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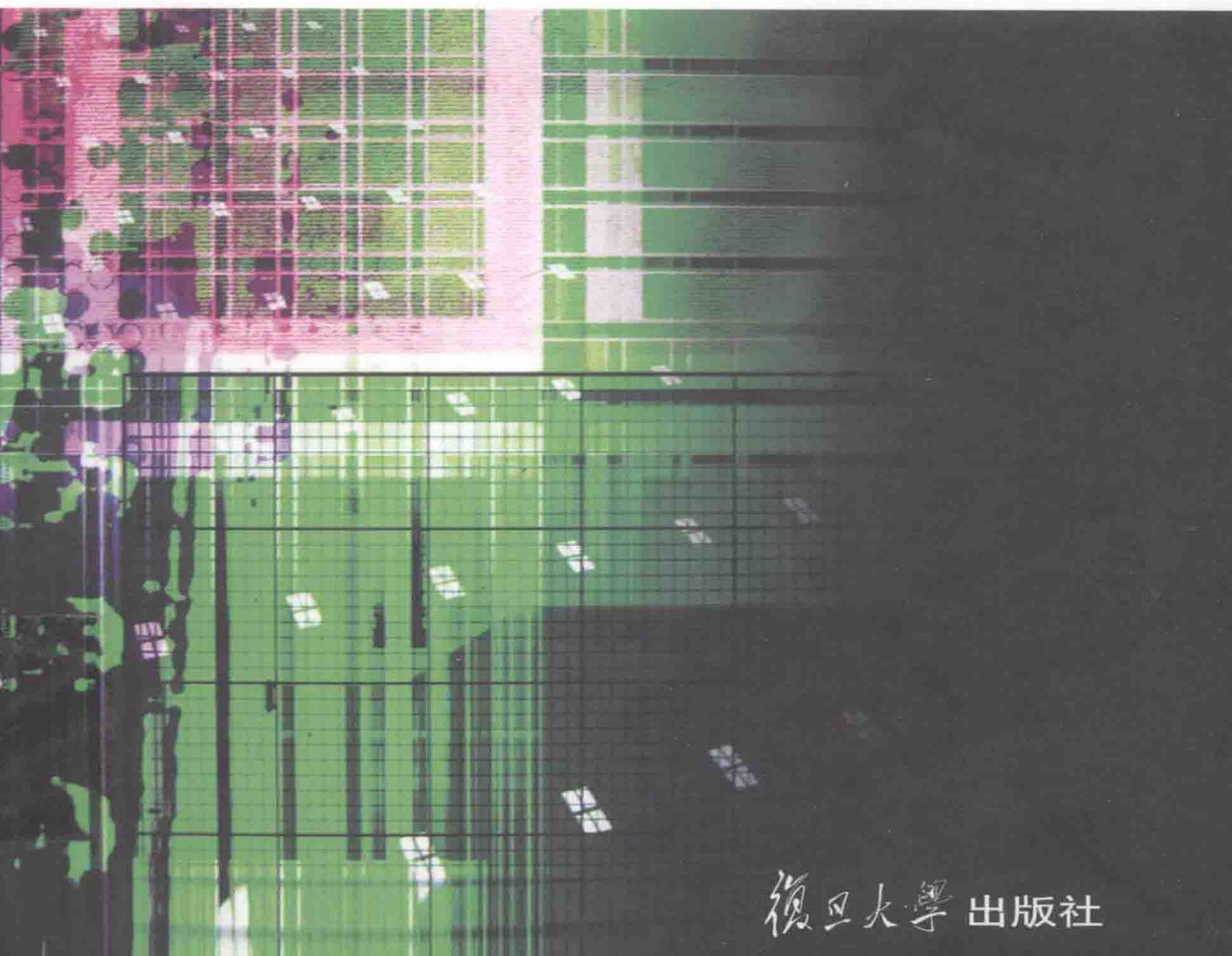
*Contemporary*

SCIENCE & TECHNOLOGY

II

英语现代科技文献精读本

华中一 陆 栋 卢义民 编著



复旦大学出版社

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图书在版编目(CIP)数据

英语现代科技文献精读本Ⅱ/华中一,陆栋,卢义民编著.  
—上海:复旦大学出版社,2008.4  
ISBN 978-7-309-05836-9

I. 英… II. ①华…②陆…③卢… III. 科学技术-英语-高等学校-教材  
IV. H31

中国版本图书馆CIP数据核字(2007)第182904号

英语现代科技文献精读本Ⅱ

华中一 陆 栋 卢义民 编著

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出版发行 复旦大学出版社 上海市国权路579号 邮编200433  
86-21-65642857(门市零售)  
86-21-65100562(团体订购) 86-21-65109143(外埠邮购)  
fupnet@fudanpress.com http://www.fudanpress.com

