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| **RESEARCH ARTICLE**

Multimodal Register Equivalence in Student Interpreters' Consecutive Interpreting Assessment

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| **ABSTRACT**

The present study proposes a source speech register analysis model that incorporates textual and situational components and parameters of register equivalence in the target language to identify the relations between the source language register and student interpreter's performance, textual register mismatch between the source and target languages, and the relevance between register equivalence parameters in the target language and interpreting quality. The findings are as follows: first, the source language register does have an influence on the interpreter's performance, and relations exist between the two. In general, a higher source language register brings better interpreting quality. Three assessment criteria and the overall quality differ across different levels of registers in the source language. Second, register mismatch between the source and target languages happens since interpreters are inclined to lower the register of interpreting output from the high-register source speech and increase the register level in the target language in the case of the low-register speech. Third, intonation and voice have the highest correlations with the interpreters' performance. Fluency ranks second, and lexical-semantic choices the third.

1. Introduction

A register was initially conceptualized by Halliday et al. (1964) and seen as a variation of language in accordance with the contexts. Halliday (1978) points out, "a register can be defined as the configuration of semantic resources that the member of a culture typically associates with a situation type" (p.111). In the same vein, Biber & Conrad's (2009) conclude that "texts can be described according to their contexts, considering the characteristics of the people who produced the texts, and the characteristics of the situations and communicative purposes associated with the texts" (p. 5). Various register levels exist in communications. As a communicator, an interpreter is required to make their renderings appropriate and accurate while dealing with different communication situations, audiences, and speakers with various backgrounds, emotions, attitudes, and purposes, all of which constitute registers in the source speeches. At the same time, it is necessary for an interpreter to make sure that his or her interpreting output maintains the original style or achieves register equivalence in the target language so as to bridge the language gap between the speaker and the audience. Interpreters need to accomplish all the above-mentioned tasks within a limited time; therefore, registers pose great challenges for their comprehension and analysis of the source language, as well as the interpreting output.

However, regrettably, despite the fact that register analysis, which provides a holistic view of the language context and comprehensive analysis of the language itself, is gaining currency in translation studies (Steiner, 1998; Liu, 2003; Pettit, 2005; Hammou, 2020), few kinds of research apply it into interpreting studies, especially interpreting quality assessment. This study aims to inquire into the relations among registers of both the source language and the target language and CI quality of student

interpreters, and the suitability of interpreting quality assessment from the perspective of the register. A register analysis model of source English speeches containing textual and situational factors is established. Textual factors refer to linguistic features at the lexical level, syntactic level, and textual level, as well as paralinguistic features, including speaking rate and pauses. Situational characteristics are classified into participants, mode, setting, functions, and topic. By proposing this model, the present research selected three source English speeches at high, medium, and low register levels and used them as experiment materials for interpreting students to conduct consecutive interpreting tasks. After the experiment, a computational tool called *Coh-Metrix* is adopted to analyze the register at the linguistic level of source speech and transcribed interpreting texts, which is indicated by the formality score. By comparing the register level of each source speech and interpreting output, the current study attempts to explore the impact of the source speech register on the register of interpreting the output. As for the relationship between source language register and CI quality, five parameters of multimodal register equivalence (lexical-semantic choices, grammatical-syntactic correspondence, fluency, intonation and voice, and formal equivalence) are analyzed to discover to what extent register equivalence is related to the student interpreters' performance.

2. Literature Review
Even though most researchers emphasize the interaction between contextual and textual levels to provide a panoramic view of the register, register analysis varies through different approaches as the definitions and categorizations of register differ across various studies. Classification of the register is divided into the following three categories:

First, only situational context includes social relations, status, and personalities of the relevant communication parties, such as intimate, casual, consultative, formal, and frozen types (Joos, 1965).

The second is communication media. According to Biber & Conrad (2009), registers are categorized by text varieties into written registers (academic prose, newspaper, fiction...), spoken registers (conversation among friends, university office hours...), and registers in electronic communications. In this way, a description of the situational context, including the communicative purposes, linguistic choices including words and structures, and the functional associations between linguistic and situational factors, are the three components of register analysis. Larsson and Kaatari (2019) leverage register as a proxy to indicate different texts' formality levels. In their research, the most formal register is academic prose, followed by popular science, news, fiction, and conversation in descending order.

Third, formality. The concept of formality/contextuality is also closely related to register analysis. Regarding formality/contextuality as a relational concept, Heylighen & Dewaele's (2002) formality/contextuality continuum proposes three degrees of formality: highest contextuality, intermediate degrees of contextuality, and lowest contextuality. Highest contextuality refers to the situation where the understanding of the more interactive and personal communication highly relies on the specific context, such as spontaneous speeches and personal dialogues. Intermediate degrees of contextuality do not rely on the specific context as much as the highest contextuality but still have certain degrees of personal involvement and interaction. Lowest contextuality means official, technical speeches or documents and other static and informational forms of communication. This classification of register degrees depends on the communication situation, and the "F-score" is generated by the frequencies of nouns, adjectives, and other word classes. Other relevant researches look beyond linguistic characteristics. For example, Koppen et al. (2016) turn to (para)linguistic features in formality analysis, incorporating phonological components in the variables of formality. Besides regular consideration of word classes, this research regards articulation rate, pauses, hesitations, and speech errors as the variable of the flow of speech, which is one of the indicators of formality or register.

Register analysis provides empirical evidence for assessing the quality of translation and interpreting (Hatim & Mason, 1990; House, 1997, 2001, 2015; Ouyang, 2015, 2018). Munday (2012) finds out that if applied to translation studies, systemic functional linguistics would be helpful in solving problems translators encounter and producing high-quality translation products. Nord (1991, 1997, 2005) establishes a TQA model based on an analysis of text style and functions. She believes the only way to produce high-quality translated text is, "First, to control source-text reception by a strict model of analysis, and second, to control target-text production by stringent translating instructions which clearly define the (prospective) function of the target text (Nord, 2005: 19) ." House (2015) improves her model of translation quality assessment (House 1997) by adding in communicative norms and styles for intercultural communication and understanding. Ouyang's (2015, 2018) model explores the meaning-related quality of interpreting. This model adopts accuracy, appropriateness, and coherence as criteria and poses them in the central position. Besides these criteria, the model is divided into macro-level and micro-level. At the macro-level, assessment is carried out based on register analysis. Field, tenor, and mode are analyzed, showcasing the situation or context of the text. Accuracy is related to the field; appropriateness is associated with tenor, and mode is relevant to coherence. At the micro-level, lexical-grammatical analysis of discourse semantics is conducted. Ideational meaning is associated with accuracy; interpersonal meaning is related to appropriateness, and textual meaning is relevant to coherence.

