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英汉学术语篇比较与翻译

Comparison and Translation of Academic English and Chinese Discourse

研究生英语精品教材

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内容提要

本书比较了英汉学术语篇的模块结构、段、句与词的共性与差异,并依据学术语篇思维、语言与文化差异等特征探讨了英汉学术语篇互译的技巧与策略。全书共分5章,第1章概述了英汉学术语篇的模块特征及影响英汉互译的要素;第2章比较分析了英汉学术语篇的概念与词汇特征,进而揭示了英汉学术语篇概念与词汇的翻译技巧与策略;第3章分析了英汉学术语篇句的篇章结构与特征,以及强调句的篇章结构与互译技巧;第4章从篇章思维的角度解析英汉学术语篇的结构与语言异同,重点分析了翻译中英汉学术语篇的衔接与连贯手段;在前4章比较了英汉学术语篇的摘要、引论和文献综述的基础上,第5章重点比较英汉学术语篇的方法、结果与讨论,以及结语的异同,从而为互译提供借鉴和指导。

前　言

　　《英汉学术语篇比较与翻译》编写组通过对本科生和研究生英语写作和翻译情况的多年分析和研究,发现达到大学英语四、六级水平的学生,尽管掌握了丰富的英语词汇和基本语法知识,但其英语写作和翻译技能仍比较薄弱,尤其是说明文、议论文的写作和翻译,普遍存在双语"比照互译"现象。为此,本书围绕英汉学术语篇的比较与翻译,从篇章对比、翻译实践、例文和翻译训练等方面组织各章内容,以满足本科生和研究生学习与提高中高级英语翻译技能的需要。

　　本书的主要适用对象为本科生和研究生,以英汉学术语篇比较和翻译技能案例教学及实训为主,旨在以英汉学术语篇的实证性和逻辑性特征为基础,结合学生的专业学习背景,培养学生研究型和发现型学习的学术思维能力和语言表达能力。从英汉学术语篇的模块结构,词、句特征,衔接和连贯手段等方面培养学生的英汉学术语篇差异意识,训练其学术交流和创造性语言的应用能力。

　　本书共分5章,各章内容均涉及英汉学术语篇的结构、语言对比和翻译技能,由语篇对比、语言差异解析、翻译技巧和训练等部分组成。第1章为绪论,包括英汉学术语篇的模块结构,词、句特征,中西方文化差异,思维与双语意识等对翻译的影响;第2章探讨英汉学术语篇中概念词特征的比较与翻译以及摘要的比较与翻译;第3章以英汉学术语篇中句的比较与翻译为研究重点,分析英汉学术语篇中句的结构与翻译技巧,解析引言的篇章特征与翻译;第4章从篇的角度讨论英汉学术语篇的思维与翻译,强调篇章整体的衔接与连贯,并比较了文献综述的特征与翻译;第5章对比分析英汉学术语篇中方法、结果与讨论、结语等方面的特征与翻译。

　　本书中每章内容都围绕语篇对比和分析展开,对翻译知识和技能进行实

证性的讨论和描述。鉴于中高级英语学习者,尤其是研究生阶段英语学习者的需要,本书所取篇章和例子均来自编写组对不同学科英汉学术期刊、论文的认真采集和分析,从学术的视角探讨翻译的案例教学和翻译训练,以促进学生英汉学术语篇翻译技能的培养和提高。

为巩固和训练学生的英汉学术语篇的互译技能,本书从学术语篇概述,学术语篇词、句特征,衔接和连贯,句式变化,篇章翻译和模块内容翻译等方面编排训练内容,以期从篇章差异意识、基本技能训练等方面发展学生英汉学术语篇的互译能力。为巩固和丰富学生英汉学术语篇的结构及语言异同认知,本书选取了不同学科的专业学术论文展开比较与翻译训练,以适应不同学科的翻译教学与学生翻译实践的需要。

本书是编写组对宁波大学十余届研究生的英语写作与翻译技能进行连续跟踪调查研究的成果。本书内容的选取和编排充分考虑到了中国学生的学科知识表征和英语学习规律,依照心理语言学和认知语言学的学习观,优化了内容,强调了中高级学术语篇翻译技能的学习和训练。

