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A Multimodal Study on the Image-text Relations in Medical English Textbook

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Abstract: With the advancement of globalization and information technology, the importance of multimodal teaching and learning of medical English has become increasingly prominent. Based on Martinic and Salway's status relations system, this paper studies the image-text relations of the medical English textbook "Medical Terminology: An Illustrated Guide"(The 8th edition)(2017). All the 256 images in this textbook were analyzed and classified according to the status relations. It has found that in each part as well as the whole textbook, from the perspective of the status relations, the complementary image-text relation is the most frequently identified, which is in accordance with the gradual complexity of the textbook. The setting of the relationship between images and texts in the textbook has a certain rationality and scientificity, which shows that the reasonable preparation and selection of images can better assist medical students in learning medical English terminologies, and can also provide beneficial guide for the compilers to design the medical English textbooks.

Keywords: Multimodal Theory, medical English textbook, image-text relations, status relations.

1. Introduction

With the development of the information and technology, the language learning and teaching has gradually shown a multimodal characterisitcs. And the Multimodal Theory is widely used in the field of educaiton, among which the study of image and text has always been the core of the multimodal research. Halliday (1985: 306-3077) has shown how logico-semantic relations recur throughout the lexicogrammar. A systematic and comprehensive grammatical framework for analyzing multimodality in visual images was proposed by Kress & Van Leeuwen(1996) in the mid-1990s. According to them, multimodality refers to all channels and media involved in the communication process, including color, image, music, color and other semiotic systems, in addition to the basic linguistic symbols encountered in life. Martinec and Salway's (2005) system for the semantics of image-text relations has two subsystems that combine independently, status and logico-semantics. In China, Fangben Zeng (2010) introduced the theory of image-textual relations for the first time. Nini Xie (2014) took Martinec & Salway's image-textual logical semantic relations system as the theoretical basis, and proposed a framework for studying image-textual relations in "Grimm's Fairy Tales" from the perspective of interpersonal meaning. While most of the previous studies focus on the applicability of the logico-semantic relations, this research will mainly deal with the status relations.

This study tries to analyze the relationship between images and text based on Martinec and Salway's (2005) image-text relation framework, and selects the textbook "Medical Terminology: An Illustrated Guide" (The 8th edition) (2017) edited by Jones & Bartlett Learning as the research object. The textbook has been an important referential textbook for the medical students in China, which contains rich image resources and is accompanied by brief text descriptions, and thus can be acted as a representative sample for the current study.

2. Research Questions

This study attempts to understand how images and texts complement each other to convey complex concepts effectively, and the research questions are as following:

(1) Of all the images in "Medical Terminology: An Illustrated Guide", what is the predominant relation between text and visual images in terms of the status?

(2) In the three parts of this book, are there any differences in the proportion of different status relations?

(3) What is the enlightenment of the current research on medical English teaching and textbook designing?

3. Data Collection and Description

There are a total of 256 pictures, photos and diagrams in the textbook, and 29 of them have no further notes beside them and are only black and white diagrams depicted for students to recite the medical words, without any image meanings (as in Figure 1). Therefore, they are regarded as the invalid data for the research. And the effective picture rate of the image-texgt relations in the whole book is about 88.7%.

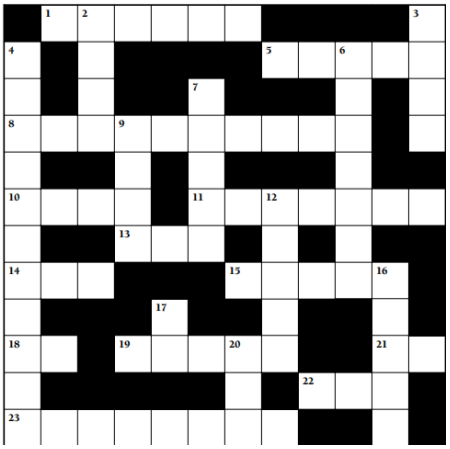

Figure 1. Sample of the Invalid Data (Barbara, C. & Ann D., 2017: 351)

The content of the textbook is mainly divided into three parts: Introduction to Medical Terminology (Chapter 1-5), Disease and Treatment (Chapter 6-7), and Body Systems (Chapter 9-21). Each part has different focus and emphasis, which can also be reflected in the relations between images and text.