These above-mentioned studies reveal the significant role register analysis plays in translation and interpreting quality assessment. However, major problems relating to the inadequate indicators, mere comparison between the original and target text, and objectivity still exist. The first limitation is that the analytical categories are complicated. Reiss (2015) points out that the complexity of the functional linguistic analysis prevents us from assessing the quality of each parameter and then generating an overall assessment result. The second limitation is that most of the results from translation and interpreting quality assessment generated from the systemic functional linguistic approach are qualitative. Qualitative and descriptive analysis fail to provide sound and reliable quantitative data, which can be complementary to qualitative ones. Third, lack of multimodality analysis in register studies. Translation and interpreting activities involve multiple modes of communication, such as phonological factors, gestures, and images. Register, as a critical element in translation and interpreting quality assessment, is also manifested by various communication modes. Especially in studies of interpreting activities where there are at least two communication modes: words and sounds, register analysis is supposed to include multimodal contexts. Therefore, translation and interpreting quality assessment requires register analysis to have clear criteria and objective and multimodal analysis combining qualitative and quantitative approaches.

3. Theoretical Framework

During consecutive interpreting, an interpreter listens to a segment of information for a while and then is required to "re-express the speakers' original ideas" (Harris, 1990: 115) in the target language with the support of notes (Gile, 2003). Even though interpreters in both consecutive and simultaneous modes have limited time to reproduce information, consecutive interpreters have more time to focus on the textual and contextual patterns of speeches and make corresponding choices at linguistic and (para)linguistic levels, thus facilitating the register parameter analysis of the final products. In this way, considering the distinct features of consecutive interpreting and the differences between English and Chinese, this study will establish a register analysis model to determine the register levels of the source speeches and refer to the parameters of register equivalence in the target language as the determinants of quality assessment of the target outputs. The present research explores the relations between consecutive interpreting quality and register in both source and target speeches, which is regarded as a multi-modal factor influenced by the text and its context. Linguistic and extra-linguistic properties are integrated into the register analysis model of the source language and register equivalence parameters in the interpreting output.

3.1 *Register analysis model of the source English speeches*

Textually reflecting information in the source speech, linguistic characteristics come from lexical, grammatical, syntactic, and textual levels. Since whether a register is high or low is a relative concept, Biber and Conrad (2009) point out the need to adopt a comparative and quantitative approach to analyze the linguistic features of registers and different registers depending on the degree of textual formality. Heylighen and Dewaele (2002) discover that word classes reflect text to register or formality. Specifically, nouns, adjectives, prepositions, and articles appear more frequently in more formal texts, while pronouns, verbs, adverbs, and interjections are more prevalent in informal ones. Based on different word classes, the F-score is proposed to measure the contextuality/formality of different texts, including the comparison of F-scores in spontaneous speech and prepared speech. However, confining formality measurement to a lexical level is not sufficient to demonstrate the formality of a text as a whole. Corresponding to this need, Graesser et al. (2014) put forward a new approach to measure text formality: Coh-Metrix. This measure is based on a multilevel theoretical framework that covers words, syntax, text base, situation model, genre, and rhetorical structure. Specifically, it investigates "co-referential cohesion, causal cohesion, and density of connectives, latent semantic analysis metrics, and syntactic complexity" (Graesser & McNamara, 2011) by integrating "lexicons, pattern classifiers, part-of-speech taggers, syntactic parsers, shallow semantic interpreters, and other components that have been developed in the field of computational linguistics (Jurafsky & Martin, 2002)." This tool has been tested in second language proficiency and interpreting studies, which have generated fairly reliable results (Azadnia et al., 2019; Ouyang et al., 2021).

Given the comprehensiveness and quantitative features of the *Coh-Metrix formality score*, the linguistic analysis of registers in this research adopts this measure to quantify the registers of speeches. There are five dimensions of the formality score: referential cohesion, deep cohesion, narrativity, syntactic simplicity, and word concreteness. Referential cohesion refers to the cohesions between sentences at the text base level. Highly cohesive texts witness words and ideas frequently reoccur across sentences, connecting the threads and central ideas in an entire text. Deep cohesion, as a reflection of the situation model, emphasizes causal, intentional, and other kinds of connectives that deepen readers' understanding of the text. Narrativity means the genre level, and the more narrative a text is, the more casual the text is and the more familiar between the speaker and the audience because narrativity is like telling a story. Syntactic simplicity investigates the level of complexity of syntactic arrangements, and word concreteness touches on the lexical choices' impact on speech registers. In general, discourses and texts with high registers tend to have fewer concrete words, complex syntax, high cohesion, and low narrativity, while those with low registers are the opposite. Considering lexical arrangements, syntactic structures, coherence, and logic flow as a whole in a text or discourse, the z-score for each of the five principal dimensions is integrated into the equation of the Coh-Metrix formality score:

Formality score = (Referential cohesion + Deep Cohesion – Narrativity – Syntactic Simplicity – Word Concreteness) / 5

Speaking rate and fluency are paralinguistic indicators for registers. Koppen et al. (2016) include articulation rate, pauses, hesitations and speech errors, and other paralinguistic features to measure the level of formality. Igras-Cybulska et al. (2016) reveal that pausing features can be applied to distinguish different speech contexts. In addition, a faster speaking rate often happens in informal speeches (Armstrong, 2001). However, speakers read prepared speeches in most conference interpreting situations, and few errors or hesitations occur. Read by Obama, drafted and revised by elites in the White House, the selected materials in this present experiment are all written-to-be-read scripts; no error or hesitation occurred in the speeches. Therefore, the study excluded speech errors and hesitations in the register analysis of the source speeches. On the contrary, interpreters, pressured by a cognitive load in consecutive interpreting, pauses, errors, and hesitations in their output have significance in the registers of the interpreting output. Therefore, the three paralinguistic features are still included in the parameters of register equivalence in the target language.

This present research simplifies the situational characteristics of registers proposed by Biber and Conrad (2009: 40). The situational features are divided into participants, mode, setting, functions, and topics. Participants refer to the speaker, audience, and the relations between the two. This model will analyze the social status of the speaker, such as the speaker's profession and educational background. As for the audience, the model will investigate their background and identities as well as the relations between the audience and the speaker, including their interaction and personal relationship.

