

Research on Speech-associated Gesture in Chinese College Students' English PPT Presentation Based on Multimodal Theory

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Abstract—Multimodal discourse analysis has been adopted in many researches to analyze the oral language data and is also employed to investigate non-verbal communication. Based on multimodal discourse analysis theory, this research is intended to conduct an empirical research to investigate the hand gestures used by ESL learners in PowerPoint presentation in English classroom. Through analysis, it is found that the special training lessons can improve students' practical ability to use hand gestures in PPT presentation. However, the general quality of oral output is found to be affected by the subjects' low diversity of gestures and insufficiency of integrating various modalities together in speech. At the end of the paper, some suggestions for English teaching are proposed on how the findings can be applied to the oral English teaching in China.

Keywords—speech-associated gesture; multimodality; oral English

I. INTRODUCTION

In face-to-face communication between people, only 7% of the information is transmitted in spoken language and 93% of the information is transmitted through non-verbal means such as facial expressions, gestures and intonation (McNeil, 1992: 75-103). Speech-associated gesture is one of the most common and widely used nonverbal communication methods. Gesture language refers to the associated actions made by people while speaking. Gesture can also be narrowly defined as the way a speaker uses to convey information and express emotions. It is a silent verbal language form that is used in close coordination with vocal verbal language and in close relation to culture (Yang Xiaoqiong, 2010: 110-113; Liu Fuying, 2012: 52-55).

From the perspective of language learning, relevant scholars (Canale & Swain, 1980: 1-47; Taylor, 2006: 51-60; Yang Quanliang, 1990: 18-22; Xu Jing, 2007: 86-87;) also clearly point out that foreign language teaching should not only focus on verbal language ability regardless of the cultivation of students' nonverbal communication ability. Many teachers and scholars (Liu Hong, Ma Xiao, 2001: 67-70; Sun Yanling, Chen Qian, 2009: 139-141) point out that there is a widespread problem of unbalanced development of learners' oral and nonverbal communication abilities. For

example, in classroom environment, when students are making English speech or conversation, most of them communicate by using oral English, and the use rate of gesture language is very low. This may affect their language development and even affect their communication in real circumstance in the future.

Therefore, combined with the characteristics of the actual oral English output of college students in China, this research made an investigation on the status quo and characteristics of college students' use of speech-associated gesture from the qualitative and quantitative perspective based on multimodal discourse analysis theory, in order to provide effective feedback information for oral English teaching.

II. RESEARCH BACKGROUND

Researches on speech-associated gestures were started early in the West: from the view of speech and thinking, McNeil (1992: 75-103) studied the relationship between gesture language and cognition and found that 90% of the gestures appeared in association with oral discourse and using speech-associated gesture during communication can improve the efficiency of the brain in processing information; Kenden (1988: 131-151; 2004: 38-66) revealed the role of gestures in promoting language from the perspective of discourse analysis and proved that speech-associated gesture had certain correlation with the fluency degree of speaking, namely gesture might appear all the time when the speaker spoke fluently and the associated gesture might be paused correspondingly when the speaker's discourse was interrupted (Mayberry & Jaque, 2000: 199-213).

Hence, speech and speech-associated gesture is an organic whole, accompanying each other, playing an equally important role in constructing the meaning of a discourse. But in the field of second language acquisition, research of gesture is still in its initial stage due to the lack of relevant theories and methods. Due to the complexity of human communication, the interdisciplinary nature of gesture research and the difficulty in collecting data, most relevant researches stay at the level of qualitative discussion and analysis. However, the rise of multimodal discourse analysis

theory provides researchers a brand-new perspective and method for analyzing speech-associated gesture.