3.1. Introduction of the Status Relations

Barthes (1977) identified three possible image-text relations: text supporting image ('anchorage'), image supporting text ('illustration'), and the two being equal ('relay'). A similar but much more systematic distinction between status and logico- semantic relations was made by Halliday (1985), and the status of the clauses in the clause complex is thus equal or unequal and, at the same time, they are related by logico-semantic relations of expansion and projection. By integrating Barthes' categorization of image-text relations with Halliday's logico-semantic relations, Martinec and Salway(2005) proposed a dual image-text relation framework, namely, the status and logica-semantic relations. For the limite space, the current study only fucuses on the status system.

According to Martinec and Salway(2005:342-343), images and texts are considered to be unequal in status when one of them modifies the other, and the modifying element is considered to be dependent on the modified one. Equal status between images and text is further divided into independent and complementary, An image and a text are considered independent and their status equal when they are joined on an equal footing and there are no signs of one modifying the other. When an image and a text are joined equally and modify one another, their status is considered complementary. With this as a framework, the following part will focus on the descripion of the status relations in the selected medical English textbook.

3.2. Description of the Status Relations

The distribution relationship of images and text in these three sections will be analyzed one by one, and after the analysis of the individual parts, there will be a comprehensive analysis following them.

3.2.1. Description of the Status Relations in Part 1

The analysis will first focus on the status relations in Part 1 Introduction to Medical Terminology, in which 3 invalid illustrations are excluded. As shown in Diagram 1, in this part there are 31 illustrations in total, among which the proportion of equal illustration-text relationship is about 58%, and that of unequal illustration-text relationship is about 42%.

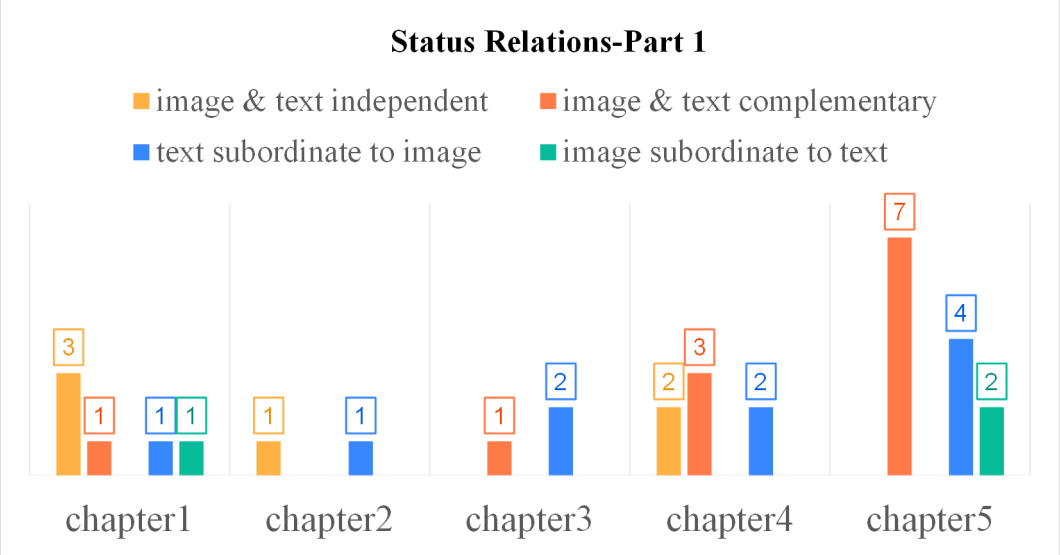

Diagram 1 Image-text Realations (Part 1)

The numbers of these two categories are roughly equal, which may due to the reason that Part 1 is mainly functioned as the introductory part, laying the groundwork for the learning of medical proper nouns and technical terms. There is no complementary relationship between the derivative, prefix and suffix of words, and they are mainly independent.

3.2.2. Description of the Status Relations in Part 2

As shown in Diagram 2, in Part 2 Disease and Treatment, there are 23 images, and all of which are valid for the study, among which the proportion of equal relationship between images and text is about 96%, and the proportion of unequal relationship is 4%.

It can be clearly seen from this part that the content of the book is gradually becoming more and more professional, that is, it is related to more medical professional knowledge, so it is necessary to understand the text with the aids of pictures. Complementary images and texts indicate that the images and texts are inseparable, images can be employed as a supplement to the texts, and texts can also play the role of supplementing the images, and both are equal in status, thus without either one of them, the meaning cannot be completely expressed and understood by students.

