

Research on C-E Emergency Interpreting Service for the Immigrant Elderly Groups With Hearing Impairment in China

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Abstract—*The Disaster Prevention Guideline* for hearing-impaired groups, issued by the World Federation of the Deaf and the International Sign Language Translation Association, aims to help hearing-impaired groups to get accurate, timely information in the event of disasters or other emergency situations. In order to provide feasible interpreting strategies for immigrant elderly groups with hearing impairment, this study employs the corpus statistics method to analyze this guideline based on the Emergentist Model of Pragmatics. The results of this study demonstrate that the elderly can be divided into mild, moderate, and severe groups in information vulnerability. Therefore, this article puts forward corresponding interpreting strategies for them. For mild groups, interpreters can commonly use positive words, focusing on short sentences. For moderate groups, interpreters can usually use positive words, simple sentences, loud voices and gestures. For severe groups, interpreters should explain and retell loudly close to their ears by positive words with low loading significance, supplementing information by body movements. All of these strategies attempt to accurately convey emergency information to these groups and reduce their harm in emergency events. It is hoped that this can promote the research of emergency interpreting services in China.

Index Terms—*the Disaster Prevention Guideline*, immigrant hearing-impaired elderly, corpus statistics method, Emergentist Model of Pragmatics, interpreting strategies

I. INTRODUCTION

“Emergency language service refers to providing quick rescue language products, language technology or participating in language rescue actions for the prevention, monitoring, quick disposal, recovery and reconstruction of major natural disasters or public crisis events. It includes the first-aid translation of Chinese and foreign languages, minority languages, dialects and sign language for the disabled. In addition, the development of language software for disaster relief and emergency language standards, the dissemination of disaster information, the management of language resources for disaster relief, and the training of first aid language are its contents” (Wang et al., 2020, p. 22). Therefore, emergency interpreting is also a part of emergency language service. The outbreak of the novel coronavirus fully highlights the urgent need for emergency language services (Li & Rao, 2020). To make matters worse, the lack of emergency interpreters has harmed the immigrant elderly with hearing impairment in emergency events in China, because they can’t know and master the emergency information timely and accurately in various disasters. They don’t do a good job in emergency preparedness, becoming a vulnerable group in information (Yi et al, 2015).

The author used “emergency interpreting” and “the elderly with hearing impairment” as keywords to search on China National Knowledge Infrastructure (CNKI), but there were no published papers. Then, “translation or emergency interpreting”, “hearing impairment” and “the old or senior citizen” were used as keywords to search on the Web of Science (WOS). Only 10 articles focus on the translation of health care of the hearing-impaired elderly. Next, the same method was utilized in the National Medical Library (PubMed), the largest medical library in the world, and the author got 21 published articles. Through analyzing the above articles, the author found that the current research focuses on the following three aspects: Flores et al. (2012) studied the translation problems of the hearing-impaired people in health care services. Yabe (2019) studied the use and shortcomings of remote video interpreting in emergency care. Patriksson et al. (2019) and Cardoso et al. (2006) studied the translation problems faced by children and adults with different hearing impairments when receiving medical interpreting services. Given the above results, none of these three types of studies involved interpreting services for the immigrant elderly with hearing impairment during an emergency event. To solve the problem of emergency interpreting service for the hearing-impaired immigrant elderly with information weakness in China, this study puts forward feasible interpreting strategies under the Emergentist Model of Pragmatics, so as to be keenly aware of the emergency event and victims’ feelings in emergency language translation (Chen, 2020).

II. RESEARCH OBJECT

The study object is *the Disaster Prevention Guideline* jointly issued by the World Federation of Deaf People (WFD) and the International Sign Language Translation Association (WASLI) (hereinafter referred to as the guideline) (WFD & WASLI, 2015). As the only disaster prevention information guideline for the hearing-impaired group all over the world, it specifically assists the hearing-impaired group to get and exchange information in natural disasters or emergencies. Thus, the multimodal presentation means of some information in emergencies, the vocabulary and sentences in the guideline boast reference for the interpreting of immigrant elderly with hearing impairment to some extent.

