



# Metaphorization in Scientific Discourse

科学语篇的隐喻性

● 董宏乐 著



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郑州大学 \*04010166103M\*



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江苏工业学院图书馆  
藏书章



复旦大学出版社

## 图书在版编目(CIP)数据

科学语篇的隐喻性/董宏乐著. —上海:复旦大学出版社, 2005.3  
ISBN 7-309-04365-0

I. 科... II. 董... III. 科学—语言学—隐喻—研究 IV. H0

中国版本图书馆 CIP 数据核字(2005)第 009482 号

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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

86-21-65118853(发行部); 86-21-65109143(邮购)

fupnet@fudanpress.com http://www.fudanpress.com

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责任编辑 曹珍芬

总编辑 高若海

出品人 贺圣遂

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印	刷	句容市排印厂
开	本	850×1168 1/32
印	张	8.125 插页 2
字	数	204 千
版	次	2005 年 3 月第一版第一次印刷
印	数	1—2 000

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书 号 ISBN 7-309-04365-0/H·853

定 价 16.00 元

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# Acknowledgement

I am thankful to the following people for this book. Special thanks should go to my supervisor, Professor Zhu Yongsheng, who initiated me into the essentials of systemic functional linguistics and offered me meticulous guidance and moving encouragement in the process of writing this book. After I finished the draft, he painstakingly labored through it in its entirety — reading most parts of it many times over, and made a lot of constructive suggestions and corrections, without which this book would not have been possible. Therefore, I owe all its merits to him and of course, for the mistakes, if any, I bear the whole responsibility. By the way, Professor Zhu also sets me a wonderful example as a tolerant, forgiving and generous person. In short, his admirable attitude both to academic research and to life will be of immense value to my future career.

My heart-felt thanks go to Professor Lu Guoqiang for his enlightening lectures on text semantics, from which I came to have a better understanding of the semantic aspects of discourse and frontier linguistic studies. The profit I gained from his

intellectual ingenuity and critical thinking will have a lasting influence on my future academic research.

I am also grateful to Prof. Yan Shiqing, whose generous encouragement and unstinting criticisms have made this book far better than it would otherwise have been. His contribution to this research will be forever appreciated.

I also want to express my thanks to my good friend Prof. Wan Zhengfang for his encouragement and suggestions throughout this research. Incidentally, I'd like to thank Mr. Chai Jianmin for his help with the technical processing of this book and Ms. Cao Zhenfen for the time and trouble she takes to proofread and edit the book.

Finally, I would thank my wife and daughter, who, with their love and thoughtfulness, have supported my devotion to this book in the past few years.

# 序

近年来,我以前有幸指导的几位博士生经常给我传来喜讯:有的成了教授,有的成了博导,有的出国深造,有的成了部门党政领导。不过,最令我开心的是他们在圆满完成教学任务之余,刻苦钻研,笔耕不止,时有论著正式发表,其中包括严世清(苏州大学)、苗兴伟(山东大学)和徐立新(洛阳解放军外国语学院)的博士论文。而如今复旦大学外文学院为了推动学术研究,决定于近期出版由本院青年教师撰写的博士学位论文,入选的作者名单中又有董宏乐副教授。这使我又一次感到了做教师的喜悦和自豪。

董宏乐是1997年考入复旦外文系的。那三年时光,说不上悬梁刺股,潜心苦读却是实实在在的。他的钻劲和韧劲,至今使我难忘。遇到困难,他痛苦过,彷徨过,却从来没有动摇过。取得进展时,他开心过,微笑过,却从来没有满足过。

董宏乐的论文写的是科学语篇中的隐喻。众所周知,两千多年来,学术界对隐喻的性质和功能一直争论不休。占上风的看法是把它看作是一种类似明喻的修辞手段。然而,近20多年来,人们越来越清楚地认识到,隐喻不仅是修辞的手段,更重要的是,它是人类认识世界的一种途径和方式。董宏乐在当代隐喻研究成果的基础上,从社会与文化的角度考察科学英语语篇在词汇语法层