本书由杨新亮策划和组织总体内容、编排与审校,熊艳编写第 1 章,应葳编写第 2 章,柳旦编写第 3 章,杨莹编写第 4 章,邓金莲编写第 5 章,杨建华负责各单元练习的编写和审校。本书的编写过程得到了宁波大学外语学院大学外语部诸多同事的指导和帮助,在此向他们表示由衷的感谢。同时也向为本书的基础理论和可行性研究提供帮助的宁波大学历届研究生表示谢意。本书得到了宁波大学 2011 年研究生重点教育改革项目"研究生学术英语写作与翻译教学研究"和 2013 年编号为 ZDKC2013006 的研究生重点课程建设项目基金的支持。

由于本书内容丰富,信息含量大,语料领域广泛,编著过程中难免出现不妥之处,敬请读者指正。

本书编写组

目 录

绪　论

1.　引言

　　翻译是一个复杂的思维认知及语码转换过程,此过程中的意义解析、推理、词汇检索、联想、译语表达等都会受到译者的知识、社会背景及语言文化差异、思维定势等要素的影响。英汉学术语篇作为一种特殊的篇章形式,具有其独特的文体特征和表意规律,国内外专门用途英语、学术英语、语篇分析、文体学、翻译学等领域对学术语篇结构、信息分布、概念形式、词句特征等方面的研究表明,英汉学术语篇既有共性又有各自的特质,而对译者产生影响的往往是这二者所存在的差异。因此,译者必须具有英汉学术语篇的结构及语言特征知识,了解其共性和特质,从而更好地建构英汉学术语篇的差异意识,更好地利用不同的翻译技巧处理英汉学术语篇的互译。本章将简要介绍英汉学术语篇的结构特征、影响英汉互译的要素及差异意识的作用。

2.　英汉学术语篇的模块结构

　　当今,日益频繁的国际学术交流促进了中西学术写作的相互学习与借鉴,由此产生的学术语篇结构也日趋吻合。从宏观上看,题目、摘要、引言或绪论、文献综述、方法、数据、结果与讨论、结语等模块构成了英汉学术语篇的重要组成部分。从微观上看,论题背景、引题、观点陈述、定义、阐释、例证、对比、推理、分类、评论等要点信息贯穿语篇的整个过程,构成了语篇的重要行文特征和要素。把握英汉学术语篇的这种共性的框架结构和信息要点有利于实现两种语篇的语言模块对应,从而把握翻译的宏观与微观层面的结构规律和表意需要。例如:

　　Intercultural competence fundamentally influences the performance of international companies in several significant ways. Management research **considers** intercultural competence as an important condition for the success of intercultural business relationships and performance in foreign markets, in the areas of expatriation (Black, 1990; Clarke & Hammer, 1995; Bilkey & Tesar, 1977; Müller, 1996; Reid, 1980), customer-supplier relationships (Bush et al., 2001; Usunier, 1997), and

efficient interaction within multinational companies (Ralston et al., 1995). Consequently, intercultural competence can be a strategic organizational competence for multinational companies (Eubel-Kasper, 1997; Klimecki & Probst, 1993; Iles, 1995; Saner et al., 2000): "The intercultural competence of individuals and organizations has a high economic impact which becomes obvious in a multitude of situations." (Gauthey, 1998: 15)

Yet, while the importance of intercultural competence has been pointed out many times, **its development and transmission within organizations has not been established clearly.** Specific barriers to intercultural competence include several challenges. Recruitment of inter-culturally competent people is not always possible. Management training, based on conferences, seminars and readings (Peretti, 1993: 172), and coaching (Barmeyer, 2000), is considered too expensive or inefficient by many top managers. Furthermore, the focus on cultural differences and culture-specific problems can be dangerous, for it sometimes increases prejudices and reinforces a stereotyped world-view (Chevrier, 2000; Gohard-Radenkovic, 1998). Thus, managers find themselves in an "evident impossibility to act" (Bosche, 1993: 265) concerning intercultural competence.