III. THEORETICAL BASIS

In order to reveal the characteristics and diversity of pragmatic barriers, Perkins constructed an Emergentist Model of Pragmatics as shown in Figure 1 (Perkins, 2007). The model reveals that the semiotic system, cognition, motor characteristics and sensory affect the pragmatic function of the elderly, leading to language barriers. The choice representations of these factors constitute the basis of communication behavior between interpreters and the elderly with hearing impairment. The model also shows that the lack of information reception and expression caused by pragmatic barriers can be supplemented by pragmatic compensation within individuals and interpersonal levels. According to the actual situation of interpreting, the interpersonal compensation involved in this study is usually conversation compensation through the linguistic signs, context and action representation of participants.

| Emergentist Model of Pragmatics | | | |
|---|--|---|-------------------|
| Semiotic | Cognitive | Motor | Sensory |
| Language: phonology prosody morphology syntax semantics discourse | Inference Theory of mind Executive function Memory Emotion Attitude | Vocal tract Hands Arms Face Eyes Body | Hearing Vision |
| Gesture Gaze Facial expression Posture | | | |
| Impairment of expressive resources | | Compensation by interlocutor | |
| Semiotic-e.g. syntactic formulation problems | | Greater reliance on inference based on contextual clues, shared knowledge, etc. | |
| Cognitive-e.g. attention deficit | | Greater reliance on gesture, eye contact, linguistic repetition | |
| Sensorimotor-e.g. dysarthria, dyspraxia | | Repetition of what hearer thinks has been said for verification by speaker | |
| Impairment of receptive resources | | Compensation by interlocutor | |
| Semiotic-e.g. poor parsing, word recognition | | Simplified syntax, use of gesture and visual clues | |
| Cognitive-e.g. poor short-term memory | | Frequent linguistic recapitulation and use of visual reminders | |
| Sensorimotor-e.g. hearing impairment | | Greater reliance on gesture, exaggerated articulation and other visual clues | |

Figure 1 Emergentist Model of Pragmatics

Owens pointed out that as an important tool to maintain social communication, the core of language is pragmatic competence (Owens, 1991). Pragmatic competence is also the most important part of the elderly with hearing impairment in emergency events. Normal pragmatic competence is conducive to receiving emergency information and making active emergency preparation in time for senior citizens. Hence, the imbalance of emergency information caused by the group's pragmatic barriers can be fully compensated by the interlocutor's interpersonal intervention, so as to transfer accurate and timely information. In the Chinese-English emergency interpreting service for hearing-impaired immigrant elderly with information weakness, interpreters can provide pragmatic compensation at the interpersonal level as dialogue participants. According to the pragmatic compensation dimension proposed by the Emergentist Model of Pragmatics, interpreters can fully convey urgent information by appropriate interpreting strategies to make up for the lack of reception and expression of emergency information, thus reducing information vulnerability of these elderly.

IV. RESEARCH PROCEDURES

The above analysis shows that the information compensation pathway for these people with information weakness is

the dialogue participants in emergency events, specifically the interpreter in interpreting activity. Therefore, this study uses the statistical method based on a corpus, *the Disaster Prevention Guideline*, to count the words and sentences in the guideline and provide a reference for the choice of words and sentences for interpreters in interpreting.

A. Words Clean & Segmentation

Inevitably, there are a lot of noises in the guideline, such as spaces, punctuation marks, non-printed characters and so forth. Eliminating these noises will improve the reliability and validity of statistics. The steps of noises elimination in the study are as follows: First of all, the author used regular expressions in the EmEditor to filter out special symbols, punctuation, numbers, etc. In the second place, the line symbol and replaced multiple spaces were removed. In the end, a clear guideline text that meets the research requirements was obtained. CorpusWordParser, a software supporting the segmentation of English corpora, was used to segment the clean text, so as to prevent lexical cohesion from affecting the statistical accuracy and reliability of the standardized type-token ratio and lexical density in the following steps.