Multimodal discourse analysis is a kind of perspective that uses various modalities composed of all meaning generating resources to analyze discourse and is an ideal method for describing and analyzing the relationship between speech and speech-associated gesture. Many foreign scholars (Roth & Lawless, 2002; Lazaraton, 2004; Norris, 2004, 2011; Schnettler, 2006; Knoblauch, 2008) analyzed the spoken discourse in classroom and formal academic lecture from multimodal perspective, and discussed characteristics of the speaker's speech and speech-associated gesture; Roth & Lawless (2002: 285-304) analyzed the distribution frequency of modalities such as spoken language, charts and gestures in spoken discourse and their multimodal relations by taking the video of science lectures as an example and using quantitative and qualitative analysis method; taking interpretation of new vocabulary in a foreign language classroom as an example, Lazaraton (2004: 79-117) illustrated the auxiliary effects of four different gestures on expression of a meaning and proved that there was a dynamic hierarchical relation existing between spoken language and gesture in the process of construction of the meaning and the hierarchical relation might be changed in different stage of communication; for example, discourse modality was not always the major modality; sometimes gesture might play a role of major modality and spoken language was just a complement for construction of the meaning (Norris, 2004: 128-147; 2011: 129-147).

In this type of researches, collection of spoken discourse materials mainly depends on video recording. Taking an academic report video as an example, Schnettler (2006: 155-169) systematically expounded the multimodal analysis method of video recording, including the specific division and marking of modalities, provided a crucial instruction for making multi-modal research based on video materials in the future. In another case research, Knoblauch (2008: 40-82) conducted a multimodal analysis on the indicative gestures of the speakers in making PPT-assisted academic report and discussed the function and use characteristics of indicative gestures in making speech.

In contrast, there are very limited number of researches relevant to it in China and most of the researches explored such problems as existing in discussing the construction of multi-modality meaning from perspective of multimodal theory on the basis of Halliday's systemic functional grammar and Zhang Delu's (2009: 24-30) multimodal comprehensive analysis framework. Hu Jin and Zeng Lei (2007:12-15), taking English speech on academic conference as an example, analyzed the meaning construction of oral English (spoken language), visual, audible and body gesture modalities and briefly analyzed the cohesive relationship between body gesture and spoken language in the discourse. So far, only a few researches have carried out multimodal analysis on oral English in foreign language classroom from an empirical perspective. Yang Xiaoqiong (2010: 110-113) found that in the oral English classroom, teachers' speech-associated gesture diversifies with the introduction of new words. By turning the research object to the non-verbal

communication ability of English learners, Liu Qin and Pan Mingwei (2010: 38-43) found that there were certain correlation between the spoken content and gesture, sight and facial expression when learners were making discussion in groups in English and pointed out that some problems such as single form and lacking natural nature also exist in non-verbal communication of college students.

Above all, considering the characteristics of insufficiency researches on speech-associated gesture in Chinese college students' English learning and in combination with the advantages of the current multimodal theory, this research intends to investigate the characteristics of college students' speech-associated gesture from qualitative and quantitative perspectives in order to provide effective feedback for teaching of oral English and provide important reference and scientific basis for related teaching researches on non-verbal communication ability.

III. RESEARCH CONTENT

A. Problem Design

This research will try to answer the following two questions: 1) after the college students receive the special training about "the practical skills of PPT presentation", are their abilities to use oral English expression and speech-associated gesture improved? 2) What are the characteristics and laws of college students' speech-associated gestures in making PPT presentation?

B. Research Objects

30 students (15 students from each of the two classes of undergraduate grade one of non-English majors in a science and engineering university, where the two classes totally have 120 students) were randomly selected as the research objects. The research objects all participated in a standardized English test and two PPT presentation tasks.

C. Main Methods

A group of 15 students selected from the first class and a group of 15 students selected from the second class were respectively regarded as the experimental group and control group in this research. The experimental group and the control group had 8 hours of English lessons each week (four hours of listening and speaking lessons). One teacher was responsible for teaching the two classes at the same time. In the listening and speaking class, the teacher taught the content on traditional textbook in the experimental class, while in experimental class, the teacher especially added special training about "the practical skills of English PPT presentation" (taking 20 class hours) in addition to teaching the content on traditional textbook content. "PPT presentation skills" mainly include the following aspects: 1) oral English expression with PPT presentation characteristics; 2) body gestures (including gestures and body language) often used in speeches. After the teacher had finished teaching the content, the students respectively formed the corresponding groups and then made PPT presentation to consolidate and practice the presentation skills learnt.