Laughter and applause are typical interactions between the speaker and the audience. Jokes, which frequently appear in informal speeches, are a kind of humor in which punch lines or witty rhetoric induce the laughter of the audience (Long & Graesser, 1988). In most situations, laughter is also an indicator of informal registers (Garcia 2013). With the same function as laughter, applause is also a response of the audience, sending feedback to the speaker. This is also a kind of interaction between speakers and the audience. As a crucial part of "rhetorical devices" (Atkinson, 1984), applause frequently occurs in formal speeches, especially in political settings. By analyzing diplomatic speeches, Kurzon (2009) believed that appropriate semantic fields and changes in tempo often lead to applause by the audience. Since the speeches used in the present research are delivered by Obama and are politically related, applause is included in the register analysis framework for the source English speech.

Mode is the form of communication, usually divided into spoken and written language. The setting is similar to the field proposed by Halliday et al. (1964), which means where and when the communication takes place. The function is consistent with the purposes of the discourses, and the model will explain the general and specific purposes the communication is supposed to have. The topic analysis goes into the details of the discourses at different register levels, and it is related to specific contents in the speeches.

The register analysis model of the source English speeches is described in the following figure.
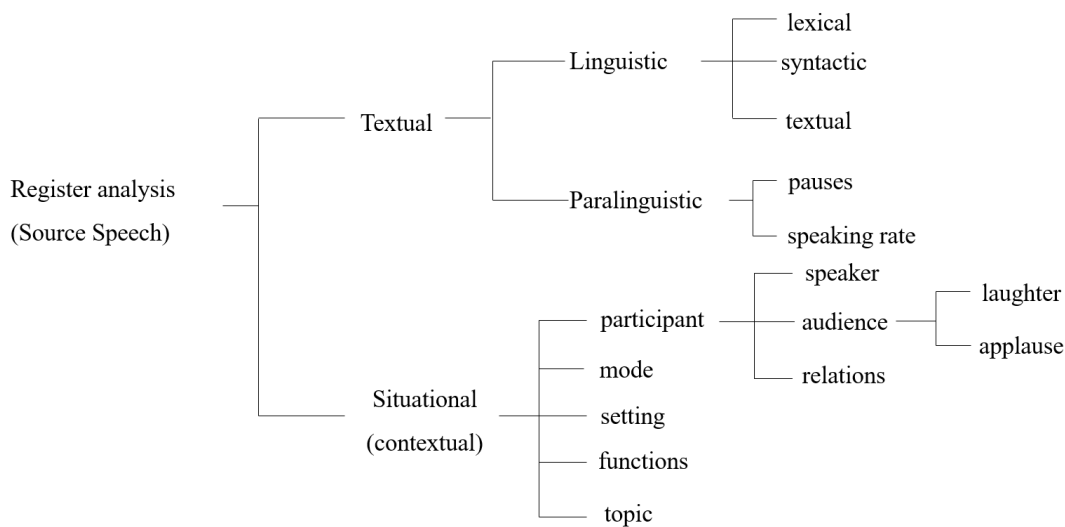

Figure 1. Register analysis model of source English speeches

Register analysis framework of source English speeches in this study combines quantitative and qualitative analysis. In the linguistic and paralinguistic part, lexical, grammatical, and syntactic choices, pauses, and articulation rates are revealed in quantitative indicators. For situational analysis, topics, audience, and other factors are analyzed through a descriptive approach to measuring the formality of the contextual aspect. Through quantitative and qualitative analysis, register levels will be summarized.

3.2 *Parameters of Register Equivalence*

The adequate revelation of equivalent register in interpreting outputs can help both the speaker and interpreter reach their communicative purpose, and it is an assurance of full and accurate delivery of information. However, studies on register parameters in translation and interpreting are scant. For instance, Pettit (2005) referred to lexical, grammatical, and stylistic changes as indications of register coherence in audiovisual translation. What the articles on register parameters' relations with interpreting quality share are that they all mentioned the linguistic and extralinguistic features of register, including lexical, grammatical, and phonological characteristics. Therefore, given the strata of language proposed by Kim (2009), the parameters of register in this study will cover the levels of semantics, lexicogrammar, and phonology. Combined with the register analysis framework of the source language in the present research, the parameters of register equivalence consist of lexical-semantic choices, fluency, intonation and voice, grammatical-syntactic correspondence, and formal equivalence.

3.2.1 *Lexical-semantic choices*

One of the challenges a translator's face is related to lexis, and a word has meaning only if it is situated in a specific context. Register and source language have a remarkable influence on specific lexical choices translators make (Vandevoorde, 2018). Baker (1992) elucidated the requirement of equivalence on phrases, idioms, grammar, texts, and pragmatics and claimed that the equivalence is not absolute but relative. And Lexical issues in translation and interpreting may lead to register shifts or register mismatches between the source and the target language (Krein-Kühle, 2011; Jiménez-Crespo & Sánchez, 2017). The parameter of lexical choice in this study discovers the impact of the interpreting of words, idioms, proverbs, phrases, and lexical bundles on register equivalence. Since contrastive lexical register analysis is the approach employed in the registered research on English-Chinese consecutive interpreting where an interpreter's output is compared with the source speech, both Chinese and English lexical properties will be considered to see whether the register in the target language matches that in the source speech.

The criteria for the formality of the lexical choices in the Chinese interpretation an interpreter has produced depend on the Distance Gradation Principle (DGP) suggested by Feng (2018). By the principle that "the more familiar an expression, the closer it is to everyday speech and vice versa" (p. 146), the levels of register or formality of Chinese expressions can be ranked. For instance, even though *fǎngfú*仿佛, *sìhū*似乎, and *hǎoxiàng*好像 share the meaning of "seem or like," *fǎngfú* is more formal than *sìhū* and *hǎoxiàng* while *hǎoxiàng* has the lowest register. Forms of lexis also reflect registers. In general, Chinese dissyllabic words are formal, while monosyllabic ones represent informality (Luo & Xiang, 2018). Besides, lexical bundles are one of the most researched topics in register-related lexical property studies. Hsu and Hsieh (2018) conclude that lexical bundles in Chinese occur more frequently in lower registers (conversation) than higher ones (news). The present study will count the number of an interpreter's lexical features whose formality and meanings match the source speech as the quantitative indicator of the parameter of lexical choice.