面上的隐喻性质。读者不仅可以清楚地看到柏拉图和亚里士多德等古希腊先哲们以及当代的哲学家和语言学家们对隐喻的看法,而且可以发现作者如何借鉴 Ortony 的“互动理论”(interaction theory)、Halliday 的“语法隐喻理论”(grammatical metaphor theory)和 Lakoff 的“概念隐喻理论”(conceptual metaphor theory)对诸如隐喻性质和功能以及科学语篇隐喻特点等问题作出讨论。

我不敢妄言这篇论文回答了与科学语篇隐喻相关的所有问题,但要说它基本上回答了作者想要回答的所有问题,则绝非夸大其词。我真诚地希望,这篇论文正式出版后,除了帮助读者认清与隐喻有关的一些问题外,作者本人也能从读者的反馈中有所得益,从而把这个领域的研究做得更加深入,使它富有更高的理论意义和实用价值。

我和本文作者都是教师。教师的主要职责是“授业解惑”。当面传授无疑是一种有效的方式,而通过发表论著与他人分享自己的研究成果也不失为一种可取的途径。让我们共同努力,在今后的岁月中,通过诚实的劳动和富有创新精神的思维,在语言学研究领域取得更加辉煌的成绩,为人类社会的发展做出力所能及的贡献。

朱永生

2004 年 5 月

于上海三湘世纪花城

# 前 言

也许是因为隐喻长期以来被归于修辞范畴,人们一般认为它与以认知为目的的科学实践活动关系不大,加之在哲学界占统治地位的逻辑实证主义思潮坚持认为,科学应是以“白描式”(literal)的语言来记述科学发现,而文体学家们所讨论的科学语篇多取材于教科书,极不恰当地把科学视为静态的“成品”(product),所以,极少有人会将隐喻与科学英语语篇联系起来。本书在当代隐喻研究成果的基础上,从社会文化(sociocultural)这一新颖的角度考察科学英语语篇在词汇和语法层面上的隐喻性质。

柏拉图被公认是最早思考隐喻这种特殊语言现象的学者。虽然这位古代先哲并没有就隐喻提出一套理论,但是他的“洞穴隐喻”(cave allegory)昭示后人,人类的感官不可能触及终极现实。虽然这一“众人皆醉唯我独醒”的理论思想在哲学界长期遭到嘲讽,但 20 世纪初发生的一系列的科学革命(如爱因斯坦的相对论)足已揭示其理论的合理成分。换言之,柏拉图几乎可以说是与逻辑实证主义思想针锋相对的逻辑相对主义的鼻祖。此外,柏拉图对待诗歌和诗人的态度也表明他反对将隐喻看成是诗歌专用的语言材料。亚里士多德是古希腊时期系统研究隐喻的另一位重要的哲学家。他有关隐喻的定义、隐喻和明喻之间的关系以及隐喻的



使用范围均表明他几乎论及了隐喻的认知作用。遗憾的是,他过于强调隐喻为诗歌专用,认为隐喻能力是不可教会的,加上后来罗马思想家们的曲解,一般被认为是传统隐喻研究中的“比较论”(comparison view)和“替换论”(substitution view)的先驱。传统理论的共性之处在于都把隐喻看成是附属于语言的修饰性成分,无任何认知功能,因此也都没有能够认识到隐喻是过程,可以提供新的认知角度和方法。乔姆斯基语言学派承袭了传统隐喻观,倾向于把隐喻看成是离经叛道的语言现象。因此他们在语言研究过程中对隐喻大施贬低。20世纪中叶,西方学术界掀起一股重新审视隐喻的热潮,并逐步形成了与传统隐喻理论针锋相对的隐喻观,即 Ortony (1979, 1993) 所说的构建主义或“互动性理论”(interaction theory)。该理论学派揭示了隐喻的复杂性和认知功能,并指出了隐喻是一种动态的现象。这些研究最终导致了认知隐喻理论(cognitive approach)的诞生。后者在分析日常语言的隐喻性基础上,提出隐喻和非隐喻并不是完全对立的,隐喻在促进语言发展过程中呈现出系统性和规则性。因此,我们可以认为隐喻构成人类认知发展的主要机制。从这个意义上讲,隐喻是人类语言和认知的根本属性。为了进一步揭示隐喻在科学语篇中的使用情况及说明隐喻对促进人类知识发展的作用,我们同时介绍了系统功能学派中所说的“语法隐喻理论”(grammatical metaphor theory),提出语法隐喻理论与构建主义思想之间的共通之处,并将两者结合起来用于本书的研究。换言之,语法隐喻理论和 Lakoff 的认知隐喻理论构成了我们讨论科学语篇隐喻性的理论基础。