Both of the two groups were required to complete two PPT themed presentations (one at the beginning of the semester and one at the end of the semester) independently within 5 min for each student in accordance with the topic designated by the teacher. Before the presentation began, the teacher had previously got video equipment ready for recording the whole process of the presentation. The camera was placed in the middle of the classroom to ensure that the students' speech, gestures and slides could be recorded when the presentation was given. In order to ensure the smooth progress of the presentation, the student giving presentation was provided with the remote controller for controlling the slide to show the playing progress. This way avoided the trouble that the student needs to go to the front of the rightmost computer in the classroom to control the slide and avoided the interfering of computer operation on the functional gesture.

The result of the students' speech was assessed by four teachers together after watching the video. Each teacher scored for the oral English performance of 30 students first, and then the average value was treated as the final score of the student. The score of oral English part was given only based on the English expression ability of the student (full score: 100 points). In terms of gesture, two teachers jointly used multimodal software ELAN to transcribe the video and mark the gestures. In this research, the score of speech-associated gesture only consider the effective functional gestures used by the student giving presentation. One point would be given for one valid gesture and the total score represents the frequency of effective gestures used by the student.

D. Gesture Marking Method

This research focuses on the speaker's oral English discourse and gestures: discourse transcription refers to marking for the whole process from the beginning to the end of a discourse; gesture refers to the hand and limb actions appeared in association with the discourse, excluding student's hand action for clicking the mouse and operating the computer.

The method proposed by Yang Xiaoqiong (2010: 110-113) was used in transcribing the gestures. The whole process from the beginning to the end of a hand movement was marked and recorded when recognizing a single gesture, to facilitate analyzing the time of the gesture movement. In order to analyze the characteristics of the gestures used by the student during the presentation, the gestures in the video were marked in categories (see "Fig. 1") in accordance with the classification methods proposed by McNeill (1992: 75-103) and Bai Xuejun (2009: 48-53).

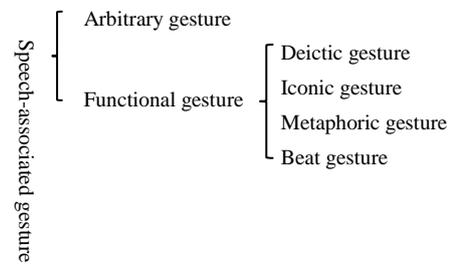


Fig. 1. Classification of gestures.

Speech-associated gesture can be divided into functional gesture and arbitrary gesture. Functional gesture is a non-verbal behavior with determination function and used to convey meaning in the process of expression. Arbitrary gesture can be defined as an arbitrary, fixed and modeled behavioral habit formed by the speaker in a long time and has no contribution to the expression of a meaning. Therefore, this research does not concern arbitrary gesture. In combination with McNeill's (1992) theory, functional gesture can be further divided into four categories, namely deictic gesture, iconic gesture, metaphoric gesture and beat gesture.

Deictic gesture is a gesture having indication function. For example during the speech, the speaker may directly use hand or laser pointer to point toward the object or content or direction of the PPT to be noticed in order to draw audience's attention. Iconic gesture, also called concretized gesture, is a limb action used for making clear a word or behavior or getting the concept or name described in the discourse connected to the object in real life. For example, when the speaker describes the sweeping event, he also performs the action of sweeping. Metaphoric gesture, also called intentional gesture, is a gesture made to express an abstract concept and is more complex than iconic gesture (Roth & Lawless, 2002: 285-304). Beat gesture can be understood as a action to emphasize the spoken content or rhythm by repeatedly beating by hands.

This research only focuses on functional gesture, so the data presented is all gesture types made contribution to language expression. For the convenience of marking, deictic gesture is marked as [HNDG], iconic gesture is marked as [HNIG], beat gesture is marked as [HNBG] and metaphoric gesture is marked as [HNMG].

IV. ANALYSIS OF EXPERIMENTAL RESULTS

A. Oral English Scores and Gesture Usage of Experimental Group and Control Group

An independent sample T test was performed on the data of oral English scores and gesture usage of the tested students in the two groups in initial stage of the semester. The results are shown in "Table I". As can be seen from the statistical results, the oral English scores of the two groups are almost the same. There is no significant difference between them ($p=0.251>0.05$). The frequencies of gestures used by tested students in the two groups in making PPT presentation are also very similar. The average gesture use

frequency of single sample in control group is 7.06 times and that in experimental group is 7.33 times. There is no great difference between the two frequencies ($p=0.829>0.05$).