3.2.2 *Fluency*

Formal speeches are always fluent, with barely any fillers or hesitations. When encountering formal speeches, interpreters are expected to produce fluent and accurate speeches with no chance of being interrupted (Setton & Dawrant, 2016). In contrast, disfluencies are more prevalent in informal registers. Torreira et al. (2010) note that spontaneous speeches witness more false starts, corrections, repetitions, and hesitations than carefully planned (formal) speeches. Besides, speakers in informal speeches more frequently use gap fillers with little meaning and run-on sentences. These provide strong evidence that interpreters' fluency can be a convincing indicator to judge whether the register in interpreters' output is at the same level as that in the original speech. In addition, fluency influences interpreting assessment. In Pöchhacker's (2012) large-scale survey on interpreting quality, 71% of 704 interpreters regarded fluency as a critical criterion, and this criterion ranked third in terms of importance. Yu and van Heuven (2017) step further, finding a highly positive correlation between accuracy and fluency scores, which reveals that accuracy and fluency, as two essential performance indicators of interpreting, are intertwined with each other. Based on Tissi's (2000) types of non-fluencies (silent pauses and disfluencies), the parameter of fluency focuses on the total number of hesitation pauses within grammatical units, unnecessary repetitions, gap fillers, false starts, and corrections. What is worth mentioning is that since this parameter counts the occurrences of non-fluencies, the correlation direction between the parameter and interpreting quality will be the opposite of those between other parameters and interpreting performance.

3.2.3 *Intonation and voice*

Interpreting has at least two modalities: textual and auditory, and thus register variations in interpreting include both textual and auditory aspects. Higher registers witness more monotonous speech while lower registers are livelier in intonation. Besides, voice and intonation are the most important determinants of first impression in interpreting quality assessment (García Becerra, 2016). Through simultaneous interpreting experiments, Collados Aís (2016) holds the view that intonation, which reflects evaluators' impression of interpreters' professionalism and attitudes, does have an influence on the overall interpreting quality, including the quality parameters (e.g., accuracy). Interpreters are required to familiarize speakers' tone and voice in a limited time and adapt to different interpreting situations, modes, and acoustic conditions so that they can be aware of their own voice and prosodic choices

to correspond to those of the speakers. In this way, interpreters can manage to deliver the speaker's position, attitude, and speech gist.

Indicators of intonation and voice in interpreting vary. Ahrens (2005) points out that tonal, dynamic, and durational parameters can be utilized as variables of intonation. Yenkimaleki and van Heuven (2016, 2018) consider one of the suprasegmental features-stress at the word and sentence level as the indicator of intonation and later include accentedness, pace, and voice in the prosody-related evaluation criteria. Since intonation's grammatical functions, attitudinal functions, discourse functions, and sociolinguistic functions are interrelated with each other, it is hard to measure intonation (Chun, 2002). There exist some technologies to visualize intonation analysis, yet normally the method for evaluating voice and intonation is holistic judgment.

The parameter of intonation and voice is measured through a comprehensive and continuous scale from 0 to 10, as described below:

Table 1. The scale of Intonation and Voice

The score for intonation and voice equivalence	Criteria description
$8 < x \leq 10$	The interpreter's intonation and voice are considerably consistent with those in the source language, fully representing the discourse functions of the original speech.
$6 < x \leq 8$	The interpreter's intonation and voice are relatively consistent with those in the source language, mostly representing the discourse functions of the original speech.
$4 < x \leq 6$	The interpreter's intonation and voice are partially consistent with those in the source language, moderately representing the discourse functions of the original speech.
$x \leq 4$	The interpreter's intonation and voice are not consistent with those in the source language. They do not represent the discourse functions of the original speech.

3.2.4 *Grammatical-syntactic correspondence*
Different levels of registers have distinct grammatical and syntactic patterns. Informal speeches allow broken and incomplete sentences, colloquialisms, and sentence fragments. In contrast, formal speeches, especially carefully planned, written-to-be-read speeches, have higher syntactic and grammatical complexity, whose indications include longer sentences, a larger number of linked subordinated syntactic units, and more complex grammar.

Grammatical and syntactic correspondence refers to the strategy that in translation and interpreting, translators and interpreters are supposed to reproduce the grammar and syntactic features of the original text or speech as closely as possible. For instance, Foster (2014) puts forward that correct use of concord, tense, syntax, and prepositions are the basis of target language grammar assessment. But that does not mean completely copying the original structure without considering the language differences is acceptable. This kind of correspondence is also a dynamic one. Translators and interpreters still need to care for the meaning to be delivered and readers' or listeners' comprehension. Compared with translators, interpreters are more restricted to the original syntactic and grammatical structure of the original speech because of limited time and resources. Be it consecutive or simultaneous interpreting. Interpreters tend to follow the macrostructure or the syntactic arrangement in the source language despite some necessary restructuring strategies due to the differences between Chinese and English. The parameter of grammatical-syntactic correspondence in the present study emphasizes the quantitative indicators of correspondence on tense, personal pronouns, and other grammatical properties and sentence length, sentence patterns, and other syntactical characteristics.

3.2.5 *Formal equivalence*
Regarding interpreting output as a whole, this study uses interpreting duration as the quantitative indicator of the formal equivalence. A fundamental aspect of the register in interpreting, which comprehensively reflects the lexical-semantic, grammatical-syntactic processing, and speech flow during the interpreting processes, is the overall length of interpreting. From the register perspective, the duration of interpreting needs to be close to that of the source speech as much as possible. It is ideal if the interpreter consumes the same time or less time than the speaker. A longer interpreting duration lowers the register of the original speech while the same or shorter duration corresponds to the original register, reflecting the style of the source speech. By comparing the length of the target speech with that of the source speech, we can see the overall results of formal (non-)equivalence affected by interpreters' diction, grammatical and syntactic choices, speech flow, and other paralinguistic characteristics.

3.2.6 *CI quality assessment*

This study adapts Choi's (2013) assessment categories: accuracy, expression, and presentation. Accuracy is based on the information points in the original speech, and expression and presentation are judged through a holistic scale approach. In addition, as the study aims to investigate the relations between register levels in the source language and each category of interpreting assessment as well as the overall interpreting quality, the adapted assessment criteria in this study will eliminate weights on each category to avoid disturbance from weights on the experiment results and conclusions.

4. Method

4.1 *Participants*

A total of 9 second-year graduate students majoring in translation and interpreting participated in the experiment. Four of them are female, and the rest five are male. All student interpreters speak Mandarin Chinese as their L1 and English as L2. They all have completed one-year consecutive interpreting training courses at a graduate school and gained basic interpreting skills. After the interpreting experiment, interpretations were transcribed verbatim.