B. Words Statistics

In this study, the software WordSmith 8.0 was used to carry out the standardized type-token ratio and lexical density statistics on the lexical level of the post-segmentation guideline, so as to offer the research object with quantitative criteria for interpreters' vocabulary selection in emergency interpreting service.

For the standardized type-token ratio (STTR), the higher its ratio, the more diverse the vocabulary. The lower the ratio, the less vocabulary. The STTR of the guideline obtained by the software is shown in Table 1 below. It can be seen from the table that the STTR of the guideline is 34.55 %.

TABLE 1
STTR OF THE GUIDELINE

| Category | Count |
|--------------------------|--------|
| tokens used for wordlist | 2452 |
| types (distinct words) | 614 |
| standardized TTR(STTR) | 34.55% |
| STTR basis | 1000 |

For the lexical density, the higher the proportion of notional words in the text, the greater the loading significance, the harder the text is, otherwise, the easier the text is. The software TreeTagger 3.0 and Excel 2019 were used to calculate the density of nouns, pronouns, adjectives, numbers, verbs, and adverbs in the guideline. The lexical density of the guideline is shown in Table 2.

TABLE 2
LEXICAL DENSITY OF THE GUIDELINE

| Part of Speech | Frequency | Rate |
|-------------------|-----------|--------|
| Noun | 910 | 35.51% |
| Pronoun | 44 | 1.72% |
| Adjective | 297 | 11.59% |
| Numeral | 14 | 0.55% |
| Verb | 267 | 10.42% |
| Adverb | 84 | 3.28% |
| Lexical Density % | 63.07% | |

C. Average Sentence Length Statistics

After vocabulary statistics, this study used Wordsmith 8.0 to calculate the average sentence length of the guideline, which provides an average standard for interpreters to choose sentence length in interpreting.

For sentence length, the longer the average sentence length, the higher the syntactic maturity and complexity, otherwise, the lower the syntactic maturity and complexity (Hu, 2011). This software was used to calculate the average sentence length and standard deviation of the average sentence in the guideline, as shown in Table 3 below.

TABLE 3
AVERAGE SENTENCE LENGTH OF THE GUIDELINE

| | |
|---|-------|
| Average Sentence Length mean (in words) | 24.04 |
| Average Sentence Length standard deviation (word length std. dev) | 28.85 |

V. RESEARCH RESULTS

The above corpus-based statistical methods are used to calculate the STTR, lexical density and average sentence length of the guideline, providing objective and quantitative average data standards for the selection of vocabularies and

sentences for interpreters during interpreting. The above data will be analyzed by combining the model and the guideline.

A. Usually Using Positive Words

Negative and positive words are two main components of the continuum of vocabulary knowledge of language users. Negative words can be recognized or understood by language users in a certain context, but can not be produced correctly. Positive words can be understood, pronounced correctly, spoken or written creatively by language users (Hatch & Brown, 2001). Everybody's vocabulary includes positive and negative words, and the immigrant elderly with hearing impairment are no exception. The above studies show that the STTR of the guideline is only 34.55 %, indicating that the words in the guideline are simple and their changes are small. The lexical density is 63.07%, which shows that the proportion of notional words in the guideline is average for the elderly in the world, and their loading significance is plain. However, the function words assisting to understand accounts for 36.93% ($36.93\% = 1 - 63.07\%$), showing that the guideline pays more attention to readers' understanding and reception. According to STTR and lexical density in the guideline, all the words used in the guideline are positive and boast low loading significance. Therefore, the elderly with hearing impairment can understand, pronounce correctly and use them creatively.

B. Simple Sentences with Low Loading Significance

As an essential linguistic feature, sentence length is helpful to analyze the language rules and usage habits of sentence users. This guideline is universal for people with hearing impairment all over the world. Therefore, analyzing sentences in the guideline can provide an average data standard in the sentence length for these people. According to the above statistics, the average sentence length of the guideline is only 24.04, which shows that the syntactic maturity and complexity of the guideline are extremely low. They are simple and have low loading significance, because simple sentences always contain simple words. The guideline reflects the general reception of the language of international hearing-impaired groups. Therefore, for those native English speakers, 24.04 belongs to the average sentence length level of English expression, understanding and reception.

