project.
- By the time he arrives, they will **already have left**.

❖ Soon the errors **will have multiplied** to the ten-foot scale, and so on up to the size of the globe.

『 **multiplied** 大幅增加 』

- Our problems have **multiplied** since last year. 自去年以来, 我们的问题成倍增加。
- It's an administrative sham of the kind that has **multiplied** over the last 30 years. 这是一种行政骗局, 在过去30年里该骗局不断激增。

<b>snowballed to...</b> (像滚雪球般) 迅速增加到...	The rumours will have <b>snowballed to the ten-foot scale</b> . 谣言将迅速增加到十英尺的规模
<b>proliferated to...</b> 激增到...	The problems will have <b>proliferated to the ten-foot scale</b> . 问题将激增到十英尺的规模
<b>rocketed to...</b> 猛增到...	The numbers will have <b>rocketed to the ten-foot scale</b> . 数字将猛增到十英尺的规模
<b>soared to...</b> 飙升到...	The costs will have <b>soared to the ten-foot scale</b> . 成本将飙升到十英尺的规模

『 **scale** 程度、规模、范围 』

- The **scale** of the fighting is almost unimaginable. 战斗的规模几乎难以想像。
- There is no precedent for a disaster of this **scale**. 这种规模的灾难是空前的。
- What began as a minor scuffle turned into a **full-scale** riot. 开始的小冲突演变成了大规模的暴乱。

<b>on a small / limited scale</b> 小规模/有限规模	The experiment was conducted <b>on a small scale</b> . 以小规模进行
<b>on a large / grand scale</b> 大规模	The changes were implemented <b>on a grand scale</b> . 以大规模实施

<b>on a / an colossal / enormous / gigantic scale</b> 特大规模	They planned a building project <b>on an enormous scale.</b> 以特大规模进行
<b>on a national / nationwide scale</b> 全国规模	The campaign launched <b>on a national scale.</b> 在全国规模启动
<b>on a / an global / international / world / worldwide scale</b> 全世界规模	The crisis affected markets <b>on a global scale.</b> 影响了全球规模的市场

### 『 and so on 等等 』

- We discussed everything—when to go, what to see **and so on.** 我们什么都商量过了一什么时候走、看什么等等。
- Don't forget about texts, emails, **and so on.** 不要忘记短信、邮件等等。
- There is tutoring, sports clubs **and so on.** 有补习班、体育俱乐部等等。

<b>and so forth</b> 等等	We discussed music, movies, and <b>so forth.</b> 等等
<b>etc. (et cetera)</b> 等等	The list includes apples, oranges, pears, <b>etc.</b> 等等
<b>and the like</b> 以及类似事物	He collects stamps, coins, <b>and the like.</b> 以及类似事物
<b>and what not</b> 以及诸如此类的事物	They sell crafts, jewelry, <b>and what not.</b> 以及诸如此类的事物

### 『 global size 全世界规模 』

- **Global** regions are weighted by the **size** of their GDP. 而衡量世界国家地区规模的标准是GDP。
- That is the **size of the global** telecom market. 而这就是全球电信市场的规模。
- Still, while the **size** and reach of **global** illicit industries can seem overwhelming, there are signs of hope. 尽管全球非法产业的规模越来越大，分布越来越广，我们依旧能够看到希望。

<b>global scale</b> 全世界规模	This environmental problem requires action on a <b>global scale.</b> 这个问题需要全世界规模的行动。
<b>international scale</b> 国际规模	The conference brought together experts working on an <b>international scale.</b> 这次会议汇集了在国际规模上工作的专家。
<b>world scale</b> 世界规模	The company is now operating production facilities on a <b>world scale.</b> 该公司现在正在以世界规模运营生产设施。

**worldwide scale** 全球  
规模

The new technology is expected to be adopted on a **worldwide scale**. 这项新技术预计将在全球规模上被采纳。



**all thumbs**

笨手笨脚

受限于个人水平，笔记若有疏漏之处，恳请发送邮件至 [hibenba@gmail.com](mailto:hibenba@gmail.com) 批评指正。

同时可通过网址([ncego.com](http://ncego.com))页面底部“举报”错误 (更新于:2026-03-01)。

一场孤独的修行，需要相信积累的力量。专注当下、珍惜时间、心怀感恩、顶峰相见。