4.2 *Materials and Registers in the source language*

This study used three speeches delivered by Barak Obama in different registers. Each speech is analyzed by the register analysis model of source English speeches. The first speech (S1) came from the State of the Union in 2016. The second speech (S2) is extracted from Obama's speech at the 2017 Goalkeepers, and the third speech (S3) comes from the White House Correspondents' Dinner speech in 2016. To control the possible variables, the speeches are delivered by the same person, and durations are very close (S1=5min54s, S2=5min54s, S3=5min28s).

At the linguistic level, the formula of the Coh-Metrix formality score (Graesser et al., 2014) is employed to analyze the textual formality of the source English speeches, and the results are listed below:

Table 4. The textual formality of the three source English speeches

Speech	Referential cohesion	Deep cohesion	Narrativity	Syntactic simplicity	Word concreteness	Final formality score
S1	0.019	1.147	1.121	-0.603	0.007	0.128
S2	-1.447	-0.281	0.213	-0.242	-0.197	-0.3
S3	-1.493	-0.327	0.837	0.768	-0.656	-0.553

From the Coh-Metrix formality results, we can conclude that the textual formality ranking order of the three speeches is S1>S2>S3.

As for paralinguistic analysis, the speaking rate and pauses of each speech are compared to decide the register levels.

Table 4. Paralinguistic analysis of the three source English speeches

Speech	Speaking rate	Number of pauses
S1	90 words/min	19 (8 times interrupted by applause)
S2	133 words/min	6 (laughter occurred twice)
S3	100 words/min	23 (21 times of laughter)

S1 has the lowest speaking rate. Formal or even frozen speeches are highly low-contextual communication forms, highly dependent on the information expressed in the commutation process. Therefore, formal speeches tend to pause frequently and run slowly. Besides, from the situational perspective, eight times of pauses in S1 occurred because of applause from the audience, indicating that the S1 is formal. The speaking rate in S2 is the highest because the speaking flow is inconstant, sometimes fast and sometimes slow. The number of pauses in this speech is the lowest due to the fast speaking rate. However, laughter from the audience shows that S2 is less formal than S1. S3's speaking rate is at the medium level because it has the highest number of pauses, 21 out of which are caused by the audience's laughter, meaning that S3 is more informal than S2.

The three source speeches are also compared in terms of the situation-level features.

S1, State of the Union, is the government work report in the U.S., and it is delivered by the president of the United States at a joint session of the United States Congress, where senators and congressmen gather to listen to the report. The speaker, the president of the United States, is working with the audience and lawmakers in this country, and according to the principle of checks and balances, the administrative and legislative agencies are making major decisions on national affairs together. The speaker and the audience are well-educated elites with prestige. During the speech, the audience also responded to the speech with rounds of

applause. The speech was drafted repeatedly nearly six months earlier than the joint session, and this written speech uses formal and solemn words and long and complex sentences. The purpose of the State of the Union is to brief about issues in the United States and the government policies and decisions.

S2 was delivered at the 2017 Goalkeeper forum in New York. At that time, Obama had already finished his presidency and became active in public speaking. The audience was "goalkeepers," who could bring fundamental changes to the world. Equipped with novel ideas and active minds, they are a new generation of educated youngsters and leaders from all walks of life who are not afraid of thinking out of the box. Through public speeches, debates, and other interactive communication channels, the forum provided a platform for idea exchanges and inspiration. This speech covers new challenges in the 21st century and outlook on the ever-changing world, offering suggestions for the next generation to step into the bright future. This is also a prepared speech, but the style is more casual than S1.

S3, White House Correspondents' Dinner speech, enjoys a nearly 100-year tradition. Guests invited to the dinner are celebrities, journalists, and politicians with mixed backgrounds, and the relations between the speaker and the audience became casual and personal. The most prominent feature of S3 is the jokes embedded in it. The speech content was humorous, and sometimes, the president even told some self-disparaging jokes, which is an effective way to induce laughter and improve the audience's impression of the speaker, and even draw the speaker and the audience closer (Bitterly et al., 2017). This 2016 speech mainly reviewed Obama's changes during his eight years in office and revealed some personal feelings when Obama was about to finish his presidency. Therefore, content in S3 was more personal and casual than in S1 and S2. Even though the script was written beforehand, the overall structure was loose, with many short and simple sentences. Despite some potential difficulties in identifying the names of politicians mentioned in this speech (a name glossary was offered to participants before the experiment), the style was informal and witty, relatively easy to understand.

Table 5 shows the detailed analysis of the three source speeches and the register level of each speech.

Table 5. Register analysis of the three speeches

Speech			S1	S2	S3
Linguistic level	Formality score		0.128	-0.3	-0.553
Paralinguistic level	Speaking rate		90 words/min	133 words/min	100 words/min
	Pauses		19	6	23
Situational level	Participants	Speaker	Barack Obama	Barack Obama	Barack Obama
		Audience	Lawmakers	Inspiring and creative young leaders	Celebrities, journalists, and politicians
		Relations between the two	Formal working relations; applause from the audience (8 times).	The speaker offers advice, and the listeners get inspired; by interactive communication; 2 times of laughter from the audience.	Casual and personal; laughter from the audience;21 times of laughter from the audience.
	Mode		Speech	Public Speech	Speech
	Setting		Joint session of the United States Congress	Public Forum	White House Correspondents' Dinner

		Governme nt report	Inspiration for the next generation	President roast
	Functions			
	Topics	National affairs	Advice for the youth	Personal feelings of the president
Register level		High	Medium	Low

Combining the qualitative and quantitative analysis of the register factors, this study regards the S1 register as a high register, S2 as a medium register, and S3 as the low register. Adapted from the formality continuum (Sanders, 1993), this study proposes a register continuum where each source speech in the experiment can find its position.
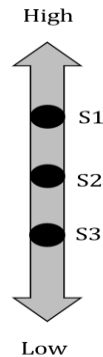

Figure 2. Register continuum and the positions of the three source speeches

The three speeches were all delivered by Barack Obama, with a moderate speaking rate and no accent. The contents were general political and economic topics, so there was no major difficulty for the interpreters. Before the experiment started, interpreters were given the glossary to familiarize themselves with some personal names mentioned in S3.

4.3 *CI quality assessment*
Each speech in this study is divided into 36 information points by sense groups. The accuracy score depends on the number of correct information points expressed in interpreters' outputs.