C. Expression Assisted by Movements

Before denoising, *the Disaster Prevention Guideline* contains multimodal presentations such as audio, video links, images, etc. This shows that it is not enough for the guideline to fully convey urgent information by some words and sentences. Other multimodal modes such as movements, gestures, banners, etc. are supplements. Considering the special pragmatic barriers of the immigrant elderly with hearing impairment and the actual situation of the interpretation, interpreters need to adjust flexibly the volume, utilize facial expressions and body movements and other action representations advocated by the guideline in emergency interpreting activities, so as to advance effectively the transmission of emergency information.

Chinese-English emergency interpreting service is on-site, instant, time-bound and urgent. Appropriate use of interpreting strategies is conducive to the flexible response of interpreters and can promote successful communication in interpreting. Therefore, the above indicators of vocabulary and syntax and action representations can be used as average reference data for interpreters when they are interpreting for the elderly in emergency events. Based on the Emergentist Model of Pragmatics and analysis mentioned above, some feasible interpreting strategies are put forward for the hearing-impaired immigrant elderly.

VI. INTERPRETING OBJECTIVES & STRATEGIES

A. Interpreting Objectives

The immigrant elderly with hearing impairment in this study refer to those living in China with English as their mother tongue, and they can't communicate in Chinese. These people have been attracted by reform dividends and settled in China for a long time. Due to age growth, normal organ function reduction and inevitably hearing impairment, they are not able to boast normal social activities. According to *the Classification & Grading of Disabled Persons* jointly issued by the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China and the National Standardization Administration Committee, hearing impairment refers to the organic or functional abnormalities of the sensory, transmission of the auditory system and the auditory pathway. It leads to different degrees of hearing loss, affecting people's normal life and social participation (Qu & Ren, 2000). Diao et al. (2019) proved that the association disorder of the auditory center and the limbic system will affect the prefrontal lobe of the brain, resulting in disuse atrophy and the decline of cognition activity efficiency in the brain. Thus, the normal cognitive ability and pragmatic ability of hearing-impaired immigrant elderly will be degraded (Diao et al., 2019), appearing the language attrition (Huang & Zhu, 2019). Naturally, they become the vulnerable group in information.

In the study, the elderly groups were divided into mild, moderate and severe information vulnerability groups respectively, which is based on the latest hearing-impaired criteria, *Classification Standard of Hearing Loss* newly released by the World Health Organization (WHO) on March 3rd, 2021 (WHO, 2021). This standard demonstrates that interpreters can use simple words and sentences for normal oral communication in a quiet environment when providing

interpreting services for the hearing-impaired elderly with mild information vulnerability. In this way, the elderly can receive urgent information timely and accurately. But there may be communication barriers in a noisy environment. The hearing-impaired elderly with moderate information vulnerability can respond to some simple words expressed loudly by the interpreter in a quiet environment, but it is difficult to communicate in a noisy environment. It is difficult for the hearing-impaired elderly with severe information vulnerability to communicate normally in quiet or noisy environments. Thus, interpreters can't convey normally emergency information to them to some extent.

In emergency events, it is an information exchange behavior to transmit emergency information to the immigrant elderly with information vulnerability. The information exchange behavior is mainly explored by information access barriers and information exchange tools (Wang et al, 2015). In emergency interpreting services, interpreters act as special tools for information exchange, and the degree of hearing impairment is an obstacle for the elderly to obtain information. Therefore, before putting forward interpreting strategies, it is necessary for interpreters to fully understand the degree of hearing impairment of the elderly, so as to accumulate the positive words and sentences commonly used by them. Interpreters also need to know and master the gestures and expressions commonly used in professional terms in emergency information, so as to accumulate knowledge for the selection of words, sentences and body movements.