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责任编辑 梁 玲  
总 编 辑 高若海  
出 品 人 贺圣遂

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印 刷 浙江省临安市曙光印务有限公司  
开 本 787×960 1/16  
印 张 27.75  
字 数 533 千  
版 次 2008年4月第一版第一次印刷  
印 数 1—3 100

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书 号 ISBN 978-7-309-05836-9/H·1162  
定 价 42.00 元

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## 前 言

随着信息社会的进展,作为一种世界性的语言,英语在国际化的科技、文化交流方面起着越来越大的作用。在科技教育领域加强英语学习,已经成为人们的普遍共识。但应当指出,如何有效地引导学生从大学英语学习顺利地过渡到科技文献的阅读,现在还存在着认识上的误区。有不少人认为有必要专门编写所谓的“科技英语”教材,以为“科技英语”非常特殊,与“普通英语”不一样,是一门专门的学科,——其实不然。实际上只有“用于科技方面的英语”,而没有与“普通英语”对立的“科技英语”;既没有特殊的英语规律,也没有可称为“科技语法”或“科技修辞学”之类东西。当然,各门学科都会有一些专门的用语,且同一个词汇在不同学科中可能有其特定的涵义和不同的侧重点;另外,也有一些在当前科技文献中常见的惯用法和特殊涵义的缩略语甚至新词汇。

正是因为有没有特殊的“科技英语”和采用何种方法构建“大学英语”和“文献阅读”之间的联系上的模糊观念,迄今我们看到的这方面的教材,大都从专业书刊中选用某些文章片段或章节作为课文,编成所谓的《生物英语》、《管理英语》之类教材。粗看起来这对学生的专业阅读似乎能够起到速成的效果;但如回头再认真地审视一下,不难发现过早地囿于本专业阅读范围,很可能会忽视通过语言推敲达到深入理解的学习环节,无益于英语本身的继续提高,也不利于通过阅读产生创新的萌动,即难免有后劲不足之嫌。我们认为使学生实现从大学英语到文献阅读的跨越,最有效的方法是双管齐下,在运用英语基础知识的同时,仔细诵读当代各种专业的优秀科技文献,并充分理解其涵义,这样才能在求知中积累,在积累中创新,以至熟练后能随心地运用英语这个工具。

我们就是根据这样的要求,选择当代的优秀研究论文(research paper)、综述评论(review)和科普(popular science)文章,并就专业术语、理解难点作出注释和点评,使读者在学习英语的同时,能吸收文章中的新鲜知识。我们在这里选择了自然科学、技术科学、生命科学和管理科学等不同学科的内容,不仅是为了适应多种专业的需要,而且更重要的是当代科技的新起点往往始于交叉学科;补充更多方面的知识,可以开阔视野、体现创新思维、反映时代特色。

我们准备陆续推出几本教材。各本虽有相对侧重点,但各课单独成文,无规定的、按难易排列的次序,因此文中的少量注释会有重复。读者可以先从比较贴近自己专业的课文入手,再逐步拓宽选读范围。为了阅读方便,特地安排了左页正文、右页注释的排版形式,读者可在右页空白处补充自己的注释或写上阅读体会,以便日后复习巩固之用。

文后还附有少量练习,读者可循此找到文章主旨、研究现况、重要结论等等,以此加深对文章的理解,并逐步学会用英语写出简要答案。这样提高一定会更快。

最后我们对选本原文的作者们和原出版单位表示诚挚的感谢。这里也包含了他们对中国教育事业的贡献和国际友情。

华中一 陆 栋 卢义民

2006年5月27日

复旦大学建校101周年

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*Text 1***The Pleasures and Pains of Information**

George Loewenstein  
(*Science* 312, 704, 2006)

Information serves not only as an input into *decision-making*<sup>1</sup>, but is a source of pleasure and pain *in its own right*<sup>2</sup>. This has diverse consequences for human decision-making.