这是 Anne Bartel-Radic 在 *Management International Review*(2006)上发表的论文 *Intercultural Learning in Global Teams* 的引言部分。其中第 1 段为学术研究背景,以一般现在时的形式陈述现有的学术观点,而第 2 段的开头以 yet 转折的形式引题,指出现有学术研究的缺陷,从而引出其文章的相关论题内容。第 1 句用完成时,后续论题内容用一般现在时。再如:

Researchers studying public representations of science **have stressed** that biology, and molecular biology in particular, **has recently become** of great public interest. Jon Turney, for instance, in his reconstruction of the history of popular images of biology, **underlines** that this subject is currently enjoying the same renown that once characterized physics. Richard Lewontin, author of several treatises on the social repercussions of biological research, **notes** that in 1958, one year after the Sputnik was launched, Isis and Philosophy of Science dedicated but two articles to biology, whereas the discipline currently boasts two specialized journals, *Biology and Philosophy*, and *the Journal of the History of Biology*. Dorothy Nelkin, who **has been** studying the relationships between science and mass media for years, **maintains** that the gene has become a cultural icon, to be rated among the main causes of social and political

phenomena. Lastly, Massimiano Bucchi **points out** that, economically speaking, molecular biology is currently attracting a large percentage of the investments in Big Science.

Other signs coming from specialized literature **support** the centrality of molecular biology and **show** how the study of DNA, which began towards the end of the 1940s, gradually captivated the attention of the scientific world. In 2002, both the Nobel Prize for chemistry and the one for medicine went to studies on the form and development of organic molecules. In the same year, publications on genetic switches achieved the top three positions in Science's annual top ten scientific studies.

Considering all this, and since in our era public opinion influences research policies, **it is interesting to see** whether the centrality of genetics and biotechnologies in the scientific and sociological scenario is mirrored in the mass media as well. The mass media are the forum that is socially dedicated to the discussion of science and the main source of information on research for the majority of people. Besides, they perform a catalysing function as regards public opinion: as McQuail **points out**, not many people can remember an occasion when they formed an opinion or obtained an important piece of information without the media.

The present article follows this line. It **illustrates** the results of a quantitative investigation which **means** to determine the incidence of genetics and biotechnologies on the whole of science communication; it also means to identify the main thematic areas which could become the object of further qualitative studies on the frames used to present the news to the public. The statistics employed in the article **refer to** the 590 newspaper issues published by the five Italian daily newspapers with the widest circulation in the last third of 2002; i.e., in a period of time comprising months of ordinary scientific news (from September to November) and a month of front-line news (December).

此例为 Silvio Mini 于 2005 年 9 月在 *Journal of Science Communication* 发表的论文 *Genetics and Biotechnologies in Italian Mass Media* 的引言部分。其中的前两段为研究背景,第 1 段以完成时和一般现在时为主,第 2 段以过去时为主。后两段为引题和论文结构布局,以一般现在时为主。文中黑体部分的 *stressed, underlines, maintains, illustrates, points out* 等为观点陈述类表意词汇,这些词构成英语学术语篇观点引述的重要词汇群,与汉语学术语篇的观点引用中的"强调""认为""说""表明"等对应。

从对比的视角看英汉学术语篇的结构,可以简要把握英汉学术语篇的共性

与差异,从而培养译者在翻译中的差异意识,更好地利用共性要点进行翻译。例如:

> **近年来**,心理词汇已成为心理语言学研究的一个热门话题,涌现出大量的有关心理词汇的研究。总体而言,这些研究大都以母语心理词汇为研究对象,因为学者们想当然地**认为**二语心理词汇的储存、运作方式与母语心理词汇大致一样。然而问题是,这两者的储存、运作方式真是一样的吗?