Emergency information can be transmitted before, during and after the event. The decline of physiological organs, normal cognitive aging and other language barriers may befall the elderly (Gu, 2019). Thus, interpreters need to consider the interpreting environment, and the emergency interpretation strategies are fully fit for the quiet and noisy environment. Based on the above analysis, the following feasible interpreting strategies are put forward.

B. Interpreting Strategies

1. Mild Group: Mainly Using Positive Words and Short Sentences

The hearing-impaired immigrant elderly with mild information vulnerability can communicate normally in a quiet environment. They can understand directly singular sentences and common words from familiar life fields in a quiet environment, such as simple personal and family communication, shopping information exchange, work communication, etc. But information exchange may be very difficult in a noisy environment. According to the Emergentist Model of Pragmatics, the pragmatic obstacles of these people are mainly reflected in semiotics and vision. Therefore, in terms of vocabulary choice, the interpreter can choose the words slightly higher than 34.55% in STTR. Words can be changed appropriately, but they should be positive words commonly used by the interpreting object in life. The lexical density is 63.07%. It is appropriate to connect words and sentences with function words, but sentences should not be too long. They are slightly higher than 24.04, the average reference data in the guideline.

2. Moderate Group: Mainly Using Positive Words, Short Sentences, Loud Voice and Gestures

The hearing-impaired immigrant elderly with moderate information vulnerability have trouble with information exchange in a quiet or noisy environment. If the interlocutor speaks slowly and clearly and is willing to cooperate in conversation, the elderly can communicate simply. According to the Emergentist Model of Pragmatics, the pragmatic barriers of these people are mainly reflected in semiotics, vision and cognition. Therefore, in terms of vocabulary selection, the interpreter needs to choose 34.55% in STTR, which is the average level of the guideline. Simple words can be used, but they should be positive words commonly used in these people's life. In the light of vocabularies and their loading significance, the interpreter needs to choose them slightly lower than 63.07%. Compared with the mild group, the loading significance of nouns, pronouns, adjectives, numerals, verbs and adverbs in sentences is reduced by half. Hence, the interpreter only needs to use simple sentences. It is also necessary to maximize the volume and use gestures to boost the reception and understanding of interpreting information.

3. Severe Group: Words with Low Loading Significance, Interpreting Near Ear, Repeated Expression and Gestures as Supplements

Although English is the mother tongue of hearing-impaired immigrant elderly with severe information vulnerability, their conservations in both quiet and noisy environments are greatly hindered, and they aren't able to receive oral information from interlocutors. According to the Emergentist Model of Pragmatics, pragmatic barriers of this group are reflected in semiotics, vision, cognition and motor. Therefore, in terms of vocabularies selection, the interpreter needs to choose words far lower than 34.55% in STTR. As far as the loading significance of words is concerned, the density should be half of 63.07%. Only positive words commonly used in everyday life can be used. The loading significance of nouns, pronouns, adjectives, numerals, verbs and adverbs is halved, and sentences are unnecessary. Besides, the interpreter needs to be close to the ears of the interpreting object, and the volume should be as loud as possible. Technical terms should be explained by facial expressions and body movements. If necessary, the interpreter also needs to retell emergency information so that these people can receive information effectively to make an adequate emergency preparedness.

After the interpreting activity, the interpreter needs to reflect and summarize the whole interpreting activity. In the first place, the interpreter should reflect own understanding of the interpreting object and the preparation of emergency terms before interpreting. In the second place, the expression of language, gestures and body movements in interpreting is also should be reflected. In the end, the terminology maintenance and the summary of emergency gestures and body movements should be done after interpreting, so as to make them become important language assets for the interpreter

(Wang & Zhu, 2020).

VII. CONCLUSION

All in all, this study provides feasible interpreting strategies for the hearing-impaired immigrant elderly with different information vulnerabilities in China. All of these strategies are to accurately convey emergency information to these people and reduce their harm in emergency events. It is hoped that this can promote the research of emergency interpreting services in China. Nevertheless, numerous factors are involved in emergency interpreting services, and each group has different characteristics. For example, the characteristics and needs of the elderly with hearing impairment in health care and specific disasters, which also deserve further research.

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