本书第三章通过讨论科学和诗歌、科学和修辞之间的关系,表明科学语篇必然是隐喻性质的。譬如,现代人所说的科学行为

其实是人类文明前科学阶段所盛行的神话(如占星学和炼金术)理性化的延伸,体现了人类认识世界的艰难性和阶段性。因此,无论从起源还是从认知功能上讲,科学和诗歌有着许多相似之处。关于科学与修辞之间的关系,我们借鉴以库恩(Kuhn)为代表的科学历史主义思想,探讨了科学语篇的修辞本质,提出将科学和修辞学割裂开来的传统做法体现了学术界对科学的错误认识。我们认为,科学应该定义为“对主客观世界的非完善、但却可以进一步完善的群体构建过程”(an imperfect but perfectible social construction of physical and non-physical reality)。如此说来,科学英语语篇不是外在事物的真实摹写,也不是客观世界的同构模型,而是科学家“解读”自然界时所构成或参与的社会性的语言行为。所以,以词汇和语法隐喻为代表的修辞手法必然会在科学事业中发挥重要的作用。为了加强我们的论述,本章最后以达尔文的“物种起源”一书为例说明科学语篇的隐喻性质。这些讨论为后文探讨科学语篇在词汇层面和语法层面上的隐喻必要性和功能打下伏笔。

第四章讨论的核心问题是科学语篇中词汇隐喻的表现形式、功能和特征。该章首先批判了逻辑实证主义就科学语篇应使用“白描式”语言的主张。其一,它的理论基础,即证实性原则(verifiability principle),本身就不具有说服力;其二,它预设了科学活动中收集和建立科学理论的感觉材料是中性的(neutrality of sense-data);其三,该观点显然认为隐喻和非隐喻之间的界限是泾渭分明的;其四,它没有考虑到有限的语言材料不可能充分照应纷繁无序的宇宙世界(chaotic world);最后,该观点没有认识到正常的人类思维本质——既呈解析型(digital)又是比拟型(analogic)。上述讨论表明,虽然我们不能否认白描式语言在科学语篇中的重要作用,但逻辑实证主义认为科学语篇只能使用白描式语言的观

点显然有悖于科学历史事实和理性的思考,因而是有失公允的。本章第二部分主要讨论隐喻在科学语篇中的体现方式,并创造性地将这些方式归结为具体化(concretization)、放大化(magnification)、缩小化(minimization)、动物化(animalization)、机械化(mechanization)、相互得益化(mutual-fertilization)和非专业化(de-technicalization)等方式。这些隐喻一方面促成了众多科学术语的诞生,使人类能在混沌之中把握相似性,并进而改变或构建一个全新的大千世界。因此,我们认为科学隐喻具有 Halliday 对语言划分出的概念功能(ideational function)。另一方面,这些科学隐喻可以减轻公众在接受、理解及运用全新的科学理论时花费的精力,显然有利于加强科学家和公众之间的“沟通或亲和”(solidarity)。有鉴于此,科学隐喻也具有 Halliday 提出的人际功能(interpersonal function)。在第四章的最后,我们将科学隐喻和文学隐喻进行比较,凸显科学隐喻在科学语篇中的特点。