> 最早对两者之间的差异感兴趣的学者之一是 Paul Meara(1982;1984)。他的研究**得出下列结论**:①二语心理词汇中的词汇联系不像母语心理词汇中的词汇联系那么稳定;②语音在二语心理词汇中起的作用更大;③二语心理词汇中的语义联系与母语心理词汇中的语义联系有系统的差异。

> **然而**,遗憾的是,Paul Meara 并没有进一步研究二语心理词汇与母语心理词汇之间到底有什么样的系统性差异。这正是本研究的出发点。(张淑静,2005)

> 自我效能感(Self efficacy)是班杜拉社会认知理论的核心概念,是指人们对个人行动控制的知觉或主导,即指人们对自身利用所有技能完成某项工作行为的自信程度。自我效能感在自我调节系统中起主要作用,它不仅影响个体的情绪状态,还会影响个体的主观幸福感、成就动机等,是学校心理健康教育研究的重要课题。**以往大多数研究**集中于研究一般自我效能感与其他心理特征,如情绪反应、学习适应等之间的关系等方面,对于提高大学生的一般自我效能感的**干预性研究较少**。**本研究**尝试运用团体辅导的方式对医学生群体自我效能感进行辅导,以期改善大学生的一般自我效能感状况,并为促进和提升医学生的自信心和心理健康水平提供科学的研究依据。(赵淑娟等,2010)

从上述两篇汉语学术语篇的引言可以看出,汉语学术语篇引言中重要内容的结构布局与英语学术语篇的引言具有一定的共性,即包含学术背景、问题评述与引题等。汉语依靠"近年来""以往"等时间词指示文献背景,动词没有时态的变化,这正是译者需要注意的英汉差异所在。在英汉学术语篇互译中,译者必须恰当地调整译文结构与表达方式,以达到译文信、达、雅的标准要求。

在英汉学术语篇的文献综述、方法、数据、结果、讨论与结语部分,译者同样可以通过对比分析洞察各内容模块的语言特征,并从中归纳二者的共性和差异,为英汉互译提供框架基础和词汇群基础。相比较而言,英语学术语篇更具模块性,常用 *introduction*, *literature review*, *method / methodology*, *result and discussion*, *conclusion / concluding remarks* 等作为论文各模块的语言标示,而汉语学术语篇既有引言、绪言、导言、文献综述、研究方法、结果与讨论、结语、结束语等与英语学术语篇类似的语言标示词,同时也常用模块论题内容概述作为模块分标题,这在社会科学的学术语篇中更是常见,文学、商学、政治学等学科的学术语篇常用内容概述的形式标示语篇框架结构。

3. 英汉学术语篇的专业知识背景

学术语篇的目的在于阐释或论述作者对自然及社会科学等领域相关的专业研究与发现，涉及学科和专业面广泛。对外语专业和不具备专业背景的译者而言，学术语篇中的专业知识就是一个翻译难题，甚至是障碍，妨碍译者对文本的解读和翻译。例如：

Present and future **supercomputers** offer many opportunities and advantages to attack complex and demanding industrial and applied mathematical problems, but also provide new challenges. In the **Peta-Flops regime**, these concern both the way to exploit the increasingly available power and the need of designing **algorithms** which are **scalable and fault-tolerant** at the same time. An example of **a probabilistic domain decomposition method**, which is indeed scalable and naturally fault-tolerant, is presented. **Grid computing** should also be mentioned as an increasingly popular way to perform **massively distributed computing**: It represents a way to exploit computing power, aside the existing supercomputers. Beyond **classical supercomputers** there is the prospective **quantum computer**, in view of which it is advisable to start now a search for suitable **algorithms** for certain classes of problems.

The most powerful machine till early in 2004 was the Japanese **Earth Simulator**, a large-scale "**parallel vector**" supercomputer, in the line of **vector computers** similar to the Cray's, and equipped with 5 120 **CPUs**, organized in 640 **8-ways nodes**, and capable of 8 **G Flops** (Giga Flops) per CPU, hence 41 **T Flops** (Tera Flops) in total. It was based on groups of few powerful **vector systems**.

In June 2004, IBM's **Blue Gene/L prototype** came into operation, and scored in TOP500 Supercomputer List (which is based on a **Linpack benchmark**) at the 4th and then 8th position. In September 2004, it overtook the NEC's Earth Simulator, reaching a speed of 36.1 **T Flops** (against the 35.83 T Flops of the Earth Simulator).