TABLE I. COMPARISON BETWEEN THE CONTROL GROUP AND EXPERIMENTAL GROUP IN INITIAL STAGE OF THE EXPERIMENT

	Control group N=15		Experimental group N=15		t	p
	Average	Standard deviation	Average	Standard deviation		
Spoken language	78.46	3.132	81.08	2.932	-1.171	0.251
Gesture	7.06	3.575	7.33	3.081	-0.219	0.829

An independent sample T test was performed on the data collected from the second PPT presentation made in the end of the semester in order to test whether the oral English and gesture use level of students in the experimental group were improved somewhat after receiving the training about "the practical skills of PPT presentation". The results are as shown in "Table II". As can be seen from the statistical results, the oral English score of the experimental group (81.46) is higher than that of the control group (84.60). There is significant difference between them ($p=0.251>0.05$). In aspect of speech-associated gesture use, the average gesture use frequency of single sample in control group was 8.24 times and that in experimental group was 32.93 times. There is great difference between the two frequencies ($p=0.829>0.05$). It can be seen that after receiving the special training, the student in the experimental group obviously increases the frequency of using gestures.

TABLE II. COMPARISON BETWEEN THE CONTROL GROUP AND EXPERIMENTAL GROUP AT THE END OF THE SEMESTER

	Control group N=15		Experimental group N=15		t	p
	Average	Standard deviation	Average	Standard deviation		
Spoken language	81.46	3.129	87.60	2.613	-4.173	0.000
Gesture	8.24	3.075	32.93	2.143	-17.996	0.000

B. Characteristics of Various Gestures Made by Students of the Control Group and the Experimental Group

A statistics was made on various gestures made by students of the two groups in the second presentation in order to further compare the similarities and differences between the two groups in using speech-associated gestures. The results are as shown in "Table III". It can be seen from the statistical results that the use frequencies of the four types of speech-associated gestures by tested students in the two groups follows the sequence (from high to low frequencies) as follows: deictic gesture (315 times totally by students in the two groups) > beat gesture (254 times) > iconic gesture (19 times) > metaphoric gesture (17 times). It can be seen that in the PPT presentation, for tested students in the two groups, what used most frequently is deictic gesture (accounting for 52% of all gestures used) and what used the least is metaphoric gesture (accounting for 2.8% of all gestures used).

TABLE III. DESCRIPTIVE STATISTICS OF VARIOUS GESTURES IN THE CONTROL GROUP AND THE EXPERIMENTAL GROUP AT THE END OF THE SEMESTER

	Control group N=15		Experimental group N=15		t	p
	Average	Standard deviation	Average	Standard deviation		
Deictic	3.93	1.667	17.06	2.250	-18.157	0.000
Iconic	0.26	0.457	1.00	0.925	-2.750	0.010
Beat	2.66	0.453	14.26	0.769	-10.150	0.000
Metaphoric	0.25	0.593	0.86	0.743	-2.443	0.021

Further analysis was performed on the tested students' use of deictic gestures. Deictic gesture can be divided into three categories according to the direction pointed to: pointing to PPT projection (178 times), pointing to themselves or the audience (40 times) and others (97 times). PPT presentation is different from traditional speech and requires using multimedia equipment, including computer and projector. Therefore, the speaker has the highest frequency of gestures pointing to the screen direction during the speech in order to attract the attention of the audience and realize the natural connection between spoken language and PPT content.

In addition, ELAN software was used to retrieve the usage of related words when the speaker uses gestures (see "Table IV"). As a result, it is found that deictic gesture often appears in association with indicative words. For example, the indicative word "this" is usually accompanied with the gesture pointing to the PPT screen (e.g., "This is the picture I'm going to show you"). When using the personal pronouns "I" and "you" (e.g., "I want to share the great happiness with you"), the speaker usually retract his/her hand toward his/her body or point his/her hand toward the audience. In addition to the correlation with the pronouns listed in "Table IV", sometimes the speaker may also use deictic gestures when describing spatial locations or time concepts. For example, when the speaker says "You'd better go out, travel and then come back", the accompanying gesture is pointing to a side of his/her body first, then slowly move the hand to the other side to express the concept of "go out" and "come back" in spatial location. Deictic gesture plays an important role of meaning expression in the PPT-assisted speech. Such gesture can not only guide the audience to pay attention to the content on the slide but also create a meaning surpassed the content on the slide by a combination with oral discourse to enrich the meaning of the discourse (Bucher & Niemann, 2012: 283-306).