In 1961, economist and *Nobel Laureate*<sup>3</sup> George Stigler<sup>4</sup> [1] initiated the “*economics of information*<sup>5</sup>” when he relaxed an assumption that had dominated economics until that point. Rather than assume that people are fully knowledgeable of relevant information when it comes to making a decision, he allowed for the possibility that people might lack information and be motivated to acquire it. As Stigler noted when he accepted the 1982 Nobel Prize, “The proposal to study the economics of information was promptly and widely accepted, and *without even a respectable minimum of controversy*<sup>6</sup>. Within a decade and a half, the literature had become so extensive and the theorists working in the field so prominent, that the subject was given *a separate classification*<sup>7</sup> in the *Index of Economic Articles*.<sup>8</sup> Stigler acknowledged that “The absence of controversy certainly was no tribute to the definitiveness of my exposition.” Rather, “All I had done was to open a door to a room that contained many fascinating and important problems” [2].

Relaxing the assumption of *perfect information*<sup>9</sup> did, indeed, open new doors for economists. Yet the economics of information that emerged from Stigler’s *seminal contribution*<sup>10</sup> embraced *its own set of*<sup>11</sup> strong assumptions about how people deal with the information they acquire. Although these assumptions have proven their value, forming the basis for tractable models that generate testable, often valid, predictions of decision-making and *market outcomes*<sup>12</sup>, several of the

## 信息的欢乐与痛苦

### Notes

1. **decision-making** *a.* 决策的 *n.* 决策  
decision-maker 决策者
2. **in its own right** 凭自身的名义（资格或权利）
3. **Nobel Laureate** 诺贝尔奖获得者
4. **George Stigler** 乔治·施蒂格勒（1911— ）  
美国当代经济学家，芝加哥微观经济学派领头人之一，信息经济学和管理经济学的创始人。1982 年度诺贝尔经济学奖获得者。
5. **economics of information** 信息经济学  
这是乔治·施蒂格勒于 1961 年提出的。他认为获得信息是有成本的，信息是生产、交换、分配和销售的纽带，并以此出发，分析市场出现的许多经济现象并获得成功。由此发展形成了微观经济学的新领域：信息经济学。此前经济学假设人们决策时具有完全的有关信息，而施蒂格勒允许人们在信息不足时做决策并激发人们获取信息。
6. **without even a respectable minimum of controversy** 几乎毫无争论
7. **a separate classification** 单独的分类
8. **Index of Economic Articles** 经济学论文索引
9. **perfect information** 完整的（完全的、完善的）信息
10. **seminal contribution** 首创的（创新的）贡献
11. **its own set of...** 它自己的一套……
12. **market outcome** 市场结果

new assumptions are as patently unrealistic as the original assumption of perfect information. Much as the allowance for imperfect information initiated a rich vein of<sup>13</sup> new work, relaxing some of the assumptions that took its place has the potential to help resolve important puzzles for economics. These include *inconsistencies*<sup>14</sup> in the apparent degree to which people take account of the future, and the human tendency to avoid information in certain situations or fail to draw seemingly obvious conclusions from the information one receives.

One *tenet*<sup>15</sup> of the economics of information that may be ripe for<sup>16</sup> modification is the assumption that information is not valued in its own right, but only insofar as it informs decision making and enables decision-makers to secure desired outcomes. Berns et al. [3] challenge this assumption by showing that people not only dislike experiencing unpleasant outcomes, but also dislike waiting for them. Confronting human subjects with the prospect<sup>17</sup> of an impending<sup>18</sup> electric shock<sup>19</sup>, the authors find that regions of the pain matrix<sup>20</sup> (a cluster of brain regions that are activated during the experience of pain) are also activated in anticipation of shock. This activation intensifies as the shock becomes imminent<sup>21</sup>. The information that one is going to receive an electric shock, like the shock itself, is a source of misery.

The idea that people derive pleasure and pain directly from information, rather than from any material benefits that the information procures, has diverse implications for decision-making. As highlighted by Berns et al., utility derived from anticipating future outcomes can have a major impact on *intertemporal choices*<sup>22</sup>—decisions involving costs and benefits that extend over time. The standard economic account of intertemporal choice predicts that people will generally want to expedite pleasant outcomes and delay unpleasant ones [4]. If, however, people derive pleasure or pain from the information that an outcome will occur in the future, they may prefer to defer desired outcomes so as to prolong the pleasure of anticipation or to expedite unpleasant outcomes so as to shorten the period of dread. In the Berns et al. study, 84% of subjects preferred to get electric shocks over with quickly. Ignoring the utility of information, the standard account would predict instead that subjects would prefer to defer the shocks.