以上几段例文中的加粗概念词对非计算机学科的译者而言是很难理解和翻译的，其专业性表达需要译者具备特定的专业背景知识和掌握丰富的专业概念词群，因此以英语为程序语言的计算机科学课程的中文教材、著作中会保留大量英文术语概念和公式。

一般而言，社会科学类的学术语篇的专业性低于自然科学类的学术语篇。

文化、教育、政治、社会等方面的知识作为个体人文素养的重要内容,在语言上有一定的共享性。而天文、地理、经济、数理、医学、军事、心理等学科知识由于其专业性与自然性,在语言上有很强的独特性,具有丰富的学科和专业术语。例如:

The popularity of digital technology drives the use of digital resources and communication tools for learning in school education. To benefit from this type of digital learning, learners need inquiry and critical thinking skills to select and process useful and reliable information from varying sources for learning. Learners also need communication and collaboration skills to communicate and collaborate with their peers to complete tasks and share outcomes. These skills are fundamental components of 21st century skills, which empower learners to successfully acquire knowledge and advance learning in the 21st century. It is therefore foreseen that the learning goals of school education in the coming 10 years need to address the development of 21st century skills beyond curricular goals of learning domain knowledge.

A few adiabatic logic families using a single-phase power-clock have been reported, which have easier generator. TSEL and SCAL circuits use a single-phase power-clock, but the additional reference voltage and current increase the design complexity, since they are difficult to design due to the optimal value of reference voltage concerning about clock frequency. The CAL (Clocked Adiabatic Logic) circuits can also use a single-phase power-clock by introducing an auxiliary clock signal. Because of the simple structure, CAL circuits are easy to design for realizing complicated circuits. However, the auxiliary clock signal doesn't work in an adiabatic manner, resulting in large energy loss because of large switching capacitance on auxiliary clock lines.

From another point of view, real-time video communication is becoming popular these days due to the prevalence of smart devices. Since real-time communication requires low delay operations of the video encoder and decoder, prediction from future pictures is not allowed. In AVC/H.264, the low delay constraint was usually met by using P pictures instead of B pictures, losing the compression performance benefits from bi-prediction. In HEVC, however, a new type of B picture, the Generalized P and B (GPB) picture, has been introduced to preserve low delay operations while providing increased coding performance. A GPB picture is still a bi-predictive picture, however, it only allows

prediction from past reference pictures.

随着现代词典编纂技术及机器翻译技术的发展,对于不同专业的译者而言,专业概念翻译的难度已大幅度降低。英汉学术语篇的互译难题主要在于对英汉语差异度的把握和普通表达式的互译。对于具有专业背景的译者来说,其专业知识有助于其对文本论题及概念词群的理解和翻译。在信息技术发达的今天,专业性词典日益细化,词汇日益丰富,因此,译者对专业类概念词群的把握会更加便捷和准确。翻译中的困难往往在于文本中非专业术语的表达,如动词的时态、情态助动词、形容词、副词、介词短语等修饰性结构以及句子的层次关系等,这些方面往往是英汉语差异较大的地方,也是译者需要谨慎对待的地方。

4. 英汉学术语篇的词、句特征

就语言层面而言,学术语篇具有特有的文体和语言风格。英汉学术语篇在段、句、词汇等方面存在一定的共性,如都包含学术性论题鲜明的段落、信息负荷大和逻辑关联性强的长句、与论题相关的概念词群等。但同时又有很大的差异,如英语学术语篇中段落的论题、句群结构更清晰,其词汇的派生性、词汇衔接等语言形式手段更丰富,而汉语学术语篇往往重在叙述和阐释,概括性结构多于实证性结构,句子主语往往省略,连动结构多,论题概念重复多,缺乏派生衔接手段。这些差异需要译者在长期的英汉翻译训练中加以注意,以增强英汉学术语篇的差异意识。

比较下列英汉学术语篇的词、句特征:

Climate change is an important factor in determining the past and future distributions of biodiversity. In the ocean, the pattern of marine species richness, notably for fish and invertebrates, is strongly related to environmental factors. Also, observations and theory suggest that marine species respond to ocean warming by shifting their latitudinal range and depth range. Such species responses may lead to local extinction and invasions, resulting in changes in the pattern of marine species richness. For example, in the North Sea, species richness of fish fauna increased from 1985 to 2006, which was related to large-scale biogeographical patterns and climate change. Overall, changes in pattern of species richness may disrupt marine biodiversity and ecosystems, and impact commercial fisheries. Here, local extinction refers to a species ceasing to exist in an area although it still exists elsewhere, while invasion refers to the expansion of a species into an area not previously occupied by it.

Previous attempts to investigate climate change effects on marine species dealt with limited taxa and on specific regions. A review of recent

literature on quantitative analysis of the effect of anthropogenic climate change on community assemblages or distributional range of marine fish and invertebrates shows that the majority of the reviewed papers focus on a regional scale (e. g., North Sea, coast of Britain and California). Most of the regional studies took place in North Atlantic, Northeast Pacific and the Mediterranean. The few (two reviewed papers) studies on ocean basin scale (e. g., North Atlantic Ocean) and global scale focus on limited taxa. The lack of large-scale study that encompasses a wide array of marine species is in contrast to the situation prevailing in the terrestrial realm. Particularly, climate change impacts on marine biodiversity are likely to intensify in the future, with the intensity of impacts differing geographically according to changes in ocean conditions and sensitivity of the species. Thus, a global perspective on the impact of climate change on a wide range of marine species is urgently needed to obtain a more complete picture of the climate change problem. This is the primary objective of this paper. Bioclimate envelope models, alternatively called environmental niche models, have been widely used to predict distributions of plants and animals. A bioclimate envelope can be defined as a set of physical and biological conditions that are suitable to a given species. Thus, shifts in species distributions can be predicted by evaluating changes in bioclimate envelopes under climate change scenarios.

气候变化是引起生物多样性变化的重要因素。在海洋生态系统中,物种丰富度(尤其是鱼类和大型无脊椎动物)的分布与环境特征息息相关。许多理论和实践表明,全球变暖影响海洋生物在纬度和水深层面上的分布。这将导致某些物种在特定水域消失,而另一些物种得以成功入侵,进而改变该水域的物种丰富度。例如,全球变暖造成 2006 年北海水域鱼类丰富度比 1985 年显著提高。总的说来,物种丰富度分布格局的改变将会对生物多样性和生态系统造成负面影响,影响正常的渔业生产。本文所讲的区域性灭绝是指某些物种在特定水域的消失,而在其他水域仍有分布。物种入侵是指某些物种大量进入某些以前没有分布的水域。

此前有关气候变化对海洋生物的影响的研究多局限于有限水域(如北海、英国沿海、加利福尼亚沿岸)和特定物种。仅有两项研究是在大洋(东北太平洋)或全球层面上较为系统地研究了某些特定生物类群(桡足类和鲣鱼)对于气候变化的反应。与陆地生态系统在该领域内的研究相比,海洋生态系统在该领域内的研究欠缺在大尺度、多种类层面上的研究。在未来一段时间内,气候变化对于生物多样性的影响有进一步加剧的趋势;同时,鉴于不同水域气候变化的幅度以及各物种对气候变化的敏感程度不同,不同

水域的响应方式将有所区别。

故此,有必要在全球层面上研究气候变化对海洋生物多样性的影响方式。生物气候分室模型(Bioclimate envelope models),或称为环境生态位模型(Environmental niche models),现已被广泛应用于动植物时空分布的预测。生物气候分室是指适于某特定物种生存的生物、物理条件。研究气候变化对生物种群空间分布的影响可通过研究生物对气候变化的响应来加以确定。