3.2.3. Description of the Status Relations in Part 3

As shown in Diagram 3, Part 3 Body Systems contains 13 chapters. With 26 invalid illustrations are excluded, and there are 173 valid objects in total, among which the proportion of equal relationship between illustrations and texts is about 85%, and the proportion of unequal relationship is about 15%. (See Diagram 3)

This part focuses on the studies of the health, disease status and treatment methods of the body system based on the previous two parts. Compared with the previous two parts, this part tend to be the most complex one, so a larger number of images are ncessary to help students understand and memorize the normal or abnormal pathophysiological states. Another characteristic of this part is that many after-class

exercises requiring text-illustration correspondence are added, which leads to a certain number of unequal relationship between illustrations and texts.

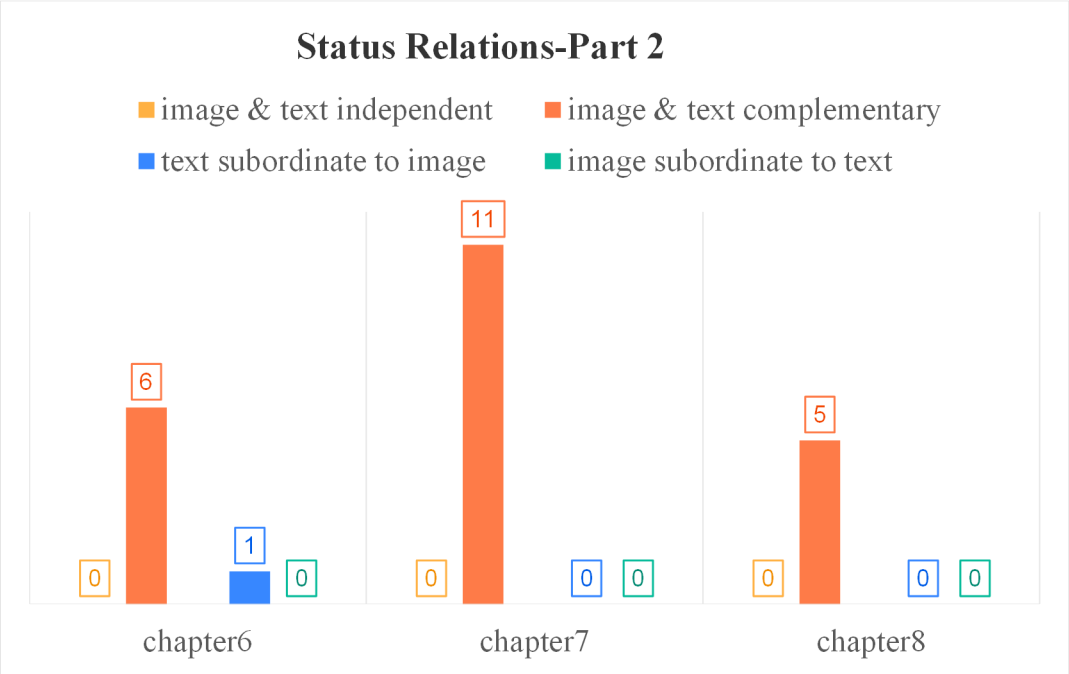

Diagram 2 Image-text Realations (Part 2)