Table 2. Accuracy scale in consecutive interpreting

Score	Number of accurate information points expressed in the target language
10	35-36
9.5	33-34
9	31-32
8.5	29-30
8	27-28
7.5	25-26
7	23-24
6.5	21-22
6	19-20
5.5	17-18
5	15-16
4.5	13-14
4	11-12
3.5	9-10
3	7-8
2.5	5-6
2	3-4
1.5	1-3
1	Fewer than 1

Expression and presentation are evaluated through holistic and comprehensive scales:

Table 3. Expression and presentation scale in consecutive interpreting

Assessment category	Band	Criteria description
Expression	$8<x\leq10$	Excellent expression in the target language and accurate lexical and grammatical choices with few linguistic mistakes.
	$6<x\leq8$	Good expression in the target language with a few minor lexical and grammatical mistakes does not affect the overall communication intention and comprehension.
	$4<x\leq6$	Adequate expression in the target language with some lexical and grammatical mistakes which might impede the overall communication intention and comprehension.
	$2<x\leq4$	Inadequate expression in the target language with major lexical and grammatical mistakes which impede the overall communication intention and comprehension to a great extent.
	$x\leq2$	Poor expression in the target language which fails to reach the communication intention.
Presentation	$8<x\leq10$	Excellent delivery with smooth speech flow, outstanding articulation, and few deviations.
	$6<x\leq8$	Good delivery with relatively smooth speech flow, good articulation, and a few deviations.
	$4<x\leq6$	Adequate delivery with relatively interrupted speech flow and articulation, some deviations.
	$2<x\leq4$	Inadequate delivery with seriously interrupted speech flow and articulation and major deviations.
	$x\leq2$	Poor delivery with poor speech flow, poor articulation, and complete deviations.

The final score sums accuracy, expression, and presentation scores to indicate an interpreter's CI quality.

4.4 *Procedure*
Before the interpreting experiment, participants were gathered in an interpreting lab and were briefed on the background information about the three speeches and the speaker. Participants were not informed about the experiment's purpose. Glossary lists were handed out to participants in written form. After the briefing, all participants started to interpret the video-recorded speeches, and the videos were paused nearly every minute for consecutive interpreting. Subjects' interpretations were recorded and transcribed after the experiment.

4.5 *Research questions*
Research questions of the experiment include:
(1) Does register levels in the source speeches influence interpreters' CI quality?
(2) Does register mismatch between the source and target language happen? If so, how?
(3) Which register parameter in the target language has the highest correlations with CI quality?

5. Results
5.1 *Relations between source speech register and interpreting quality*
To find relations between source speech register and interpreting quality, the source speech registers are regarded as the independent variable while accuracy, expression, presentation, and the overall quality are dependent variables. The independent variable is considered an ordinal variable because of the register continuum and was thus divided into high, medium, and low (respectively coded with the value of 3, 2, 1). The dependent variables are continuous variables, and the scores for each category and the overall quality were put into the data analyzing software. MANOVA (Multivariate Analysis of Variance) was conducted in SPSS 25 to reveal whether register levels in the source speech have relations with the consecutive interpreting quality. Statistics generated from MANOVA are shown in the following tables.

Table 6. Results from Multivariate Tests

Effect		Value	F	Hypothesis df	Error df	Sig.
Register	Pillai's Trace	0.507	2.606	6.000	46.000	0.029

Table 6 shows that all text statistics are significant with *p*=0.029 (less than 0.05), which confirms that the three assessment categories and the overall quality indeed differ across different levels of registers. Therefore, we summarize that high, medium, and low registers can be distinguished according to the differences in accuracy, presentation, and expression. Even though the mean quality scores at three levels of the register are close to each other, descriptive analysis in Table 7 demonstrates that the mean overall quality scores in the high register are slightly higher than those in the low and medium registers. Specifically, mean accuracy in the high register is also higher than in the other two, but the same register level witnesses the lowest mean presentation performance. In terms of expression, the highest mean score falls into the low register and the highest, medium register. Therefore, fluctuations among the three assessment categories lead to similar quality scores across the three register levels; hence we can conclude that register levels in the source speech do have an influence over interpreting quality, and it should be examined based on specific assessment categories.

Table 7. Descriptive Statistics

Register		Mean	Std. Deviation
Accuracy	High	8.8	0.80
	Medium	8.5	0.70711
	Low	8.1	0.85
	Total	8.4	0.80
Expression	High	7.6	0.83
	Medium	7.4	0.71
	Low	7.6	0.63
	Total	7.5	0.71
Presentation	High	7.5	1.22
	Medium	7.6	1.00
	Low	7.8	0.39
	Total	7.6	0.91
Quality	High	23.9	2.68
	Medium	23.6	2.33
	Low	23.5	1.67
	Total	23.7	2.19

5.2 *Register mismatch between the source and target language*
As for the register level comparison between the source English speech and the Chinese output, the textual formality of the transcribed interpretation is measured through the Chinese version of Coh-Mextrix.

Table 8. One-Sample test of the formality comparison between source speech and target language production

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
S3 (High Register)	-91.807	8	.000	-.26843	-.2752	-.2617
S2 (Medium Register)	45.203	8	.000	.16332	.1550	.1717
S1 (Low Register)	89.843	8	.000	.40563	.3952	.4160

T-test shows a significant difference (p=0.000<0.05) exists between the textual formality of the source speeches and that of the target language. In the case of high-register source speech (S1), textual formality in the Chinese interpretation is lowered by 0.27, while the Chinese interpretation of S2 is more formal than the medium-register source speech by 0.16. Low-register speech (S3) witnesses the most significant rise (0.41) in the textual formality of the target language interpretation. Thus, it is concluded that textually, interpreters tend to decrease the register level of the high-register source speech while raising the register level of the low-register source speech. The medium-register source speech, mixed with informal and formal expressions and structures at the same time, sees a slight rise in register level in the interpretation version. This conclusion of register mismatch between the source speeches and interpreting output is consistent with the leveling effect proposed by Shelesinger (1989) and Wang and Hong (2011), who explains the tendency of interpreting oral texts to be more literate and literal texts to be more oral.

5.3 *Relations between parameters of register equivalence and interpreting quality*
For exploring the relations between parameters of register equivalence and interpreting quality, this study uses register levels of the source speeches as the control variable to examine the correlations between the five parameters of register equivalence in the target language output and three categories of interpreting quality.