生物气候分室模型在应用过程中存在诸多假设和不确定性,例如,该模型没有考虑生物间的相互作用、物种进化以及种群扩散等因素,仅假设物种的分布与外界环境存在确定的对应关系。尽管如此,该模型仍是目前为数不多的能够有效预测由物种地理分布改变引起的生态系统结构和功能变化的模型之一。大量实践表明,该模型的预测结果与实际观测结果较为相符;此外,该模型还可通过加入种群扩散、变化等模块加以改进,因此该模型可为气候变化对生物多样性的影响预测提供第一手资料。

从句子层面看,汉语学术语篇广泛使用并列的散句结构,无主句较多,而英语学术语篇句子结构完整,上下文语句依靠严谨的词汇和语法手段实现主题连贯和形式衔接,被动句使用广泛。英语学术语篇的长句结构与汉语学术语篇的多句并列结构都比较普遍,从而给互译带来难题。

从词汇层面看,英语学术语篇以名词结构为主,广泛使用名词化结构,而汉语学术语篇以动词结构为主,有大量的连动结构。英语词汇有时态的变化,专业性词缀丰富,尤其是理工科学术语篇,其专业类概念很大程度上是依靠词缀变化构成的,而汉语是以字构词或词合成组词的,缺乏时态和词缀手段。

比较下列英汉学术语篇的词汇特征:

本研究表明,气候变化将影响海洋生态系统生物的多样性和群落结构。结合陆地生态学的研究成果,我们认为海洋生物多样性和陆地生物多样性对于气候变化的响应具有一致性,特别是在极地和热带水域。与陆地生态系统相似,海洋生物多样性同样受到诸多人为干扰因素的影响(诸如过度捕捞、环境破坏和水域污染等)。气候变化可能放大这些因素对生物多样性的影响程度。海洋生物群落结构及其多样性的变化将影响捕捞活动的运作形式,可能给业已脆弱的近海生态系统带来更多的灾难。故此,亟需减少温室气体的排放量,降低人为引起的气候变暖的幅度,并形成行之有效的海洋管理方案以应对气候变化对生物多样性的影响。同时,应尽量降低过度捕捞、水域污染等因素的干扰,以恢复生物机体及生态系统的结构功能,适应气候变暖对其造成的影响。

In this research, we focused on two specific questions within a general framework of learning with multiple external representations.

The first question was whether the form of visualization influences the structure of mental models and, as a result, the pattern of performance when individuals have to solve tasks after knowledge acquisition on the basis of their previously constructed mental models. The second question was whether the availability of a further external representation when solving tasks after knowledge acquisition will modify the influence of the form of visualization on the learners' patterns of performance resulting from the different structures of mental models acquired during learning. Our results indicate that the form of visualization affects the structure of the mental model constructed during learning, which in turn influences the patterns of performance that individuals show after learning. However, these effects are significantly reduced if further external representations are available during the usage of the acquired knowledge.

英汉学术语篇强调论题阐释、论述、说明等的客观性,大量及物动词要求其施动者为代表生命体的名词或人称代词。汉语学术语篇以零主语句居多,可以避开人称代词的使用,而英语学术语篇的句子一般都需要有主语。因此,英语学术语篇就有了许多无生命词或抽象名词作主语的情况,而且常采用被动句结构以规避人称代词的使用。但是,在汉语学术语篇中却尽量避免使用被动句或使用隐性被动句。例如:

The specific way in which internal and external representations interact in solving tasks during knowledge acquisition **is not sufficiently** clarified yet. The table used in our experiment, for example, could function as an additional external database, which allows learners to create their own mental model according to the task at hand and, thus, become less dependent on their previously constructed mental model. Another possibility is that the external representations helps to translate one representation into another representation. Ainsworth et al. (2002) have pointed out that a key issue in using multiple external representations appropriately is the successful translation between different representations. If this notion **is applied** also to the interaction between external and internal representations, the use of a table presented during task performance could also function as an aid for the translation of a carpet model into a circle model and vice versa. This issue requires further investigation. **Further research is also needed** regarding the interaction between other formats of external representations used during the application of knowledge and the formats used previously in the acquisition of knowledge. Finally, further research **is needed** regarding the question to what extent the