本书第五章首先根据比较语言学、符号学和人类学等领域的研究成果,批判句法只是个逻辑范畴因而和语义无关的传统认识,旨在为 Halliday 的语法隐喻寻求更多的理论支持。Halliday 的语法隐喻理论的重要贡献在于它使我们认识到语法和人类切分世界即认识世界的紧密关系。然后,本章援引 Halliday 近年来的研究论文阐释自然语言中为何会具有语法隐喻现象,以及语法隐喻的表现方式及判别标准。在科学语篇中为数众多的语法隐喻以名词化(nominalization)和范畴化(categorization)等体现手段再现人类经验或重组人类知识,此为语法隐喻的概念功能。语法隐喻的语篇功能(textual function)在于科学家通过语法隐喻可以构思出具有逻辑性的连贯语篇。但是,本书有别于 Halliday 近年来对语法隐喻在科学语篇中的作用的探讨,研究了概念语法隐喻和人

际语法隐喻(诸如“引语”、“自问自答”和“客观性明显的情态隐喻”)的人际功能。本章通过分析这些科技语篇中的语法隐喻现象及功能,说明语言的建构性(constructivity)在一般以精确、客观自居的科技语篇中的作用,旨在提请人们注意所谓科学的归类对其思维方式或世界观的影响。

第六章在作出尝试性的结论之前,探讨了词汇隐喻和语法隐喻在科学语篇中的互补性。首先,科学语篇中的词汇隐喻(如 atom 是“miniature solar system”)和语法隐喻(如把过程表述为实体)都是对自然界现象常规描述方式的背离;第二,科学语篇中的词汇隐喻和语法隐喻的产生似乎都遵循着“从抽象到具体、化繁为简”的原则,共同构建出一个为现代人易于把握和操纵的现实世界;第三,词汇隐喻和语法隐喻不但分别是众多科学术语产生的主要机制,而且在为数不少的科学术语产生过程中呈现互补态势,如: a comma-free genetic code;第四,在词汇层面上的转义必然要求有语法层面上的转换与之呼应;最后,如果说词汇隐喻的人际功能在于影响公众对科学理论的接受,达到最终改变其世界观的目的,语法隐喻却使科学家形成“严谨、客观”的文体,达到语言霸权(linguistic hegemony)的目的。本章最后也指出了今后的研究方向,主要有以下几个方面:(1) 中国文化(如道教)对现代科学可能具有的促进作用;(2) 如果科学进步和隐喻紧密相关,那么科学教育和语言学的合作对科学理论的传授既有必要性也有可行性;(3) 科学语篇中体现科学家声音的语言形式还有待于更为系统的研究;(4) 借助功能语言学的语法隐喻理论研究汉语科学语篇中的语法隐喻现象,这对我国科学工作者的写作和翻译不无裨益。

# Foreword

With a brief introduction to the traditional conception of metaphor in scientific discourse, this book focuses on metaphorization of scientific discourse by touching upon the problems with the logical positivist stance, according to which "reality could, and should, be literally describable" (Ortony, 1979:1). The book takes as the point of departure the historical review of metaphor study (Chapter 2) and ends with a discussion of the complementary nature of lexical metaphor and grammatical metaphor in scientific discourse as a further indication of the necessity and essential functions of metaphor in the human cognition and cognizance of the chaotic reality (Chapter 6). On the basis of previous study of metaphor, this book adopts a sociocultural approach in the defense of the metaphorical nature in scientific theorization.

The historical review of metaphor study in Chapter 2 selects for a sketchy and critical analysis some influential metaphor theories that have so far been put forward from the ancient Greece to the contemporary era. We initiate our discus-

sion with Plato, whose Cave allegory suggests the inaccessibility of the ultimate reality to the human sense and perception and whose attitude to poets and metaphor indicates his strong opposition to the exclusive use of metaphor in poetry. His points of view can thus be rightly considered the theoretical background for the present logical relativism. The review of Aristotle's insights concerning the definition of metaphor, the relationship between metaphor and simile, and the use of metaphor makes it apparent that this Greek philosopher almost hits upon the cognitive role of metaphor. But his emphasis on poetic use of metaphor and the unteachability of the ability to metaphorize, coupled with the misunderstanding on the part of later Roman thinkers, is justifiably regarded as the theoretical basis for the later comparison and substitution theories we discuss in Section 2.3. The two theories, though interpreting metaphor in slightly different terms, both reduce metaphor to an ornament of language without any cognitive function and thus fail in the same way to show that metaphor affords different ways of perceiving. And their inadequacy is very likely derived from their resistance to the idea that the use of metaphor, or metaphorization, is primarily a process, not a product. Another depreciatory model of metaphor we examine is the TG view, which, conceiving of language as a set of rules, regards metaphor as violating the selection restriction. Our critical discussion under the heading TG View shows that the endeavors made by the Chomskyan theorists to look for new rules so as to reconcile their