Earlier studies posited<sup>23</sup> a causal link between anticipatory utility and the desire to get unpleasant outcomes over with quickly [5]. However, Berns et al. actually observe a correlate of dread in the brain activity of human subjects<sup>24</sup> and a significant relationship between individual differences<sup>25</sup> in this measure<sup>26</sup> and indi-

13. **a vein of** 一系列的, 一连串的

14. **inconsistency** 不相符合; 不一致性

15. **tenet** 宗旨、原则、信条

16. **be ripe for...** 解决……的时机已成熟

ripe 和 mature 的区别:

ripe 多指水果、庄稼的成熟或借喻时机的成熟

mature 多指人的智力、体力的成熟

17. **prospect** 前景, 景色, 前途光明或堪忧的事物

18. **impending** 悬而未决的、即将来临的

19. **electric shock** 电击、触电; 电振颤; 喻惊心动魄的震动

20. **regions of the pain matrix** 痛觉基质区域, 痛域。

它是人在经历疼痛时大脑中受激活的一组区域。

21. **imminent** 急迫的、迫切的、即将来临的

22. **intertemporal choices** 内部时间选择 (行为)

这是作者介绍 G. S. Berns 等人在有关信息经济学工作的论文中所引用的新概念: 对愉悦和痛苦信息在人脑中有不同的内部时间选择行为。

23. **posit** 发现、断定

24. **the brain activity of human subject** 实验人的大脑活性

25. **individual differences** 个体差异

26. **in this measure** 在这个分寸之内的, 在这个范围内的

vidual differences in intertemporal choice behavior [6]. *In tandem with*<sup>27</sup> other recent work that highlights the role of emotions in intertemporal choice [7], and consistent with historical accounts of intertemporal choice behavior [8], these findings support the idea that the decision to delay or expedite an outcome depends critically on how a person feels while waiting. When waiting is pleasurable, people will often prefer to defer. When it is unpleasant, however, because waiting for an unpleasant outcome produces dread or waiting for a pleasant outcome generates frustration, people will prefer to expedite outcomes—even, sometimes, *at the cost of*<sup>28</sup> experiencing worse ones.

The idea that people *derive*<sup>29</sup> utility directly from information has a variety of consequences that *go well beyond*<sup>30</sup> the domain of intertemporal choice. Emotions, such as fear and excitement, can dramatically change *people's willingness to take risks*<sup>31</sup> [9-11]. And utility derived from self-image—that is, from information about one's value as a person—can have *diverse ramifications*<sup>32</sup>, including encouraging *prosocial behavior*<sup>33</sup> [12, 13].

*Utility from information*<sup>34</sup> can also affect the demand for information. *Conventional economics*<sup>35</sup> predicts that people should prefer more information to less. If people derive utility directly from information, however, they may sometimes be motivated to avoid information, even if it is free and useful for decision-making [14]. Indeed, people often avoid *getting tested for medical conditions*<sup>36</sup> because



Fig. 1.1 Bring it on. People generally choose to get unpleasant things over with quickly.

27. **in tandem with** 协同, 联合

28. **at the cost of** 以……为代价, 花多少钱

29. **derive** 导出、获得、派生出

30. **go well beyond** 大大超出、远远超过

31. **people's willingness to take risk** 人们甘冒风险的意志(愿)

32. **diverse ramification** 多样的衍生结果

33. **prosocial behavior** 亲社会行为

34. **utility from information** 信息的效用

在经济学上信息的效用是指信息满足人们需求的能力。

35. **conventional economics** 传统经济学

就对待信息而言, 传统经济学期望获得更多信息作为决策依据, 而实际上人们有时想回避信息 (to avoid information)。

36. **getting tested for medical conditions** 接受医疗状况检查

they are afraid of getting bad news [15], and investors are more likely to look up the value of their *portfolios*<sup>37</sup> when the stock market is up (and the news about one's own portfolio promises to be favorable) than when the market is down [16].

Beyond sometimes motivating the avoidance of information, the utility associated with information also provides people with an incentive to *process information in a biased fashion*<sup>38</sup>—to form “*motivated*” *beliefs*<sup>39</sup> that feel good in the *short run*<sup>40</sup> but can distort decision-making [17]. People are remarkably *adept at*<sup>41</sup> finding reasons to believe what they wish were true and not believe what they wish were not true [18]. For example, someone who is worried about the health of a loved one is often the last to view the situation in objective terms. Instead, he or she *grasps at remedies*<sup>42</sup>—however *far-fetched*<sup>43</sup>—that promise hope. Or consider the many people who *fall prey to*<sup>44</sup> pyramid and *Ponzi financial investment schemes*<sup>45</sup>. Although economists argue that there is no such thing as a free lunch, this behavior suggests that many people are quite willing to be persuaded otherwise.