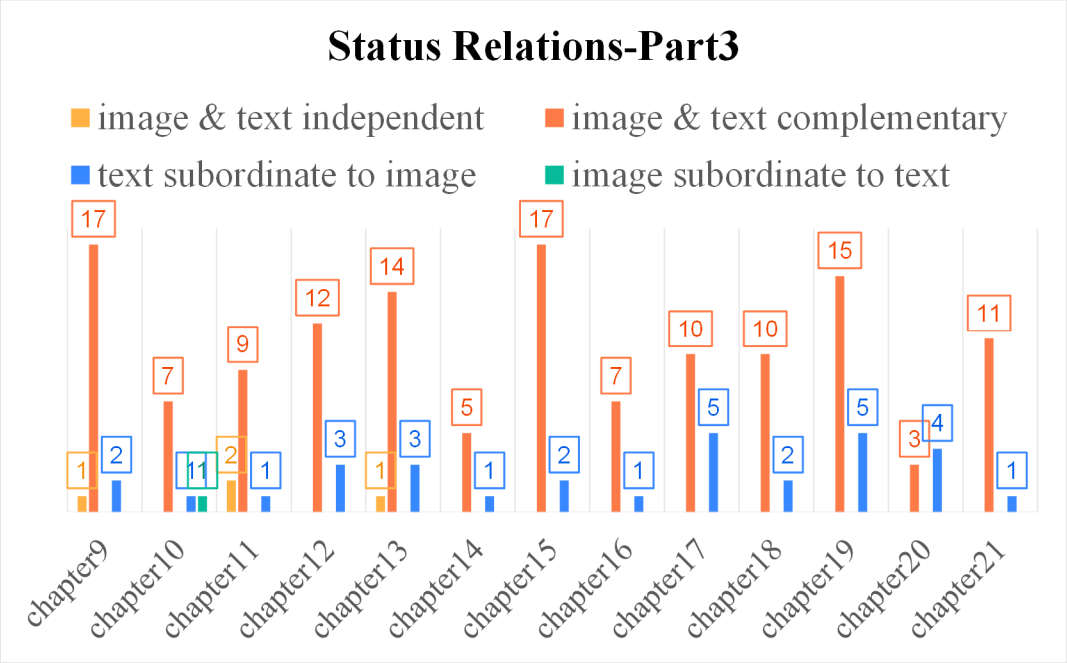

Diagram 3 Image-text Realations (Part 3)

3.2.4. Description of the Status Relations in General

Generally speaking, of all the 227 valid images (with 29 invalid as aforementioned) in the full book, there are only 10 pictures with independent images and text, 171 pictures with complementary images and texts, 42 pictures with text subordinating to the image, and 4 pictures with image subordinating to the text. Based on the previous analysis, it can be found that the image-text relationship that accounts for the largest proportion in this book is still the complementary image-text relations.

As in image-text complementary, images and texts are dependent on each other, and they co-work to form a larger structure together. The reasons for the largest proportion of complementary image-text relations are considered as follows: when learning medical English, most of the medical students in China have already gained a certain basic medical knowledge in Chinese language. One of the main purposes of learning this book is to correspond medical English with Chinese professional terms. Therefore, it is essential to make use of the color pictures, photos and diagrams to help consolidate the students' medical knowledge. Thus, the images and texts of professional English words can complement each other to help students better understand and remember the technical terms. This can be especially evident in Part 2 and Part 3, where abundant specific pathological pictures and human body system diagrams are illustrated to

complement with the text.

However, it should be noted that the chapters in Part 3 involve some after-class exercises, which show the status relation that the texts are subordinate to images, so the proportion of text and picture complementation has decreased substantially in this part.

4. Analysis of the Status Relations

The last part has revealed the status relations of the image and text in specific chapters as well as in the full book. And this part will give some detailed analysis on each type of the image-text status relations.

4.1. Analysis of the Image & Text Independent Relations

When an image and a text are independent, they do not combine to form part of a larger syntagm (Barthes, 1997b), but rather the information they provide exists in parallel – they each form their own processes. An example of such an independent relationship is the following image–text combination, which can be illustrated in Figure 2.

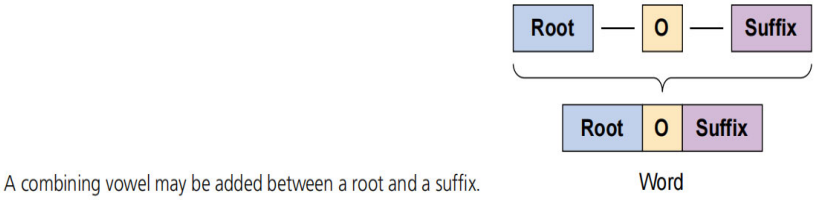

Figure 2. Word Formation (Barbara, C. & Ann D., 2017:7)

In this example, learners can undersand the teaching content through either the graph or the text message. Thus, by understaning the word formation, they can either make use of the information beside the graph, or vice versa.

4.2. Analysis of the Image & Text Complementary Relations

When an image and a text are joined equally and modify one another, their status is considered complementary. For instance, Figure 9-8 in Part 3 Chapter 9 shows three pathological basis of coronary atherosclerosis, respectively Fat deposits, Occlusion, and Blood clot.

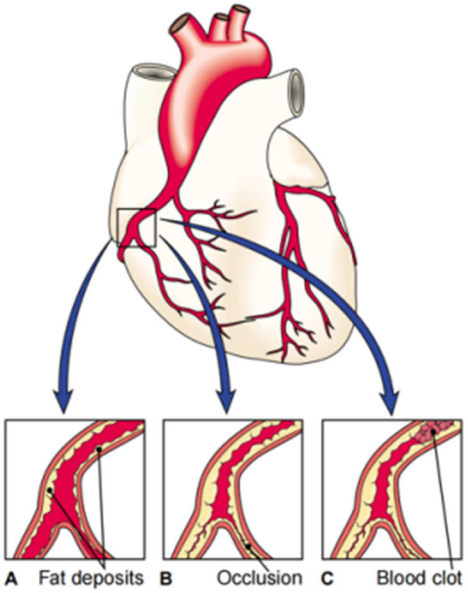

FIGURE 9-8. Coronary atherosclerosis. **(A)** Fat deposits narrow an artery leading to ischemia. **(B)** Blockage (occlusion) of a coronary artery. **(C)** Formation of a blood clot (thrombus) leading to myocardial infarction. (Adapted with permission from Cohen BJ, Wood DL. Memmler's The Human Body in Health and Disease. 9th Ed. Philadelphia: Lippincott Williams & Wilkins, 2000.)