theory with empirical facts — discernible even in their own discourses — are bound to be fruitless unless they will radically abandon their formalizing strategy in language study. Following these negative theories of metaphor are Black's interaction theory, the Lakoffian approach and Halliday's grammatical metaphor theory, the three essentially appreciatory models of metaphor. While we acknowledge Black's revolutionarily profound insights into the perplexity and cognitive value of metaphor, his conception of metaphor as symmetrical is singled out for critical comment. In this way, we declare our adherence to the cognitive metaphor theory proposed by Lakoff and Johnson et al in our subsequent reflections on the functions of lexical metaphor in scientific discourse. We offer a short introduction to Halliday's grammatical metaphor theory in the belief that the grammatical transference also exerts an enormous impact on the way we look at and construct the reality and that the theory will be of great value in accounting for the features of scientific language.

After laying a sound basis for the tentative proposition that both in terms of theorization and terminology, scientific discourse has to be metaphorical, we proceed to look into the relationship between science and poetry, and the relationship between science and rhetoric (Chapter 3) as a peripheral defense of the metaphoricality of scientific discourse. From the discussion, it is clear that what we call science is the reformed and more rationalized version of mythology (such as astrology and

alchemy), which prevails at the pre-scientific stage of human civilization, and thus interwinds with poetry both in terms of origin and cognitive function. The investigation into the rhetorical nature of scientific discourse indicates that the traditional isolation of science from rhetoric derives from a mistaken conception of science, which we can rightly define as an imperfect but perfectible social construction of the physical and non-physical reality, in the light of such philosophers of science as Bronowski, Polanyi, Ziman and Kuhn. Therefore, rhetorical devices such as metaphor (lexical and grammatical) do play an important and even indispensable role in the scientific enterprise. In order to show the contribution of rhetoric to those conclusions about the world which we regard as "knowledge", we have recourse to Darwin's *The Origin of Species* for illustration. The arguments we state in the third chapter pave the way for our defense of the necessity and functions of both lexical and grammatical metaphor in scientific discourse in Chapter 4 and Chapter 5.

Chapter 4 begins with the refutation of the literalism. The first problem with literalism lies in the untenable verifiability principle advocated by logical positivism. Secondly, it entails the neutrality of sense-data, which is impossible in actual scientific practice. Thirdly, it presupposes a clear demarcation between the literal language and the metaphorical language, which Lakoff et al (1989) and Halliday(1985) have theoretically torn to shreds. Fourthly, it does not take into account the



insufficiency of the reservoir of literal expressions as compared with the kaleidoscopic richness and complexity of the reality. Last but not least, it fails to recognize the essential nature of the normal human thinking, which is both digital and analogic according to the findings of cognitive scientists and clinical experiments. These arguments indicate that the logical positivists have unwittingly assumed the primacy of literalness in scientific discourse. On the basis of such considerations, we tentatively categorize the lexical metaphor in scientific discourse into seven *modi*, namely, concretization, magnification, minimization, animalization, mechanization, mutual-fertilization and de-technicalization. These types of lexical metaphors are obviously an important linguistic means available to the scientist to coin technical terms, revise the ways we look at the reality and ultimately construct a new world for mankind. And no less importantly, by having recourse to these *modi* of lexical metaphor, the scientist requires minimal cognitive processing and expenditure on the part of the reader so as to appropriate, apply and “consume” profound insights that the scientist gains into the kaleidoscopic flux of the reality. Therefore, we categorize the functions of lexical metaphor as both ideational and interpersonal. At the end of the chapter, we also look into the features of scientific metaphor as compared and contrasted with metaphor in literary discourse.

We start Chapter 5 by criticizing the proposition held by the mainstream linguistics that syntax is simply a matter of logic