These examples just *scratch the surface of*<sup>46</sup> promising directions for research on the utility of information. For example, neither economists nor psychologists have advanced a theory that can explain when and why waiting for a desired outcome is pleasurable or, instead, *frustrating*<sup>47</sup>, even though the emotional response to anticipation may be the single most important determinant of people's willingness to *delay gratification*<sup>48</sup>. As another example, theories of investor behavior assume unrealistically that *paper gains and losses*<sup>49</sup> (changes in the value of owned assets) provide the same utility as realized gains and losses (those that result from actually selling assets). Relaxing this assumption may help to explain a *wide range of*<sup>50</sup> *perplexing investor behaviors*<sup>51</sup>, such as the tendency to hold on to losing stocks (by holding such stocks, investors limit themselves to paper losses as opposed to actual losses). We also lack a convincing theory to account for and predict the *market bubbles and busts*<sup>52</sup> that *wreak havoc on*<sup>53</sup> economies. Such a theory will almost inevitably incorporate *interactions between expectations and emotions*<sup>54</sup> such as the *paradigmatic*<sup>55</sup> “*fear and greed*<sup>56</sup>.”

As the first of its kind<sup>57</sup>, the study by Berns et al. has limitations. Given the constraints of brain imaging<sup>58</sup>, for example, the *time intervals*<sup>59</sup> over which the study's subjects make decisions (about 30 s) are shorter than the decision intervals

37. **portfolio** 有价证券

38. **to process information in a biased fashion** 以有倾向性的方式处理信息

39. **“motivated” beliefs** “目的明确的”信念

40. **in the short run** 在短期内

41. **be adept at (in)** 对……熟练，对……内行，善于……

42. **grasp at remedy** 想抓住补药

43. **far-fetched** 牵强的，牵强附会的

44. **fall prey to** 成为……的牺牲品

45. **Ponzi financial investment schemes** 庞氏金融投资骗局

Charles A. Ponzi 是意大利裔美国人，他在 1919—1920 年间施行的骗局，骗人向虚设的企业投资。以后来投资者的钱作为快速盈利付给最初投资者来诱使更多的人上当受骗。

46. **scratch the surface of** 对……作肤浅的探讨

47. **frustrate** 挫败，感到灰心

48. **delay gratification** 滞后的满足

49. **paper gains and losses** （有价证券的）账面上的升值和亏损

50. **a wide range of** 广阔范围的。例如：

He has a wide range of knowledge. 他的知识渊博。

She has a wide range of interests. 她的兴趣广泛。

51. **perplexing investor behaviors** 令人困惑不解的投资者行为

52. **the market bubbles and busts** 市场的泡沫和崩溃（失败）

53. **wreak havoc on** 对……造成浩劫（大破坏）

54. **interactions between expectations and emotions** 期望和情感之间的相互作用

55. **paradigmatic** 作为佐证的

56. **fear and greed** 恐惧和贪婪

57. **as the first of its kind** 这方面的首例是

58. **given the constraints of brain imaging** 在大脑想象力的约束下

59. **time interval** 时间间距



of greatest interest to economics. Moreover, the authors observed *the connection between dread and intertemporal choice*<sup>60</sup> across subjects in two separate tasks. It would provide stronger evidence that dread is playing a causal role if activation in a single task was correlated with decisions made in the same task. The authors assume, finally, *that dread is better represented by the summed total of anticipatory activation over the duration of the waiting period*<sup>61</sup>. But it might *make more sense*<sup>62</sup> to represent dread as the level of activation at a particular time. These are, obviously, minor limitations given the novelty and importance of the research.

The Berns et al. study is a superb new addition to *the nascent field of neuroeconomics*<sup>63</sup> [19, 20]. It also contributes to a new wave of research in *behavioral economics*<sup>64</sup> that, following Stigler's lead, examines the consequences of relaxing economists' stylized assumptions about how people deal with information [21]. Both of these new lines of research have generated more controversy than Stigler's *initial insight*<sup>65</sup>, but will likely prove similarly rich in yielding theoretical results [22].

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