TABLE IV. DEICTIC GESTURE AND THE USE OF INDICATIVE WORDS IN SPOKEN LANGUAGE

Category	Relevant words	Frequency
Pointing to the screen	That/there/this/these/it/they	39
Pointing to the audience	You/yourself/everyone	23
Pointing to oneself	i/we/us/me/our	15

The use frequency of beat gesture is next to that of deictic gesture and accounts for 41.9% of that of all gestures. Generally, using beat gesture while speaking is to emphasize the content spoken. For example, beat gesture often appears

when the speaker uses "such as", "for example" or the sequence word "first ... second ..." to indicate enumeration or example. As retrieved by ELAN in the experiment, the frequency of this gesture reached 23 times.

Iconic gesture plays a very important role in meaning expression and interpersonal communication and can express meaning directly, allowing listeners to quickly understand what the speaker wants to express and helping the speaker to catch the attention of the audience so as to realize more efficient information communication and make the speech more vivid and interesting. For example, the speaker may raise his/her hand when saying "who can answer this question, please raise your hands" and may make a gesture like digit "II" when saying "there are two choices for this question".

However, the frequency of this gesture used by individual sample in this experiment was very low. On average, each student in the high level group used this gesture for once and that in the low level group used this gesture for only 0.26 times. This case may be caused by the following two reasons: first, due to the limited English level, the main attention of the tested student was paid to the accuracy and fluency of the spoken language so as to take a large amount of cognitive resources in the mind so that he/she cannot notice the coordinated use of gestures and language; second, students usually have less input of gestures, so that they don't know exactly which gesture should be used when speaking and often do not use any gesture to avoid making mistakes.

The frequencies of metaphoric gesture used were also very low in the experimental group (13 times) and the control group (4 times). Cienki & Müller (2008:483-501) pointed out that when speaking a language, the expressions related to metaphor in the discourse are usually accompanied by metaphoric gestures. From the view of discourse transcription in this research, there are very few contents used for expressing metaphor, which may be caused by the low frequency of metaphoric gesture used; in addition, many metaphoric gestures are related to the social and cultural customs of language use. Many gestures are only accessible to native speakers or high-level language learners. However at present, English proficiencies of the two groups of students are both limited so that metaphoric gesture cannot be well used in communication.

V. CONCLUSION

This research is an empirical research on the use of speech-associated gesture in PPT presentation conducted by Chinese English learners in classroom environment. From the perspective of multimodal analysis, this paper makes classification and quantitative analysis on speech-associated gestures used by English learners and gets the following major conclusions:

- According to the results of experiments and statistical data, it is found that the oral English level and gesture use of the tested students in the experimental group are improved after receiving the said special training. Deictic gesture is the most frequently used in giving

presentation and the use frequency of deictic gesture pointing to the screen accounts for the largest proportion (57% of all deictic gestures) and is the main gesture used in PPT presentation; the use frequency of beat gesture in giving presentation ranks second and often appears when the speaker is emphasizing the meaning or rhythm spoken.

- The research results reflect some problems existing in use of speech-associated gestures by Chinese learners when speaking English. In detail, iconic and metaphoric gestures among speech-associated gestures are less used. Iconic and metaphoric gestures are very vivid and ideographic meaning expression means, can simultaneously mobilize the audience's interest and adjust the atmosphere of the speech scene. But most of the tested students still use spoken language as the only ideographic means, or directly point to the content on the slide to let audiences understand the content by themselves. This way omits the use of gesture description so that audiences feel that the speaker is "reading" the slides instead of "description" through speaking and gestures.

Above all, in the future foreign language oral English teaching, teachers should pay more attention to cultivating students' non-verbal communication skills and use rich resources such as multimedia and internet to input as many non-verbal communication related information as possible to the learners in and out of the class and encourage learners to imitate and practice more in daily communication. To further optimize the speech-associated gesture related teaching scheme, it is still needed to obtain large amount of detailed analysis and experimental data. This will be the orientation of such work in the future.

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