Table 9. Variable construct

Variables	Indicators	
Independent variables	Five parameters of register equivalence in the target language	Lexical-semantic choices
		Grammatical-syntactic correspondence
		Fluency
		Intonation and voice
		Formal equivalence
Dependent variable	CI quality	Accuracy
		Expression
		Representation
Control variable	Register level of the source speeches	High
		Medium
		Low

Correlation analysis was conducted to measure the correlations between lexical-semantic choices (LexSem)/grammatical-syntactic correspondence (GraSyn)/fluency/intonation and voice (IntVoi)/formal equivalence (ForEqui) and accuracy/expression/presentation/overall interpreting quality. The results are as follows:

Table 10-1. Correlations between each parameter of register equivalence and each category of CI quality in different register levels of the source speeches

Parameters of register equivalence	Register level in the source speech	CI quality (Pearson correlation coefficient / Sig. (2-tailed))			
		Accuracy	Expression	Presentation	Overall Quality
LexSem	High	0.717*/0.030	0.701*/0.035	0.891**/0.001	0.822**/0.007
	Medium	0.864**/0.003	0.742*/0.022	0.827**/0.006	0.844**/0.004
	Low	0.707*/0.033	0.717*/0.030	0.600/0.088	0.770*/0.015
GraSyn	High	0.431/0.247	0.438/0.238	0.720*/0.029	0.583/0.100
	Medium	0.593/0.092	0.689*/0.040	0.687*/0.041	0.686*/0.041
	Low	0.321/0.400	-0.168/0.667	0.268/0.486	0.162/0.677
Fluency	High	-0.743*/0.022	-0.702*/0.035	-0.865**/0.003	-0.817**/0.007
	Medium	-0.694*/0.038	-0.942**/0.000	-0.894**/0.001	-0.883**/0.002
	Low	-0.418/0.263	-0.740*/0.023	-0.513/0.158	-0.612/0.080
IntVoi	High	0.836**/0.005	0.968**/0.000	0.885*/0.002	0.935**/0.000
	Medium	0.928**/0.000	0.885**/0.002	0.889**/0.001	0.934**/0.000
	Low	0.867**/0.002	0.778*/0.014	0.871**/0.002	0.937**/0.000
ForEqui	High	-0.299/0.434	-0.405/0.280	-0.352/0.353	-0.369/0.329
	Medium	-0.848**/0.004	-0.795**/0.010	-0.794*/0.011	-0.842**/0.004
	Low	-0.537/0.136	-0.734*/0.024	-0.479/0.192	-0.661/0.052

Whatever the register level in the source speech, lexical-semantic choices and intonation and voice exhibit a significant correlation with CI overall quality ($p<0.05$), while the rest parameters' correlation with CI overall quality is not significant at some levels of source registers. In terms of the specific quality categories, accuracy and expression have significant and high correlations with lexical-semantic choices, intonation, and voice across three register levels. Besides, presentation is highly correlated with intonation and voice, no matter whether the register is high, medium, or low.

From the perspective of register levels in the source speeches, the results exhibit that in interpreters' output for the high register source speech, lexical-semantic choices, fluency and intonation, and voice have strong correlations with each CI quality category and the overall quality. When the register of the source speech is at the medium level, all five parameters of register equivalence possess high and significant correlations with each CI quality category and the overall quality. The top three parameters are also intonation and voice, fluency, and lexical-semantic choices. When interpreting for the source speech at the low register level, participants' CI quality is strongly correlated with lexical-semantic choices and intonation and voice despite that the rest parameters do not show a significant correlation with quality.

Partial correlation analysis was also conducted to see the overall correlations across different register levels in the source speeches. And the statistics are listed below:

Table 10-2. Correlations between each parameter of register equivalence and each category of CI quality (Partial Analysis)

Parameters of register equivalence	CI quality (Pearson correlation coefficient / Sig. (2-tailed))			
	Accuracy	Expression	Presentation	Overall Quality
LexSem	0.733/0.000	0.635/0.000	0.716/0.000	0.751/0.000
GraSyn	0.306/0.128	0.115/0.576	0.339/0.091	0.282/0.163
Fluency	-0.522/0.006	-0.754/0.000	-0.777/0.000	-0.744/0.000
IntVoi	0.868/0.000	0.878/0.000	0.830/0.000	0.924/0.000
ForEqui	-0.324/0.107	-0.516/0.007	-0.306/0.129	-0.404/0.041
Control variable	Register (High, medium, and low)			

Therefore, it is concluded that intonation and voice, lexical-semantic choices, and fluency are the top three parameters of register equivalence with high correlations with CI quality.

Besides, linear regression analysis was utilized to examine the influence of each register equivalence parameter on CI overall quality (See Table 9-3).

Table 10-3. Linear regression analysis of the parameters of register equivalence on CI quality

Register level in the source speech	R^2	Adjusted R^2	Beta					F value (Sig. (2-tailed))
			L	G	Fl	I	Fo	
High	0.961	0.895	0.365	0.188	-0.043	2.782	-0.002	14.669 (0.026)
Medium	0.984	0.957	0.294	0.041	-0.438	0.086	-0.285	36.434 (0.007)
Low	0.935	0.827	-0.003	0.094	-0.149	2.454	-0.001	8.662 (0.053)

Note. "L"=lexical-semantic choices; "G"=grammatical-syntactic correspondence; "Fl" =fluency; "I"=Intonation and Voice; "Fo"=Formal equivalence.

From the regression analysis results, in all three source speeches at high, medium, and low register levels, every F-value reaches a significant level (p=0.026 and 0.007) or is very close to a significant level (low register, p=0.053), demonstrating that there is an obvious casual relation between the five parameters of register equivalence and CI quality and a multiple linear regression can be built. In addition, the coefficient of determination (R^2) and adjusted coefficient of determination (adjusted R^2) at each register level represent the high goodness of fit of the regression model.

Overall, five parameters of register equivalence are related to CI assessment categories, indicating a causal relationship between the two. Among the parameters, intonation and voice, lexical-semantic choices, and fluency have the highest correlations with CI quality.

6. Discussion
6.1 *Research question 1:*
Does register levels in the source speeches influence interpreters' CI quality?

Yes. Source speech registers do impact the quality of interpreting output, which is indicated by the finding that each quality criterion and the overall quality differ across different levels of registers in the source speeches.

6.2 *Research question 2:*
Does register mismatch between the source and target language happen? If so, how?

Yes. From the perspective of textual formality measured by Coh-Mextrix, register mismatch does happen between the source and target languages. Specifically, interpreters tend to lower the register level in the interpreting output from the high-register source speech while increasing the register level in the interpreting output from the low-register one. The medium-register source speech witnesses a slight rise in register level in the interpretation. This finding corroborates the leveling effect proposed by Shelesinger (1989) and Wang & Hong (2011), which explains the tendency of interpreting oral texts to be more literate and literal ones to be more oral.

6.3 *Research question 3:*
Which register parameter in the target language has the highest correlations with CI quality?