Figure 3. Coronary Atherosclerosis (ibid:182)

The picture vividly shows the pathological changes, and medical students can use their existing knowledge to name the Chinese terms. At this time, they can directly correspond the Chinese terms to the English terms by annotating the pictures with professional English, and consolidate the knowledge by combinging the textual information on the right side of the picture, so the picture and text can complement each other to promote students' learning efffeciency.

4.3. Analysis of the Subordination Relations

The chapters in Part 3 involve after-class exercises, which shows that the texts are subordinate to the images, and students should finish the tasks by a careful examination of the pictures and name each part accordingly. For example, the after-class exercise in Part 3-Chapter 9 corresponds anatomical parts to anatomical names provided, and the relationship between pictures and text is unequal.

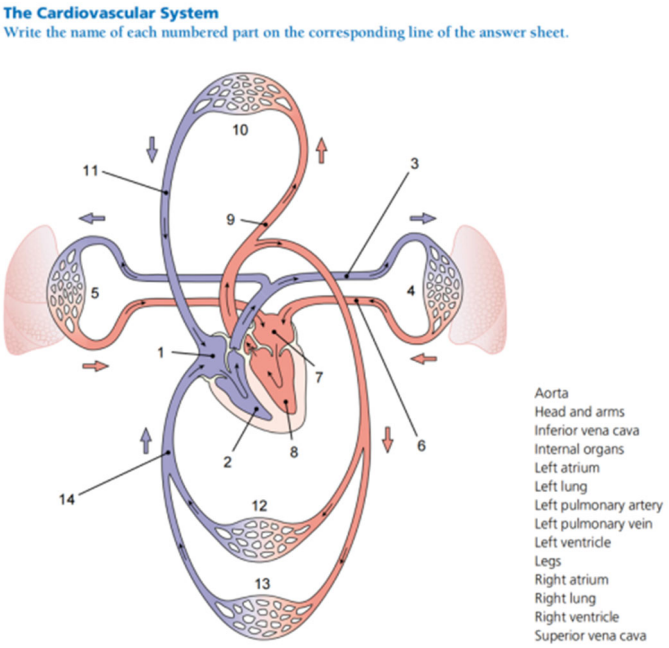

Figure 4. Exercise: The Cardidovascular System (ibid:200)

To understand the technical terms of the cardiovascular system in medical English, students have to rely on the picutre on the left side, and correspond it with the English terminology one by one. By matching the words with the correct places in the picture, students can understand and hence memorize the cardiovascular system more effeciently, which illustrate the point of text subordinating to image. Through repeated practice, students' understanding of pictures and memory of words can be promoted effectively.

5. Major Findings and Suggestions for Teachers and Book Compilers

The research results show that Martinec & Salway's image-text relations system theory can be used to analyze the relationship between images and texts in the textbook "Medical Terminology: An Illustrated Guide", especially in terms of the status relations. According to the current study, it reveals that the complementary relations occupies a dominant position. There are also significant differences in the distribution of images and texts in each chapter, which is generally in accordance with the complexity of the text contents and students' current medical Englishi learning situation in the setting of the Chinese colleges and universities.

Also, the above analysis shows that the writers and image designers of this book do not randomly put various images into the book, but arranged for various functional and practical purposes. Although visual and linguistic symbol systems contain meaning-generating resources in their own unique ways, when they are co-presented in the teaching, they can build complementary semiotic meanings and work together to create a coherent multimodal text for students to learn and understand. Thus, it is essential for teachers to employ the multimodal teaching approach and make use of the multimodal resources in the classroom teaching.

Furthermore, the combination of visual and verbal resources in the book allows for a more engaging and dynamic learning experience. The inclusion of images and picutures can serve to break up the monotony of text-dependent pages, capturing the readers' attention and maintaining their interests throughout the learning process. As a result, it is also beneficial for textbook compilers to take into consideration the multimodal resources in the textbook designing, and help to cultivate the multi-literacy of the students.

Acknowledgment

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