Lexical-semantic choices exhibit significant and high correlations with accuracy, expression, and presentation, except that in terms of the low-register speech, the coefficient is 0.6. In statistics, the absolute value of a correlation coefficient between 0.5 and 0.8 indicates a moderate correlation. Thus, across all register levels, lexical-semantic choices are an essential parameter with moderate to high correlations with CI quality. In translation and interpreting, register variations at the syntactic level in English are transferred to the lexical level in Chinese as register variation in the English language is reflected at the syntactic level, while in Chinese, register differences lie at the lexical level (Cao 2007). High- and medium-register speeches possess abundant formal or frozen words, which could often be seen in written texts. This proposes strict requirements for interpreters' lexical choice because they need to find equivalents in Chinese, which is as formal as in the source language. On the other hand, low-register speeches utilize casual words that are close to our daily conversations; if an interpreter still chooses high-register words, then a register mismatch will occur, and the interpreting quality will be compromised.

Grammatical-syntactic correspondence is not highly correlated with CI quality in high-and low-register source speeches. But it is interesting to note that this parameter shows high correlations with CI quality in source speeches at the medium register level, which is possibly attributed to the complex syntactic structure of the medium-register speech. In the speech at the medium register level, simple and complex sentences coexist with each other, and formal and informal expressions are mixed. Formal expressions have complete grammatical structures with strong logic, whereas informal expressions are sometimes not complete with loose structures. Interpreters' mind needs to jump around the two kinds of expressions, imposing some difficulties for interpreters to process.

Fluency ranks third in terms of its correlations with CI quality. The correlation coefficients are negative because disfluencies are the indicators of the parameter of fluency. Specifically, when the source speeches have a high and medium register, this parameter reveals significant and high correlations with accuracy, expression, presentation, and the overall CI quality, confirming the close relations between fluency and interpreting quality found by Yu and van Heuven (2017) and Moradkhan (2012). Fluency has a direct influence on the audience's perception of the interpreter's competence and professionalism. Especially in the high- and medium-register source speeches, speakers make few errors to maintain a smooth speech flow, and this requires interpreters to ensure fluency during interpreting to match the source register. But it seems not that important in the interpretation of the low-register source speech as the correlation coefficient reaches a moderate level. This phenomenon can be explained by the disfluency count analysis, which discovers that disfluencies occur more frequently in both high- and medium-register source speeches. This is attributed to the higher information density in the high- and medium-register source speeches than the low-register speech, causing cognitive load for the interpreters. At the same time, in order to pursue register equivalence between the two languages, it takes longer for interpreters to consider more in choosing equivalents. Therefore, uncertainty happens, and gap fillers and other disfluencies emerge. This also explains why the presentation scores decrease with the increase of register levels in the source speech. In contrast, due to lower information density and slower speaking flow in the low-register source speech, it is easier for interpreters to process information and to make the right decisions on register equivalence.

The parameter of intonation and voice has the highest and the most significant correlations with each CI quality category as well as the overall CI quality. Intonation and voice can directly unveil the register level of source speeches, and the audience can understand the speakers' purposes and attitudes through interpreters' intonation and voice. High-register speeches carry formal and solemn intonation and voice, while this parameter in low-register speeches is casual and informal. The medium register in between has semi-formal intonation and voice. Different register levels in the source speeches require interpreters to choose the equivalent intonation and voice for register match to facilitate the audience's comprehension.

Formal equivalence utilizes interpreting duration as its indicator. Based on the experiment data, formal equivalence has negative correlations with each CI quality category and the overall CI quality. The absolute value of formal equivalence's correlation coefficient with overall CI quality is at a low level. However, this parameter demonstrates significant and moderate correlations with CI quality in the medium-register and the low-register speech, respectively. The reason may be that in the medium-register speech, simple and complex grammatical structures and formal and informal expressions are mixed. Formal expressions have complete, highly logical structures, and informal expressions are disrupted to become incomplete and loosely structured. In addition, at the semi-formal register level, speakers often speak at inconstant speed, sometimes fast and sometimes slow, triggering challenges for interpreters. If limited to the original textual structures and meanings at the surface, the interpreters may cost a long time, risking CI quality decrease. Faced with formal and informal expressions, interpreters can make interpretations more concise and logical by restructuring so that interpreting duration can be shortened and quality can be increased. By comparison, high-register speech in this research is very similar to frozen style with highly formal expressions and longer and more complicated grammatical and syntactic structures. There is little freedom for interpreters to reorganize their interpretation, and they have to follow the original structure in the source speech and never miss a word. Therefore, the source speech at the high register level sees low correlations between formal equivalence and CI quality.

7. Conclusion

In this study, a source speech register analysis model is proposed. The registered level of a speech is defined by textual and situational factors. Through quantitative and qualitative analysis, register levels of source speech can be identified. Based on the model, parameters of register equivalence in the target language interpretation are divided into lexical-semantic choices, grammatical-syntactic correspondence, fluency, intonation, voice, and formal equivalence. Through the CI experiment on interpreting three English source speeches at high, medium, and low register levels, the following conclusions are drawn based on the results of the study to answer research questions:

(1) Register levels of the source English speeches do have an influence on CI quality.

(2) Register mismatch between source and target language happens because interpreters tend to lower the register of their rendering in the high-register source speech and raise the register level in the target language in the case of the low-register

speech. This corroborates Wang & Hong's (2011) discovery that the degree of orality is reduced by CI from a less formal source text, whereas CI mitigates the degree of literateness in a more formal source text. Stepping further, this study finds out that in terms of medium-register speech, interpreters also increase the register level in the target language but less significantly than in the low-register speech that witnesses the most significant register mismatch.

(3) Lexical-semantic choices, grammatical-syntactic correspondence, fluency, intonation, and voice and formal equivalence all contribute to CI quality, and a regression model is established. The top 3 parameters that have the highest correlations with CI quality are intonation and voice, fluency, and lexical-semantic choices.

Given the close relations register parameters have with CI quality, this study suggests that interpreting pedagogy should focus on the register aspect of interpreting and raise student interpreters' register awareness. Yang (2005) believed that interpreting teaching and exercising materials should not be only limited to frozen written scripts. Instead, the materials should come from real-life situations, and student interpreters need to be exposed to various speeches across all levels of the register to prepare them for their future careers in the market.

Although this study reveals a great role of register equivalence in interpreting quality assessment, the investigation is still a pilot study and confined to E-C consecutive interpreting of student interpreters. However, it is hoped that the above-mentioned suggestions can be a starting point for registered awareness to be embedded into interpreting teaching and for further observation and experimental research.

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